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UNIT 1: - INFORMATION TECHNOLOGY

INTRODUCTION TO INFORMATION TECHNOLOGY

21st century has come to be known as the era of Information Technology; it is the key driver of economic growth of not only a nation, but rather the whole world.

The growth and progress of every sector of the country today depends on the level of Information Technology.

Furthermore, technology is not important only at the work place, but also in our everyday life; whether it is working with the microwave oven which is a cooking appliance or a super computer, an appliance is based on information technology, technology helps everywhere.

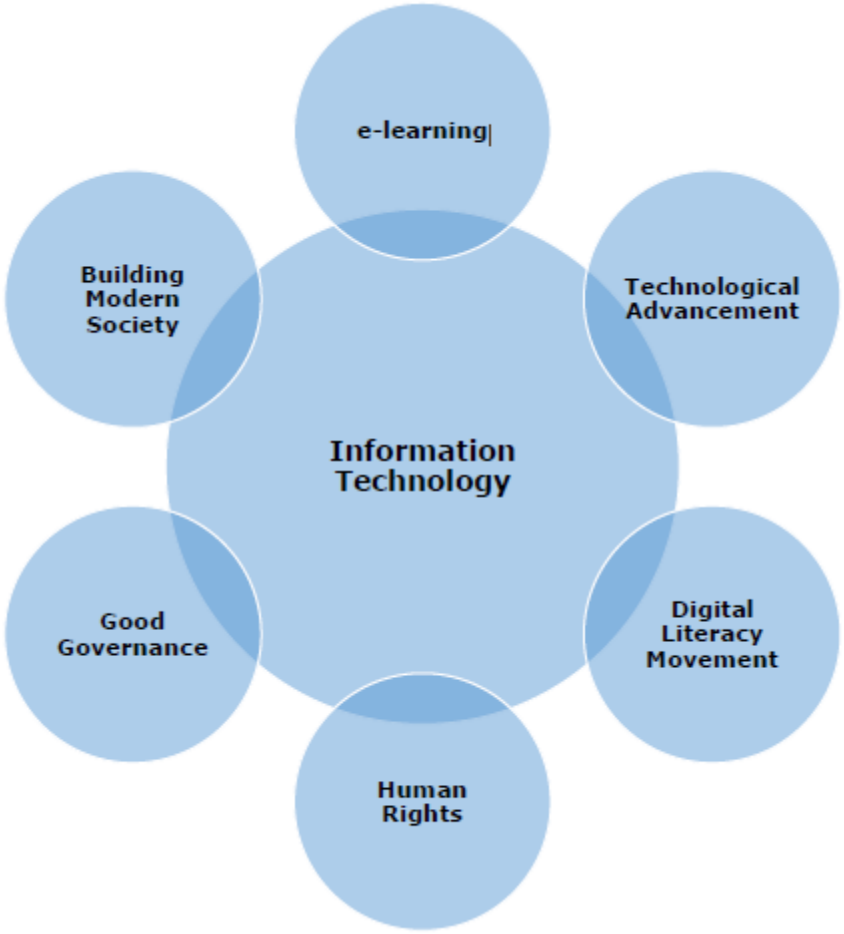
From hi-tech industry to an education system, Information Technology footprints can be seen everywhere.

Likewise, Information Technology is one of the essential features for the overall development of a country.

Meaning of Information Technology

The technology, which is exclusively designed to store, process, and transmit information, is known as Information Technology.

The following diagram illustrates the basic features and applications of Information Technology −



Though the diagram given above is not inclusive, as it does not include every aspect and application of information technology, but it comprehensively covers the major aspects.

Important Features of Information Technology

Following are the major features as well as advantages of Information Technology −

- The development of Information Technology has made education system simpler, easier, and widespread. Now, people of remote areas can also use technology for their children's education and also avail the benefits of adult education.
- Diffusion of e-governance on a large scale.
- Participation of public in governance and policy making.
- Fast economic development.
- Development of remote areas.
- Technology helps the police in nabbing the criminals.
- The judiciary and other administrative services can also take the help of technology to make work easier and faster.
- Highly beneficial for the common people, as they can access their rights and can take legal action against the person who violates his/her rights.
- It increases the happiness and prosperity of not only an individual, but rather the society as a whole.

Besides, there are many other advantages too that can be availed in our everyday life only with the further development of information technology.

Demerits of Information Technology

Information Technology is like a boon on the society. However, it comes with its own disadvantages −

- As discussed above, with the help of technology, police can arrest criminals and criminal activities; at the same time, technology has also opened the door for criminals as well to practice smart criminal activity.
- There are chances that children can misuse technology and take a wrong path.
- Some distorted and perverted minds use technology to demean or defame someone unethically and also illegally.
- These are basically not demerits but rather the misuse of technology.

Information Technology Act, 2000

By understanding the growing demand and applications of Information Technology, the Government of India passed the bill of Information Technology in 2000, which came to be known as the Information Technology Act, 2000.

The major features of the Act are −

- It facilitates e-governance and e-commerce by providing equal legal treatment to users.
- It made provision to accept electronic records and digital signature.
- It gave legal approval to electronic business transactions.
- The Act instructs banks to maintain electronic record and facilitate electronic fund transfer.

It also sets up a Cyber Law Appellate Tribunal

IMPACT OF INFORMATION TECHNOLOGY ON BUSINESS ORGANISATIONS:

Technology provides a wide range of tools entrepreneurs can use to guide their new companies through the start-up and growth stages. Business accounting, marketing and communication have been revolutionized by advances in computer, network and communications technology, and businesses in a range of industries Business have to continually adapt to take full advantage of technological developments.

The impacts are:

1. BUSINESS MANAGEMENT

- There is a never-ending demand to make electronic goods smaller, faster, cheaper, and more powerful.
- They can store thousands of files electronically, saving time and office space.

2. BUSINESS EMPLOYMENT

- VIRTUAL BUSINESS- The ease of doing business online has created a boom in new businesses, or start-ups.
- New business opportunities like e-commerce including websites, blogs, online marketing, e-tutorials are creating self-employment for people.
- New jobs like online content writer, web page designer etc are in demand.

3. BUSINESS COMMUNICATION

- It has become faster using e-mail, social media technology.
- It has become more deliberate.
- It reaches global masses.

4.EDUCATION

- The technology available today has made a wealth of knowledge available to students, which offers great potential for the speed and style of learning.
- Information is presented in so many ways that any type learner, whether gifted or disabled, can find and use the necessary material.
- With e-learning the information on the Internet is available for all who have access, without discrimination.

FUTURE OF IT:

- Digitization has transformed the business world. Digital tools are now ubiquitous in all aspects of commerce, from business processes to services and transactions, and one engine is driving the change: information technology.

- Today's companies not only rely on information technology, they can't compete without it. IT is integrated into products, it pulls priceless information from customer data, and it is the force behind online shopping.
- As digital becomes even more prevalent, the demand for IT will continue to rise, which in turn will place a heavier burden on IT organizations. Driven by the further digitization of business and increasing market competition, IT is becoming even more indispensable.

SOME OF THE TRENDS OF IT THAT WILL BE MASSIVELY USED IN FUTURE ARE

1. ONLINE TV

- It allows the users to choose the program or the TV show they want to watch from an archive of programs or from a channel directory.
- YouTube and other online video sharing sites have almost killed Television.
- The new generations prefer Internet over TV channels. It has become very popular with services such as RTÉ Player and Revision3.

2. CAREER TRENDS

- IT CONSULTANT: As CNN mentioned, everyone from local startups to the Fortune 500 companies need IT consultants to help them figure out the cheapest and fastest ways to run computers better. It also ranked number 13th on CNN's most recent Best Jobs in America list.
- Mobile/Web application developer: Hot in demand due to the internet and technology boom. Moreover, these developers are employed across every industry sector as there are needs in both commercial and non-commercial organizations to have a web page for selling or for the purpose of communication.

3. CLOUD COMPUTING:

- It is the practice of using a network of remote servers hosted on the Internet to store, manage, and process data, rather than a local server or a personal computer.
- Cloud computing and storage solutions provide users and enterprises with various capabilities to store and process their data in third-party data centers.
- Cost reductions claimed by cloud providers. A public-cloud delivery model converts capital expenditure to operational expenditure.

4. MOBILE APPLICATION

- Another emerging trend within information technology is mobile applications (software application on Smart phone, tablet, etc.)
- Mobile application or mobile app has become a success since its introduction. They are designed to run on Smartphone, tablets and other mobile devices.
- They are available as a download from various mobile operating systems like Apple, Blackberry, Nokia, etc. Some of the mobile app are available free where as some involve download cost.
- The revenue collected is shared between app distributor and app developer.

5. USER INTERFACES

- User interface has undergone a revolution since introduction of touch screen.
- The touch screen capability has revolutionized way end users interact with application.
- Touch screen enables the user to directly interact with what is displayed and also removes any intermediate hand-held device like the mouse.
- Touch screen capability is utilized in smart phones, tablet, information kiosks and other information appliances.

6. 3D Printing

- One place where technology's role as a catalyst for innovation is particularly evident is 3D printing.
- According to tech research company Gartner, we are in the beginnings of a "Digital Industrial Revolution" that threatens to reshape how physical goods are created and 3D printing is at the heart of it."
- In future this trend will be in boom.

Infrastructure (IT infrastructure)

Infrastructure is the foundation or framework that supports a system or organization. In computing, information technology infrastructure is composed of physical and virtual resources that support the flow, storage, processing and analysis of data. Infrastructure may be centralized within a data center, or it may be decentralized and spread across several data centers that are either controlled by the organization or by a third party, such as a colocation facility or cloud provider.

Infrastructure components
Data center infrastructure often includes the power, cooling and building elements necessary to support data center hardware. The data center hardware infrastructure usually involves servers; storage subsystems; networking devices, like switches, routers and physical cabling; and dedicated network appliances, such as network firewalls.

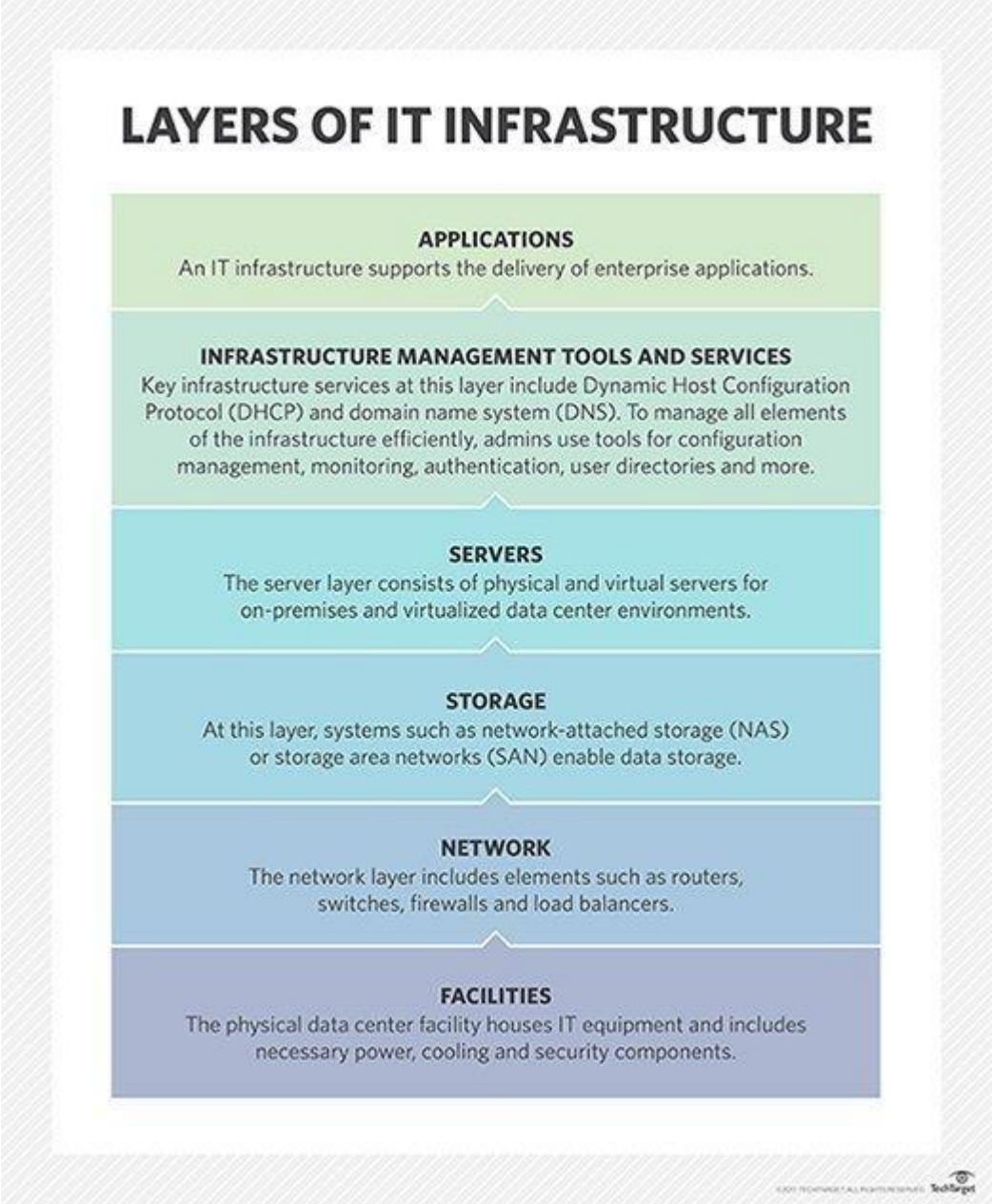
A data center infrastructure also requires careful consideration of IT infrastructure security. This can include physical security for the building, such as electronic key entry, constant video and human surveillance of the premises, carefully controlled access to the server and storage spaces, and so on. This ensures only authorized personnel can access the data center hardware infrastructure and reduces the potential for malicious damage or data theft.

Outside of the data center is an internet infrastructure, which includes transmission media, such as fiber optic cables, satellites, microwave -- line of sight -- antennas, routers, aggregators, repeaters, load balancers and other network components that control

transmission paths. Internet infrastructures are designed, built and operated by internet service providers (ISPs), such as Verizon and AT&T. When a business engages an ISP for internet access, the ISP typically ties into the data center infrastructure within a dedicated and secured building space.

The role of cloud computing is changing the way infrastructures are designed and implemented. Where traditional, business-owned data centers are private, capital-intensive resources, cloud computing enables organizations to access a cloud provider's data center infrastructure and services for a fee. This infrastructure-as-a-service (IaaS) model allows flexible computing on demand. Users can invoke a cloud provider's compute, storage and services without the need to deploy those resources locally -- and adjust cloud infrastructure usage as workload needs change.

The software-as-a-service (SaaS) model offers similar benefits for specific workloads. A third-party provider hosts hardware, software, servers, storage and other infrastructure components, and it allows users to access the provider's hosted workloads instead of deploying and maintaining those workloads locally. For example, users can employ SaaS workloads for databases, HR applications, analytical applications, office productivity suites and many others.



How infrastructures are created

To create a traditional data center infrastructure, organizations typically follow a formalized process that starts by analyzing and accessing business goals, making architectural and design decisions, building and implementing the design, and then optimizing and maintaining the infrastructure. The process usually involves detailed expertise, including data center building design, subsystem and component selection, and quality construction techniques.

However, the way IT infrastructures are created is continually changing. Traditional heterogeneous infrastructure development is a highly manual process that requires enormous

integration, optimization and systems management efforts -- especially when integrating servers, storage, network and other components from diverse vendors.

Today, some vendors provide pre integrated and preoptimized collections of compute, storage and network equipment that optimize the IT hardware and virtualization platform into a single system that can be deployed, expanded and managed easily. This modular approach is called converged infrastructure (CI). This notion has advanced into single-vendor systems that offer even tighter integration and management over compute, storage, network and virtualization. This advanced approach is called hyper-converged infrastructure (HCI).

Infrastructure management

Regardless of how it is created, an IT infrastructure must provide a suitable platform for all the necessary IT applications and functions an organization or individual requires. This means the design and implementation of any IT infrastructure must also support efficient infrastructure management. Software tools must allow IT administrators to view the infrastructure as a single entity, as well as access and configure granular operating details of any device in the infrastructure. This single-pane-of-glass objective results in more effective and efficient infrastructure management. Solid management also allows admins to optimize resources for different workloads, and to more readily understand and handle the impact of any changes on interrelated resources.

Infrastructure management is often divided into multiple categories. For example, a building management system (BMS) provides the tools that report on data center facilities parameters, including power usage and efficiency, temperature and cooling operation, and physical security activities. Systems management includes the wide range of tool sets an IT team uses to configure and manage servers, storage and network devices. Increasingly, systems management tools are extending to support remote data centers, along with private and public cloud resources. Management tools are also making extensive use of automation and orchestration to improve efficiency, reduce errors and comply with established best practices or business objectives.

Types of infrastructures

As business needs and available technologies advance, organizations can use a more diverse assortment of data center infrastructure types to meet business goals. While these infrastructure types are not necessarily mutually exclusive, they are rarely discussed together.

- An immutable infrastructure is an approach to managing services and software deployments on IT resources wherein components are replaced, rather than changed. An application or service is effectively redeployed each time any change occurs. For example, a patch or hotfix might update a conventional app, but an immutable

infrastructure does not support this. Instead, IT deploys the newer app, redirects traffic to it and retires the old app.

- A composable infrastructure is a framework that treats physical compute, storage and network fabric resources as services. Resources are logically pooled, so administrators don't have to physically configure hardware to support a specific software application. Admins can organize and manage the resources through software tools using a high level of automation and orchestration, enabling software-defined infrastructure capabilities for the data center.

- A dynamic infrastructure is a framework that can automatically provision and adjust itself as workload demands change. This minimizes the time and effort needed to manage the infrastructure and vastly reduces errors, while ensuring resources are used as efficiently as possible. IT administrators can also choose to manage these resources manually.

- A critical infrastructure is a framework for which assets are so essential that their continued operation is required to ensure the security of a given nation, its economy and the public's health and safety. The concepts surrounding high availability (HA) and resilience are essential here, often including remote data centers and cloud resources to support workload redundancy.

- A contact-center infrastructure is a framework composed of the physical and virtual resources that a call-center facility needs to operate effectively. Infrastructure components include automatic call distributors, integrated voice response units, computer-telephony integration and queue management.

- A cloud infrastructure includes an abstraction layer that virtualizes resources and logically presents them to users over the internet through application program interfaces and API-enabled command-line or graphical interfaces. Additional capabilities include user self-service, automated billing or chargeback, and user-side reporting, so users can see the resources and services they deploy, as well as corresponding costs. Similarly, a cloud storage infrastructure is a framework composed of hardware and software that supports the computing requirements of a private or public cloud storage service.

- A dark infrastructure is the part of a framework that is composed of undocumented, but active, software or services whose existence and function is unknown to system administrators -- despite the fact it may be integral to the continued operation of documented infrastructure. This is often referred to as shadow IT, and it can become a serious security or compliance vulnerability for the organization.

DESIGN ISSUES WITH IT ORGANISATIONS

BIG DESIGN UP FRONT

Large organizations have a number of challenges which often seem as though they can be solved by the concept of big design up front. Executives want to know when they will be able to see a return on their investment. Marketing and sales teams want clear deadlines so that they can begin to share information with customers about new features. Engineering management want to be able to plan what will be developed with project management groups. Operations teams need to be able to plan and purchase needed hardware to support these new products.

It is exactly these pressures which cause companies to attempt to design every facet of their software as early in the process as possible. Big design up front is the process of trying to architect and plan everything in a project before ever writing a line of code. Often big design up front will lead to long schedules filled with development tasks which take a product down the wrong path and do not leave room for an organization to learn from their customers as development proceeds. Big design up front may alleviate the initial pressures of development by creating schedules, but it will also often lead to product failure.

Obviously companies cannot just ignore these initial project pressures. The solution to these pressures is to adopt a goal to deploy to real users early in the development process and often after an initial release. At Hewlett Packard, on a consumer facing project, we made a goal to release to a small set of customers in the first week, and weekly after that. By doing so, everyone in the organization could plan and prepare for constant customer interaction. Additionally, the company was able to receive customer feedback early and pivot quickly as it saw areas of innovation. This sort of goal, as opposed to big design up front, leads to quick and consistent success.

NOT QUITE AGILE

Many organizations I work with call themselves agile. However, when pressed to discuss what agile methods they follow companies will stammer out an explanation that we in the Agile community call “Scrum But”. “We are scrum but we don’t have stand ups,” “… but we don’t write user stories,” “… but we don’t demo to stakeholders”. This list can get quite long and before long the organization is not so agile at all.
Large organizations need to understand the agile mindset now more than ever before. Agile states that an organization should value:
● individuals and interactions over process and tools
● working software over comprehensive documentation
● customer collaboration over contract negotiation
● responding to change over following a plan
Large businesses know that agile is important but they fall into the pit of “Scrum But” when they forget the real tenets of agile. Companies need to remember that agile is not scrum. But the rules of scrum, as well as extreme programming, lean, kanban, and many other so called “Agile Methodologies,” if adhered to, will help an organization to follow the four truly agile principles**.**

TOO MANY MEETINGS NOT ENOUGH ACTION

Large organizations often complain of communications issues. With dozens of levels of employee and management between the software producers and the executive teams it is easy to see how communications can become problematic. Most people within organizations have an honest desire to communicate status, changes, and issues to both their supervisors and their subordinates. However, this honest desire to communicate generally leads to a crippling number of meetings. These meetings often hamper the amount of work a team can complete. Organizations in recent years have turned to agile practices in an attempt to alleviate these meeting needs while still keeping communication channels open. This is a good tactic as long as it is kept in check. All too often companies allow agile to become a reason for more meetings. Daily stand ups turn into multiple hour status sessions. Sprint planning can turn into multiple day marathons. When agile methods are not kept in check, they are not agile at all.
When agile is used correctly it can reduce the meetings and increase communication. An organization must work to have an effective backlog and to make sure all of the stakeholders in an organization have access to the list. A prioritized backlog can tell stakeholders, even at the executive levels, more in a few minutes about development efforts than weeks’ worth of meetings. Additionally, companies must be diligent in keeping their agile meetings agile. Stand ups must be kept to 15 minutes of less. Sprint planning should be under an hour. Other meetings should be kept to a minimum or eliminated. By keeping a prioritized backlog and keeping agile meetings agile, organizations will see engineers complete more software development and meet less.

A LACK OF DEVOPS AND AUTOMATION

Whenever I start a new engagement, I always ask how the company deploys its software. Often the company will complain of the long and arduous process of moving their code from environment to environment. The process usually involves a myriad of manual steps and is quite error prone. The longer and more error prone the process is, the longer the organization will wait between releases. This is not good for the development process nor for an organizations bottom line.

This is why DevOps and automation is so important. DevOps is the intersection between development and operations teams. Before the DevOps movement engineers working on products would complete features and then "toss" the code over to operations for deployment. Operations would then try to replicate a development like environment on production hardware, deploy the code, and debug any production issues. This method of deployment is ineffective and expensive.

By implementing a DevOps strategy which includes the automation of both the server configuration as well as software deployment organizations can speed up the deployment of their software. Product engineers must help in the process of automating these steps. Companies can no longer tolerate an internal atmosphere where product engineers create software in a vacuum and then toss the results over the fence to operations. As product engineers plan their development activities, they must add tasks to automate and test deployment strategies.

REBUILD OR HAND ON TOO HARD

Large organizations can on occasion fall prey to their own success. Unlike bootstrapped or venture backed start ups, large organizations often have the capital needed to invest in very large software projects. These projects do occasionally go awry. When that happens companies will either decide to rebuild or hang on and keep trudging forward with their software development. Depending on the circumstances these scenarios can be detrimental to the company and the development teams.

When a large software project starts to have huge problems is may seem like the best plan is to rebuild the project from scratch. This stems from the nearly universal good feelings that come at the beginning of a project. Tasks complete quickly and progress often is fast in the early project stages. But if there is a problem in an initial project it will be exacerbated in a rebuild project.

Similarly, companies in distress will sometimes try to hang on to a failing project. They do not want to lose the perceived value, and cash, they have already put into a project so they trudge forward hoping things will get better. Again, when a project has issued this desire to trudge forward, throwing good money after bad, will exacerbate the issues.

The answer to these issues is not to rebuild from scratch or trudge forward blindly but to find the underlying issue in the project and eliminate it. Often the project is having issues because of ill defined requirements. At other times simple processes are being made overly complex. It is also not uncommon for a project to no longer be of value to the organization. It is better to understand the underlying needs and address them than to blindly rebuild or hang on.

WHERE DO WE GO FROM HERE?

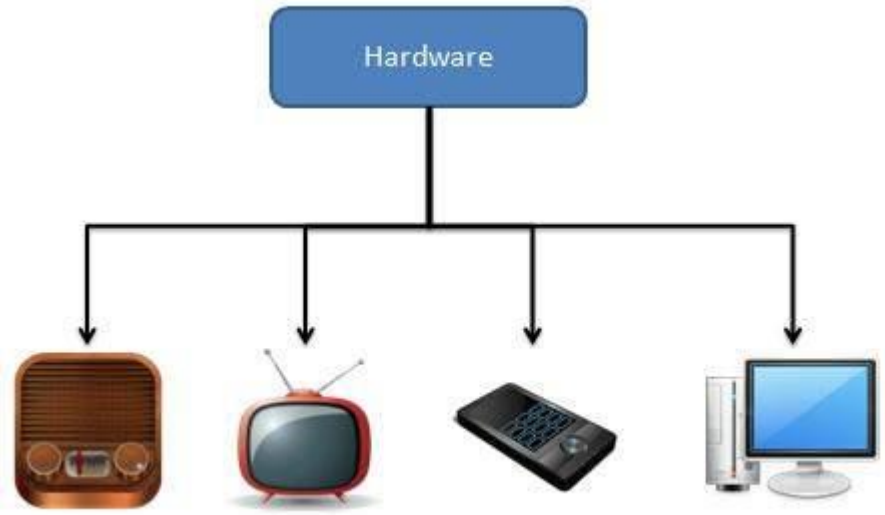
Large organizations are obviously not immune to issues when it comes to IT. Unlike smaller businesses, large organizations have a huge number of employees, levels of management, high budgets and budget constraints, and rules and regulations to follow. When we look over these issues that have been presented, it can be seen that they creep in because of the unique environment that are within these large organizations. However, by following good principles such as true agile methodologies, keeping communications in check, automating, and making solid businesses decisions when issues arise, we can overcome problems within our large organization IT departments.

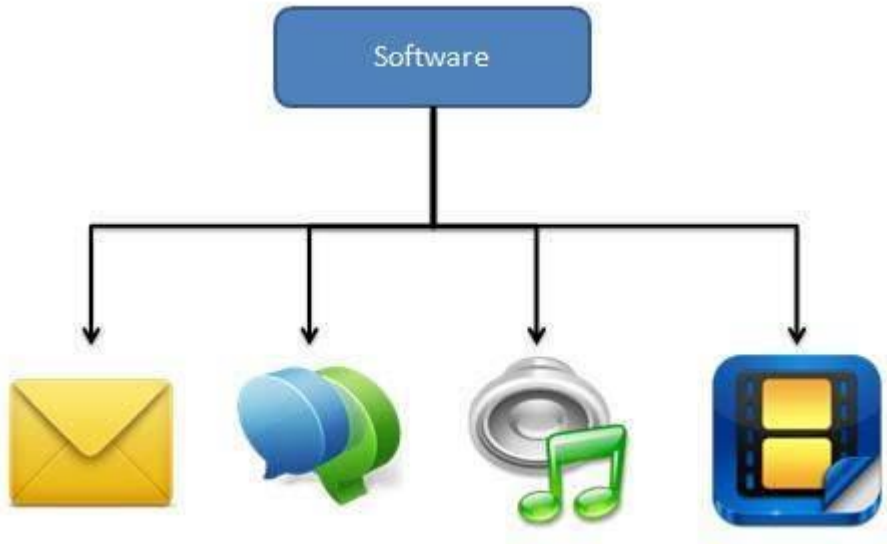
UNIT 2: --MULTIMEDIA AND HTML

Definition of Multimedia

By definition Multimedia is a representation of information in an attractive and interactive manner with the use of a combination of text, audio, video, graphics and animation. In other words, we can say that Multimedia is a computerized method of presenting information combining textual data, audio, visuals (video), graphics and animations. For examples: E-Mail, Yahoo Messenger, Video Conferencing, and Multimedia Message Service (MMS).

Multimedia as name suggests is the combination of Multi and Media that is many types of media (hardware/software) used for communication of information.





Components of Multimedia:

Following are the common components of multimedia:

- **Text**- All multimedia productions contain some amount of text. The text can have various types of fonts and sizes to suit the profession presentation of the multimedia software.
- **Graphics**- Graphics make the multimedia application attractive. In many cases people do not like reading large amount of textual matter on the screen. Therefore, graphics are used more often than text to explain a concept, present background information etc. There are two types of Graphics:
    - **Bitmap images**- Bitmap images are real images that can be captured from devices such as digital cameras or scanners. Generally bitmap images are not editable. Bitmap images require a large amount of memory.
    - **Vector Graphics**- Vector graphics are drawn on the computer and only require a small amount of memory. These graphics are editable.
- **Audio**- A multimedia application may require the use of speech, music and sound effects. These are called audio or sound element of multimedia.Speech is also a perfect way for teaching. Audio are of analog and digital types. Analog audio or sound refers to the original sound signal. Computer stores the sound in digital form. Therefore, the sound used in multimedia application is digital audio.
- **Video**- The term video refers to the moving picture, accompanied by sound such as a picture in television. Video element of multimedia application gives a lot of information in small duration of time. Digital video is useful in multimedia application for showing real life objects. Video have highest performance demand on the computer memory and on the bandwidth if placed on the internet. Digital video files can be stored like any other files in the computer and the quality of the video can still be maintained. The digital video files can be transferred within a computer network. The digital video clips can be edited easily.

- **Animation**- Animation is a process of making a static image look like it is moving. An animation is just a continuous series of still images that are displayed in a sequence. The animation can be used effectively for attracting attention. Animation also makes a presentation light and attractive. Animation is very popular in multimedia application

Applications of Multimedia

Following are the common areas of applications of multimedia.

- **Multimedia in Business**- Multimedia can be used in many applications in a business. The multimedia technology along with communication technology has opened the door for information of global wok groups. Today the team members may be working anywhere and can work for various companies. Thus the work place will become global. The multimedia network should support the following facilities:
    - Voice Mail
    - Electronic Mail
    - Multimedia based FAX
    - Office Needs
    - Employee Training
    - Sales and Other types of Group Presentation
    - Records Management
- **Multimedia in Marketing and Advertising**- By using multimedia marketing of new products can be greatly enhanced. Multimedia boost communication on an affordable cost opened the way for the marketing and advertising personnel. Presentation that have flying banners, video transitions, animations, and sound effects are some of the elements used in composing a multimedia based advertisement to appeal to the consumer in a way never used before and promote the sale of the products.
- **Multimedia in Entertainment**- By using multimedia marketing of new products can be greatly enhanced. Multimedia boost communication on an affordable cost opened the way for the marketing and advertising personnel. Presentation that have flying banners, video transitions, animations, and sound effects are some of the elements used in composing a multimedia based advertisement to appeal to the consumer in a way never used before and promote the sale of the products.
- **Multimedia in Education**- Many computer games with focus on education are now available. Consider an example of an educational game which plays various rhymes for kids. The child can paint the pictures, increase reduce size of various objects etc apart from just playing the rhymes.Several other multimedia packages are available in the market which provide a lot of detailed information and playing capabilities to kids.
- **Multimedia in Bank**- Bank is another public place where multimedia is finding more and more application in recent times. People go to bank to open saving/current accounts, deposit funds, withdraw money, know various financial schemes of the bank, obtain loans etc. Every bank has a lot of information which it wants to impart to in customers. For this purpose, it can use multimedia in many ways. Bank also displays information about its various schemes on a PC monitor placed in the rest area for customers. Today on-line and internet banking have become very popular. These use

multimedia extensively. Multimedia is thus helping banks give service to their customers and also in educating them about banks attractive finance schemes.

- **Multimedia in Hospital**- Multimedia best use in hospitals is for real time monitoring of conditions of patients in critical illness or accident. The conditions are displayed continuously on a computer screen and can alert the doctor/nurse on duty if any changes are observed on the screen. Multimedia makes it possible to consult a surgeon or an expert who can watch an ongoing surgery line on his PC monitor and give online advice at any crucial juncture.

  In hospitals multimedia can also be used to diagnose an illness with CD-ROMs/ Cassettes/ DVDs full of multimedia based information about various diseases and their treatment.Some hospitals extensively use multimedia presentations in training their junior staff of doctors and nurses. Multimedia displays are now extensively used during critical surgeries.

- **Multimedia Pedagogues**- Pedagogues are useful teaching aids only if they stimulate and motivate the students. The audio-visual support to a pedagogue can actually help in doing so. A multimedia tutor can provide multiple numbers of challenges to the student to stimulate his interest in a topic. The instruction provided by pedagogue have moved beyond providing only button level control to intelligent simulations, dynamic creation of links, composition and collaboration and system testing of the user interactions.

- **Communication Technology and Multimedia Services**- The advancement of high computing abilities, communication ways and relevant standards has started the beginning of an era where you will be provided with multimedia facilities at home. These services may include:

  - Basic Television Services
  - Interactive entertainment
  - Digital Audio
  - Video on demand
  - Home shopping
  - Financial Transactions
  - Interactive multiplayer or single player games
  - Digital multimedia libraries
  - E-Newspapers, e-magazines

HTML (HYPER TEXT MARKUP LANGUAGE):

HTML | Basics

HTML stands for **H**yper**t**ext **M**arkup **L**anguage, and it is the most widely used language to write Web Pages.

- **Hypertext** refers to the way in which Web pages (HTML documents) are linked together. Thus, the link available on a webpage is called Hypertext.
- As its name suggests, HTML is a **Markup Language** which means you use HTML to simply "mark-up" a text document with tags that tell a Web browser how to structure it to display.

Originally, HTML was developed with the intent of defining the structure of documents like headings, paragraphs, lists, and so forth to facilitate the sharing of scientific information between researchers.

Now, HTML is being widely used to format web pages with the help of different tags available in HTML language.

Basic HTML Document

In its simplest form, following is an example of an HTML document −

```
<!DOCTYPE html>
<html>

  <head>
    <title>This is document title</title>
  </head>

  <body>
    <h1>This is a heading</h1>
    <p>Document content goes here.....</p>
  </body>

</html>
```

HTML Tags:

As told earlier, HTML is a markup language and makes use of various tags to format the content. These tags are enclosed within angle braces **<Tag Name>**. Except few tags, most of the tags have their corresponding closing tags. For example, **<html>** has its closing tag **</html>** and **<body>** tag has its closing tag **</body>** tag etc.

Above example of HTML document uses the following tags −

Sr .No	Tag & Description
1	**<!DOCTYPE...>** This tag defines the document type and HTML version.
2	**<html>**

	This tag encloses the complete HTML document and mainly comprises of document header which is represented by <head>...</head> and document body which is represented by <body>...</body> tags.
3	**<head>** This tag represents the document's header which can keep other HTML tags like <title>, <link> etc.
4	**<title>** The <title> tag is used inside the <head> tag to mention the document title.
5	**<body>** This tag represents the document's body which keeps other HTML tags like <h1>, , <p> etc.
6	**<h1>** This tag represents the heading.
7	**<p>** This tag represents a paragraph.

To learn HTML, you will need to study various tags and understand how they behave, while formatting a textual document. Learning HTML is simple as users have to learn the usage of different tags in order to format the text or images to make a beautiful webpage.

World Wide Web Consortium (W3C) recommends to use lowercase tags starting from HTML 4.

HTML Document Structure:

A typical HTML document will have the following structure −

```
<html>

  <head>
    Document header related tags
  </head>

  <body>
    Document body related tags
  </body>

</html>
```

We will study all the header and body tags in subsequent chapters, but for now let's see what is document declaration tag.

The <!DOCTYPE> Declaration

The <!DOCTYPE> declaration tag is used by the web browser to understand the version of the HTML used in the document. Current version of HTML is 5 and it makes use of the following declaration −

```
<!DOCTYPE html>
```

There are many other declaration types which can be used in HTML document depending on what version of HTML is being used. We will see more details on this while discussing <!DOCTYPE...> tag along with other HTML tags.

Basic HTML Document

Below mentioned are the basic HTML tags which divides the whole document into various parts like head, body etc.

- Every HTML document begins with a HTML document tag. Although this is not mandatory but it is a good convention to start the document with this below mentioned tag:
  ```
  <!DOCTYPE html>
  ```
- **<html>**: Every HTML code must be enclosed between basic HTML tags. It begins with **<html>** and ends with **</html>** tag.
- **<head>**: The head tag comes next which contains all the header information of the web page or document like the title of the page and other miscellaneous information. These information's are enclosed within head tag which opens with **<head>** and ends with **</head>**. The contents will of this tag will be explained in the later sections of course.
- **<title>:** We can mention the title of a web page using the **<title>** tag. This is a header information and hence mentioned within the header tags. The tag begins with **<title>** and ends with **</title>**
- **<body>:** Next step is the most important of all the tags we have learned so far. The body tag contains the actual body of the page which will be visible to all the users. This opens with **<body>** and ends with **</body>**. Every content enclosed within this tag will be shown on the web page be it writings or images or audios or videos or even links. We will see later in the section how using various tags we may insert mentioned contents into our web pages.

The whole pattern of the code will look something like this:

Filter-none

brightness_4

```
<html>

<head>
```

```
    <!-- Information about the page -->

    <!--This is the comment tag-->

    <title>TUTORIAL</title>

</head>

<body>

    <!--Contents of the webpage-->

</body>

</html>
```

This code won't display anything. It just shows the basic pattern of how to write the HTML code and will name the title of the page as *TUTORIAL*. <! – – comment here – – > is the comment tag in HTML and it doesn't reads the line present inside this tag.

HTML Headings:

These tags help us to give headings to the content of a webpage. These tags are mainly written inside the body tag. HTML provides us with six heading tags from **<h1>** to **<h6>**. Every tag displays the heading in a different style and font size.

Example:
filter_none

edit
play_arrow
brightness_4
```
<html>

<head>

    <title>GeeksforGeeks</title>

</head>

<body>

    <h1>Hello GeeksforGeeks</h1>

    <h2>Hello GeeksforGeeks</h2>

    <h3>Hello GeeksforGeeks</h3>

    <h4>Hello GeeksforGeeks</h4>

    <h5>Hello GeeksforGeeks</h5>
```

```
    <h6>Hello GeeksforGeeks</h6>
</body>
</html>
```

Output:

HTML Paragraph

These tags help us to write paragraph statements in a webpage. They start with the **<p>** tag and ends with **<p>**. Here the **
** tag is used to break line and acts as a carriage return. **
** is an empty tag.

Example:

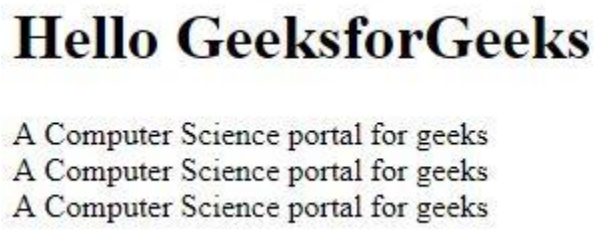
filter_none

edit
play_arrow
brightness_4

```
<html>
<head>
    <title>GeeksforGeeks</title>
</head>
<body>
    <h1>Hello GeeksforGeeks</h1>
    <p>
    A Computer Science portal for geeks<br>
    A Computer Science portal for geeks<br>
```

```
    A Computer Science portal for geeks<br>

    </p>

</body>

</html>
```

Output:



HTML Horizontal Lines

The **<hr>** tag is used to break the page into various parts, creating horizontal margins with help of a horizontal line running from left to right hand side of the page. This is also an empty tag and doesn't take any additional statements.
Example:

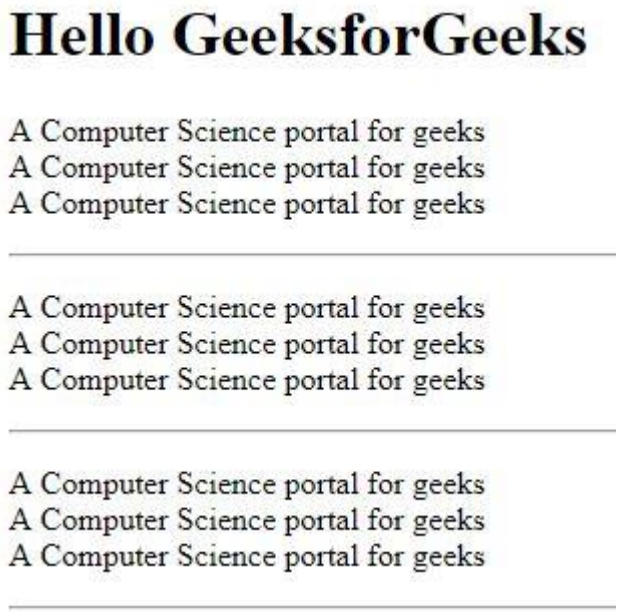
filter_none

edit
play_arrow
brightness_4

```
<html>

<head>

    <title>GeeksforGeeks</title>

</head>

<body>

    <h1>Hello GeeksforGeeks</h1>

    <p>

    A Computer Science portal for geeks<br>

    A Computer Science portal for geeks<br>

    A Computer Science portal for geeks<br>

    </p>

    <hr>
```

```
    <p>
    A Computer Science portal for geeks<br>
    A Computer Science portal for geeks<br>
    A Computer Science portal for geeks<br>
    </p>
    <hr>
    <p>
    A Computer Science portal for geeks<br>
    A Computer Science portal for geeks<br>
    A Computer Science portal for geeks<br>
    </p>
    <hr>
</body>
</html>
```

Output:



HTML Images

The image tag is used to insert an image into our web page. The source of the image to be inserted is put inside the **<img src="*source_of_image*">** tag.
Example:

filter_none

edit
play_arrow
brightness_4

```
<html>

<head>

    <title>GeeksforGeeks</title>

</head>

<body>

    <img src="https://media.geeksforgeeks.org/wp-content/cdn-uploads/Geek_logi_-low_res.png">

</body>

</html>
```

Output:

There are also various other tags in HTML to insert links, audios and various other formatting tags that we will be learning in the later sections.

How to Insert Hyperlink in HTML Page:

With HTML, easily add hyperlinks to any HTML page. Link team page, about page, or even a test by creating it a hyperlink. You can also create a hyperlink for an external website. To make a hyperlink in an HTML page, use the <a> and tags, which are the tags used to define the links.

The <a> tag indicates where the hyperlink starts and the tag indicates where it ends. Whatever text gets added inside these tags, will work as a hyperlink. Add the URL for the link in the . Just keep in mind that you should use the <a>… tags inside <body>…</body> tags.

You can try to run the following code to insert a hyperlink in an HTML page

Example

```
<!DOCTYPE html>
```

```
<html>
  <head>
    <title>HTML Hyperlinks</title>
  </head>

  <body>
    <h1>Company</h1>
    <p>
      We're a <a href="/about/about_team.htm">team</a> of professionals working
      hard to provide free learning content.
    </p>
  </body>
</html>
```

UNIT: -3 WEB DESIGN AND TECHNOLOGY

REQUIREMENTS OF INTELLIGENT (responsive) WEBSITES

Mobile internet usage is growing at a steady pace, so much so that it is expected to overtake desktop browsing as early as 2016. It means that it has become more than necessary for website owners to think about channelizing their work into designing mobile friendly, handheld device compliant websites.

What is a Responsive Website?

A responsive website, simply improves the viewing experience; it fits into any device irrespective of resolution. It means a responsive website virtually fits into any device that uses a web browser. Other than being compatible with a unique variety of resolutions, a responsive website works flawlessly across a range of devices, including smartphones, tablets and smartphones.

Why you need to consider a Responsive Website?

No more abandoned checkout at online stores and cluttered viewing experience. With a website fast and responsive you can load it effortlessly. Smartphones can be a great device for viewing websites but when it comes to legibly search out data or filling out information on a website, even smartphones require the loading of mobile friendly websites. With a responsive website, you can ensure easier and effortless browsing

Have a Unique Type of Specific Content?

A responsive website quite often uncomplicates the entire task of bowing. With a website that is responsive you can display specific content. For example; if you are organizing information on your website using a display ad, it would pop up differently on different devices, somewhere with uneven aspect ratio. With a responsive website built to work, you can use thumbnails and specific points of contacts to evenly manage ads

Single Format of App

If a website is built compatible for devices, you require not to invest individually to have applications. It means you can keep your cost down, while allowing your website to have a unique application on different variety of devices. So, no need to develop a unique app for different app source

Different other benefits of having a responsive website

SEO benefits – Instead of having an SEO campaign for sites where your website hosted, with responsive website you can just need to do only SEO for your source.

- A responsive website is often the answer to a modern website that is neatly designed
- A responsive website needs you to publish content only once while you require not to write the content again for a different source.

These are some of the vital benefits of having a responsive website. If you require an articulated website, with unique loading attribute; that never works off the mark; rather put your brand to your audience in an improved manner; you can think about utilizing a responsive website. Having a responsive website depends on how you use it.

Website Development Planning Process

1. RESEARCH AND GOAL SETTING

As with any project, it is important to do proper research and set goals before beginning. By setting goals, it will help the website to have a direction and will also help your business to achieve specific accomplishments. The planning and goal setting process could take about 1-2 weeks to complete. It is a very important first step to creating a website that sells. There are a few questions you should ask yourself during this phase:

What do I hope for my website to accomplish?

Who is the audience I would like to target?

What are the main goals of the website?

By setting goals for your website, you will be helping the site to have a clear direction and purpose. This is important to the rest of the steps. When setting your goals, you should think about outlining what you would like the rest of the steps to look like. Step 1 will guide you through the rest of the process smoothly.

The research part of this step has a few different purposes. There are so many examples out there that it might be beneficial for you to look at and use some of the websites of your competitors. This can help you to determine what you want and don't want your website to have. It is also important to do some research on the target audience you hope to draw in.

Different age groups may be looking for something different when they visit a website. Understanding what your audience wants is crucial to planning the rest of your website. It is also important to research keywords you'd like to use with your website. By developing your website with SEO in mind, you will save yourself a lot of work in the future.

2. PLANNING THE SITE

Planning the website involves creating a wireframe and sitemap. This is an important step because it is kind of like the skeleton of your site. This process can take about 2-6 weeks to complete. The sitemap allows the developer to get an outline of what the site will look like, what pages there will be and how they will interact with each other. This not only helps with planning but is also beneficial to the user experience.

A user should be able to easily navigate a site, and this begins with the development of the sitemap. Before you begin to plan content, a sitemap lets you design what the structure will look like. Once the sitemap is completed, the other part of this step is to create a wireframe or mock-up. These are just visual representations of what the site will look like. This does not include the layout details. That comes next.

3. DESIGNING THE LAYOUT

The details of the layout are what will give your website character. This is the step where you get to be creative with pictures, videos and what kinds of things the customer will notice when they come to your site. This process can take about 4-12 weeks from start to finish. The timing depends on experience, time spent on the project, and how thorough the developer is. During this step, it is especially important to keep referring back to the target audience you wish to focus on.

Consider colors, logos, and anything that will encourage your audience to interact with the site. By considering how you will create the layout of the website, you are attempting to bring the website to life. It should help the audience to get a feel for your business or product. Please note this step does not yet involve written content. That is the next step. The written content is so important that it needs its own step.

4. WRITING THE CONTENT

This step may be going on simultaneously with the other development planning steps. The written content of a website is so important to its success. While this step may be happening during other steps, it is one that is crucial and deserves a lot of expertise. It could take from 5 to 15 weeks. The written content on a website is going to help a visitor determine their next steps. It is vital to drawing customers in and keeping them. There is a lot to consider when working on the content of the website.

When determining what words to use, it is important that they are not too hard to understand. A general rule is that you have to assume not everyone is going to want to read words that are higher vocabulary. A website should have a vocabulary that the average person can understand.

Again, considering the target audience is extremely important, especially when it comes to the text being used to give customers information. This can determine what kinds of words and voice will be used in the writing, which can create the mood for the content, whether it be good or bad. It also involves creating catchy titles and headlines to draw people in.

Additionally, it is also a good idea to be well-versed in writing a call-to-action. This is what you want the user to do after reading the content on the site. The content should get customers excited about buying a product or service. A website that has well-written content is going to be much more successful than ones that do not.

5. CODING THE WEBSITE

Now that all aspects of your website have been created, you are ready to actually begin creating the website itself. The coding typically begins with the homepage and gradually branches out to the other pages included in the site. This would be where the sitemap is followed to ensure everything is coded correctly. The coding step could take from 6 to 15 weeks, depending on how much content and how intricate you would like your website to be. It is also important to set up frameworks and CMS to make sure that everything will fit onto the server during the installation process. You wouldn't want to do all that work only to find out it doesn't fit.

Once the website is laid out according to the sitemap, it should be tested before moving any further. If all works well, then the rest of the content should be added, and formatting should be completed. This phase involves having a deep understanding of the technology you are using. In fact, if you are looking to do most of the work yourself, you should at least consider getting a developer to code for you, so that you can make sure everything works as planned.

During coding, don't forget to consider factors such as SEO, CMS plugins, and any additional tools you might be using for analyzing and testing the website in the future. If you consider these things now, you will save yourself time and energy later. By keeping SEO in mind, you will get better results, and more people will be exposed to your page. Anything worth doing is worth doing right.

6. TESTING AND LAUNCHING

Before the website is launched, it is crucial that it is tested out by real users. All the links and content should be tested to see if it works. Not only is it important to test out all the buttons and everything on the site, but it is also important to test out what users think of it. There is user testing that can be completed to make sure the website is giving users what they need to be successful on the test.

Again, there are tools that can be used to determine if anything needs to be changed. Make sure to check all written content, including spelling and grammar. If your website has forms, ensure that they are working correctly as well. These might be important ways the users can get in touch with you or sign up for alerts and messages. Without these working properly, it can be very difficult for the user and also will be difficult for you to have a successful website.

Don't just check the website once, but check it over multiple times. When you are confident that everything is in working order, you can go ahead and launch your website live. When it comes to launching, you are finally ready and can do this by uploading it to the server. You will need FTP (File Transfer Protocol) for this process. It is also important to make sure everything is running smoothly immediately after launching. Testing and launching may take 2-4 weeks to complete.

7. MAINTENANCE

You might think your job is done once the website is launched, but this is not the case. Since technology and products are changing more rapidly than ever before, it is important to stay up-to-date with what is happening on the internet. Maintaining a website is hard work, but the

more effort put into its maintenance, the better. There are a few different pieces to website upkeep.

For one, it should constantly be checked out for errors. When a user encounters an error, this may be frustrating and may cause them to find what they are looking for somewhere else. Errors can also completely block them from the information they need to make a decision on purchasing a product or service. This is why it is important to not only test your website for user experience before the launch, but after as well.

User-experience should be tested often, and it should be ongoing. This will ensure that if something comes up, it can be fixed right away. A website that has constant broken links or outdated content will not make its users happy. By having regular maintenance on a website, bugs can be fixed as soon as they are detected. A problem cannot be fixed if it is not known. An unhappy user means that you are losing current or potential customers.

Another important aspect of maintaining a website is to ensure that all content is current. This means that the correct information is on the website such as contact information, pricing, and customer reviews. By giving bad or outdated information, a customer will not be able to get in touch with the business owner, complete a purchase, and it can be frustrating.

While maintaining a website can be important, it might seem like hard work. It is important to know that there are many tools out there that can be downloaded right onto the website. Reports can be sent daily or in other time increments to give you data and information about how the site is performing.

DO I NEED TO HIRE A PROFESSIONAL?

There are a couple of things to consider when thinking about hiring a professional to help. The main factors to consider when figuring out if you should hire someone to assist you are time, money, and experience. Depending on the experience you have with the building of websites, you might consider hiring a professional to help you through the whole process or for just a couple of the steps.

If you are ambitious and have time to learn something new, then perhaps this is a great opportunity. It is also important to be aware that there are many online tools that can help you during the development phase. There are also many online tools that can be used to help maintain and update your website as well.

You also have to take into consideration the time it takes to build a good website. Chances are, if you would like to get your website up and running as quickly and as effectively as possible, you might want to consider hiring something. If you have a lot of time and a lower budget, then doing the work yourself is possible. Building a website is a long process and may take some time, so if you have the time to spend on it, go ahead and do it yourself. Be sure to do your research beforehand about what it takes to build a website and the different options you have.

Another factor to consider is your budget. If you have a budget that allows for hiring a professional, this could free up your time to be spending on other aspects of your business. You also want to make sure that the money you spend on your website is going to be worth it

and help your business to become more profitable. Take the time to consider whether or not hiring someone is right for you.

Guide to Organizing Your Website and Pages

Planning Your Site Structure

Given that the purpose of most websites is to provide information, provide as much information as possible that is organized in a clear, readable and quickly scannable format for site visitors.

The organization of your site will determine the visible top-level links that form your navigation array. You should limit the number of top-level navigation links to eight.

Too many choices can overwhelm site visitors and/or make it difficult for them to focus on what you want them to see.

Also keep in mind that you can have pages on your site that aren't necessarily linked to a button on the navigation array.

When applicable, visitors can reach these pages through links in the site copy and/or by links you provide in an email. For example, you might provide a link with forms or information targeted just for customers.

Home Page: Purpose and Organization

Every site has a home page. It may not always be where people start since some arrive via links to your site from ads or emails.

But most businesses can expect the majority of their site visitors to begin here, so it's an important "front door" to your website.

People typically scan a home page—more so than other pages on your site. The reason is that—in the space of a couple seconds—they are trying to answer several questions for themselves: "Who are you, what do you do, and how can I benefit from spending time on your website?

With this in mind, I believe there are several things your home page must accomplish:

Engage Visitors. This means stopping them long enough so they don't "bounce" from the home page (leave the site and close the browser window).Briefly address who you are, what do you do and for whom.

You should also summarize the main value you offer, particularly relative to competing products or services. Some people call this your "value proposition."

Direct Visitors. Assuming you have successfully engaged them, now they need to know how to learn more. So, direct them into the site to pages that have greater detail about the solution(s) you offer.

Make an Offer. People aren't always ready to act when they haven't educated themselves yet, so jamming an "act now" offer in their face on the home page might be premature. But, depending on what you're offering and to whom, it may be a great step.

For example, you might offer them information that helps further educate them, like a free guide or report. In this case, your goal should be to have them contact you, provide their email and/or sign up for your blog so you can continue to market to them.

How long should home page content be? Remember, people typically scan the home page, so it's got to be easy to read at a glance. That said, you need enough content to get the job done—particularly if you are hoping the page will register important keywords with search engines.

But longer content can be packaged so it's easy to scan. We can break up content with subheads, images, bullet points, copy boxes and the like. Personally, I believe you're better off erring with more—rather than less—home page content.

Other Website Pages

There are several pages that most websites have (e.g. About and Contact), and people often look for these to answer specific questions. But other than that, pages vary by the type of business and how the site owner wants to organize his/her content. See box at right for sample pages and content suggestions.

Ways to design useful and attractive web pages: --

1. Have a Purpose and Plan

A user needs a reason to visit an application and that's why your website should clearly explain or convey the services or products you are offering to the users. Your website and each page of it should have a purpose and clear specification that what it does. According to the goal (entertainment website, e-commerce site, social media, etc.) of your website make a rough sketch and identify all crucial elements (like navigation, contact information, call to action, search, footer, buttons, images, layouts) that you need to include on your website. Understand your website from users' points of view and plan according to that. Before you jump to the code figure out what's your user's expectation is, what pages they are going to view, what content they are going to read and according to that find out where you want elements to go.

2. Simplicity

Complexity is scary and in web designing *less-is-more* approach work more effectively. Make your website simple and try to display one detail at a time for getting the individual attention of each part. Most people put everything on the same page whatever they want on their website, which makes the screen cluttered and users get distracted and confused. Here are some tips to keep in mind for designing a clean and simple website…

- Don't overload the information at home page on your website. If there is too much content or information, keep them on inner pages. Also, make your website consistent in terms of font-family, font-size, colors, images, headings and other aspects.

- Include white spaces in your design. Give enough padding, margin, space between sections, paragraphs, and boxes. It highlights the content and makes your website easy to use.
- Limit the pull-out menus (drop-downs, fold-outs, etc.) and avoid using sidebars, sliders, accordions, tabs, and carousels which most of the web designers prefer to include on the website. The user gets distracted and ignores the rest of the useful content on the website. A research Notre Dame University also says that we should avoid using carousels to draw the users' attention and increase the number of clicks.

3. Readability

Users should not face difficulty in reading the text on your website so you need to pay attention to the contrast between your text and its background. A lot of people use a background image with text over it where the image doesn't have any overlay and the text gets blended with the image. You should use some dark overlay over the image and then the text over that to make your content readable.
The same goes for the colored background, for example, don't use the dark gray color background with slightly lighter text over it instead of that use white color text, that will be more visible and readable. Also, don't make the font size too small, keep your body text at least 16pt and take care of whitespaces between elements. Sans Serif typefaces are much preferable to use on the website.

4. Responsiveness

People use mobile devices for most of their browsing and 50% of web traffic comes from mobile devices.These all are the reasons that your application should be viewable on different devices. Text, layout, images all the elements of your website should be viewable and accessible on different devices for better user experience. Learn to use CSS grid, media queries, bootstrap frameworks to make your application responsive or mobile-friendly.

5. Simple Navigation

Visitors will definitely move away from your website if they won't be able to find out the things they are looking for and that's the reason paying attention to the navigation of your website is extremely important. Navigation organizes your complete website and guides a user to move around your application. The navigation menu should be on the top and sticky on your website so if a user scrolls down the webpage they can still find and access the menu on your website. Below are some tips to make easy to navigate application…

- Use "*three clicks rule*" in your application that allow users to get all the information they need in in 3 clicks.
- More items in the menus confuse the visitors so try to list the items less than 7 also try to avoid dropdown menus, it becomes difficult for search engines to crawl drop-down menus.
- Brand logo of your website should redirect to a user on homepage.
- You can include some important menu (For example terms of use/FAQ/contact/blog etc.), a shortened version of your menu or social icons in your footer.

6. Call to Action

It's very important in your website to have a clear call to action button or form that indicates the next step or action user should take on a page to accomplish the task. For example, buy now, sign up, contact form, subscription, registration form, social media button, etc. CTA provides some sort of direction to the user once he/she knows the purpose of the website. Without CTA user won't be able to find that whether he/she needs to purchase a product, do some kind of registration or take a subscription and the user may leave the website without completing the final task. It's good if you keep your CTA above the fold so the visitor can find it right in front of them**.**

7. Load Speed

People are very impatient and they are not going to wait for too long if your website speed is slow. Most of the user moves away from the website within just 5 seconds if they id doesn't load fast. Size of images or videos makes a big impact on website speed so try to compress the image before you add it there. Also, combine code into a central CSS or JavaScript file to reduce the HTTP requests. Minify HTML, CSS, JavaScript (compressed to speed up their load time). Limit the large items on your website and choose the right host.

8. Prioritize Scrolling

We have already mentioned that you should avoid sliders or accordions to present a lot of information on the website. The best way to present more content and fit that into your website is by using the scrollbar. It has been found in one of the studies that conversion rates increase by up to 30% when you add scrolling feature in your webpage.

9. Pick Up The Right Images

A picture says a lot about a website and choosing the right image for your website can get a lot of visitors. We highly recommend you to use high-quality optimized speed which doesn't affect your website speed. You can take the images from professionals or from photo stock that provide high-quality images with a natural look. Your image should clearly speak the type of message you want your user to understand. Adding photos of people can increase the conversion rates of your website.

10. Color Palette

The color of your website should match the brand of your website. Choosing the right color to represent your brand is very important. You also need to take care of contrast while choosing the color. When you are choosing colors for your website it should go well with each other also your text should be clear and readable. Your choice of color should not clash with each other for example don't use purple and red color next to each other, it will make your site ugly. Use a single color for the main element (primary), highlights (secondary) and other less-important elements (background). You also need to keep in mind that your primary, secondary, and background colors should be consistent throughout your entire site. Vibrant colors create emotion so it should be used sparingly (e.g. for buttons and call to actions).

Web development tools:

Web development tools helps the developer to test and debug the web sites. Now a days the web development tooll come with the web browsers as add-ons. All web browsers have built in tools for this purpose.

These tools allow the web developer to use HTML, CSS and JavaScript etc.. These are accessed by hovering over an item on a web page and selecting the “Inspect Element” from the context menu.

Features

Following are the common features that every web development tool exhibits:

HTML and the DOM

HTML and DOM viewer, allows you to see the DOM as it was rendered. It also allows to make changes to HTML and DOM and see the changes reflected in the page after the change is made.

Web Page Assets, Resources, and Network Information

Web development tools also helps to inspect the resources that are loaded and available on the web page.

Profiling and Auditing

Profiling refers to get information about the performance of a web page or web application and **Auditing** provides developers suggestions, after analyzing a page, for optimizations to decerease page load time and increase responsiveness.

Skills Required:

For being a successful web developer, one should possess the following skills:

- Understanding of client and server-side scripting.
- Creating, editing and modifying templates for a CMS or web development framework.
- Testing cross browser inconsistencies.
- Conducting observational user testing.
- Testing for compliance to specified standards such as accessibility standards in the client region.
- Programming interaction with java Script, PHP, and J-query etc.

TESTING AND MAINTAINING A WEBSITE:

What Is Web Testing?

- Web testing is a software testing practice to test websites or web applications for potential bugs. It's a complete testing of web-based applications before making live.

- A web-based system needs to be checked completely from end-to-end before it goes live for end users.

- By performing website testing, an organization can make sure that the web-based system is functioning properly and can be accepted by real-time users.

- The UI design and functionality are the captains of website testing.

Web Testing Checklists

1) Functionality Testing
2) Usability testing
3) Interface testing
4) Compatibility testing
5) Performance testing
6) Security testing

RECOMMENDED TOOLS FOR PRACTICING WEB TESTING CONCEPTS MENTIONED IN THIS PAGE:

1) CrossBrowserTesting :CrossBrowserTesting allows you to make every web experience perfect, on any browser or mobile device with their cloud-based real device lab. Ditch your VMs and device lab. Easily run manual, visual, and Selenium tests in the cloud on 2050+ real desktop and mobile browsers.
2)LoadNinja : LoadNinja lets you load test your web application with real browsers at scale, using test scripts that can be replayed immediately after recording, producing actionable browser-based performance data to isolate issues and debug errors in real-time

1) Functionality Testing

Test for – all the links in web pages, database connection, forms used for submitting or getting information from the user in the web pages, Cookie testing, etc.

Check all the links:

- Test the outgoing links from all the pages to the specific domain under test.
- Test all internal links.
- Test links jumping on the same pages.
- Test links used to send email to admin or other users from web pages.
- Test to check if there are any orphan pages.
- Finally, link checking includes, check for broken links in all the above-mentioned links.

Test forms on all pages:
Forms are an integral part of any website. Forms are used for receiving information from users and to interact with them. So what should be checked in these forms?

- First, check all the validations on each field.
- Check for default values of the fields.
- Wrong inputs in the forms to the fields in the forms.
- Options to create forms if any, form delete, view or modify the forms.

Let’s take an example of the search engine project currently I am working on, in this project we have advertiser and affiliate signup steps. Each sign-up step is different but it's dependent on the other steps.

So sign up flow should get executed correctly. There are different field validations like email Ids, User financial info validations, etc. All these validations should get checked in manual or automated web testing.

Cookies Testing:
Cookies are small files stored on the user machine. These are basically used to maintain the session- mainly the login sessions. Test the application by enabling or disabling the cookies in your browser options.

Test if the cookies are encrypted before writing to the user machine. If you are testing the session cookies (i.e. cookies that expire after the session ends) check for login sessions and user stats after the session ends. Check the effect on application security by deleting the cookies. (I will soon write a separate article on cookie testing as well)

Validate your HTML/CSS:
If you are optimizing your site for Search engines then HTML/CSS validation is the most important one. Mainly validate the site for HTML syntax errors. Check if the site is crawlable to different search engines.

Database Testing:
Data consistency is also very important in a web application. Check for data integrity and errors while you edit, delete, modify the forms or do any DB related functionality.

Check if all the database queries are executing correctly, data is retrieved and also updated correctly. More on database testing could be a load on DB, we will address this in web load or performance testing below.

In testing the functionality of the websites the following should be tested:
Links
i. Internal Links
ii. External Links
iii. Mail Links
iv. Broken Links
Forms
i. Field validation
ii. Error message for wrong input
iii. Optional and Mandatory fields
Database
Testing will be done on database integrity.
2) Usability Testing
Usability testing is the process by which the human-computer interaction characteristics of a system are measured, and weaknesses are identified for correction.

• Ease of learning
• Navigation
• Subjective user satisfaction
• General appearance

Test for Navigation:
Navigation means how a user surfs the web pages, different controls like buttons, boxes or how the user uses the links on the pages to surf different pages.

Usability Testing includes the following:

- The website should be easy to use.
- The instructions provided should be very clear.
- Check if the instructions provided are perfect to satisfy its purpose.
- The main menu should be provided on each page.
- It should be consistent enough.

Content Checking:
Content should be logical and easy to understand. Check for spelling errors. The usage of dark colors annoys the users and should not be used in the site theme.

You can follow some standard colors that are used for web pages and content building. These are the commonly accepted standards like what I mentioned above about annoying colors, fonts, frames, etc.

Content should be meaningful. All the anchor text links should be working properly. Images should be placed properly with proper sizes.

These are some of the basic important standards that should be followed in web development. Your task is to validate all for UI testing.

Other user information for user help:
Like the search option, the sitemap also helps files, etc. The sitemap should be present with all the links on websites with a proper tree view of navigation. Check for all links on the sitemap.

“Search in the site” option will help users to find content pages that they are looking for easily and quickly. These are all optional items and if present they should be validated.

3) Interface Testing

In web testing, the server-side interface should be tested. This is done by verifying that communication is done properly. Compatibility of the server with software, hardware, network, and the database should be tested.

The main interfaces are:

- Web server and application server interface
- Application server and Database server interface.

Check if all the interactions between these servers are executed and errors are handled properly. If the database or web server returns an error message for any query by application

server then the application server should catch and display these error messages appropriately to the users.

Check what happens if the user interrupts any transaction in-between? Check what happens if the connection to the webserver is reset in between?

4) Compatibility Testing

The compatibility of your website is a very important testing aspect. See which compatibility test to be executed:

- Browser compatibility
- Operating system compatibility
- Mobile browsing
- Printing options

Browser Compatibility:

In my web-testing career, I have experienced this as the most influencing part of website testing.

Some applications are very dependent on browsers. Different browsers have different configurations and settings that your web page should be compatible with.

Your website coding should be a cross-browser platform compatible. If you are using java scripts or AJAX calls for UI functionality, performing security checks or validations then give more stress on browser compatibility testing of your web application.

Test web application on different browsers like Internet Explorer, Firefox, Netscape Navigator, AOL, Safari, Opera browsers with different versions.

OS Compatibility:

Some functionality in your web application is that it may not be compatible with all operating systems. All new technologies used in web development like graphic designs, interface calls like different API's may not be available in all Operating Systems.

Hence test your web application on different operating systems like Windows, Unix, MAC, Linux, Solaris with different OS flavors.

Mobile Browsing:

We are in the new technology era. So, in future Mobile browsing will rock. Test your web pages on mobile browsers. Compatibility issues may be there on mobile devices as well.

Printing Options:

If you are giving page-printing options then make sure fonts, page alignment, page graphics, etc., are getting printed properly. Pages should fit the paper size or as per the size mentioned in the printing option.

5) Performance Testing

The web application should sustain to heavy load. Web performance testing should include:

- Web Load Testing

- Web Stress Testing

Test application performance on different internet connection speeds.

Web Load Testing: You need to test if many users are accessing or requesting the same page. Can the system sustain in peak load times? The site should handle many simultaneous user requests, large input data from users, simultaneous connection to DB, heavy load on specific pages, etc.
Web Stress Testing: Generally, stress means stretching the system beyond its specified limits. Web stress testing is performed to break the site by giving stress and it's checked as to how the system reacts to stress and how it recovers from crashes. Stress is generally given on input fields, login and sign up areas.
In web performance, testing website functionality on different operating systems and different hardware platforms is checked for software and hardware memory leakage errors.

Performance testing can be applied to understand the web site's scalability or to benchmark the performance in the environment of third-party products such as servers and middleware for potential purchase.

Connection Speed
Tested on various networks like Dial-Up, ISDN, etc.
Load
i. What is the no. of users per time?
ii. Check for peak loads and how the system behaves
iii. A large amount of data accessed by the user
Stress
i. Continuous Load
ii. Performance of memory, CPU, file handling, etc.

6) Security Testing

Following are some of the test cases for web security testing:

- Test by pasting the internal URL directly into the browser address bar without login. Internal pages should not open.
- If you are logged in using username and password and browsing internal pages then try changing URL options directly. I.e. If you are checking some publisher site statistics with publisher site ID= 123. Try directly changing the URL site ID parameter to different site ID which is not related to the logged-in user. Access should be denied for this user to view other's stats.
- Try some invalid inputs in input fields like login username, password, input text boxes, etc. Check the system's reaction to all invalid inputs.
- Web directories or files should not be accessible directly unless they are given download option.
- Test the CAPTCHA for automating script logins.
- Test if SSL is used for security measures. If it is used, the proper message should get displayed when users switch from non-secure HTTP:// pages to secure HTTPS:// pages and vice versa.
- All transactions, error messages, security breach attempts should get logged in log files somewhere on the webserver.

The primary reason for testing the security of a web is to identify potential vulnerabilities and subsequently repair them.

- Network Scanning
- Vulnerability Scanning
- Password Cracking
- Log Review
- Integrity Checkers
- Virus Detection

Types of Web Testing:

A website is classified into many types, it is about 20 types. All these are shrinking under static and dynamic type. Among them let's discuss 4 types and its testing methods in a detailed manner. Before that, I just want to bullet those types.

- Simple static website testing
- Dynamic web application testing
- E-commerce website testing
- Mobile website testing

1) Simple Static Website

A simple static website will display the same content for all visitors who are visiting the website at different times. It is also known as an informational website. In a static website, the only developer can do changes that too in code only. This type of website will not have any major functionalities and it purely depends on UI design.

Testing a simple static website is very easy, you have to consider only a few things while testing. Some of them are mentioned below:

Points to Remember:

1) Testing the GUI design is a must because a static website purely depends on it. You need to compare the approved PSD files with web page developed. Check all the elements in the design should present on the developed page.

2) The other part of GUI design is to check the font size, font style, spacing, and color everything has been reproduced.

[This image explains the spacing alignment issue in the desktop view of a website.]

3) Secondly, you need to check the links (page links) whether it is properly working or not? And also find, is there any broken link?

4) Verify the spelling and content in all web pages by comparing the content given by the client.

5) In some cases, image will not display properly, it may break or sometimes images gets duplicated, wrong images may display. It has to be checked keenly. Because for a static website, only content and images will give lives.
6) Check the scroll bar carefully, in my experience, I have faced issues with the scrollbar. The issue you will face is unwanted scrolling appears or scroll gets hidden (it may hide the contents). The above issues are applicable to both horizontal and vertical scrolls.
7) If there is a contact form check it is working properly by sending some dummy messages.
Things to check in the contact form are:

- Whether the message is sending properly and a success message appears?
- Check the email received to the concerned person in the proper format as designed?
- Check email should not land in spam as junk mail?
- If there is a reply email trigger is activated then check whether the sender received mail?

8) Check whether it is an error-free web page, validate it with W3 validator or other related software.
9) Some constant things to be checked in a static website,

- Check favicon is present on the tab bar
- URL should contain the correct page title
- If copyright information is there, it should be displayed
- If there is a contact form, Captcha is a must. [It prevents junk email]
- Check the loading speed of the website. [A static website should not take much time for loading]. If a gif image is used while loading then track its functionality

Apart from these, there are huge things that have to be tested at the backend of every website that is system testing, security testing, interface testing, compatibility testing, and performance testing, etc. For this, you need to have technical knowledge. In a simple static website, you will not find more functionalities if there you need to do functionality testing too.

2) Dynamic Web Application [CMS Website]

It is the type where the user can update and change their website content regularly. From here I am going to use the word “web application testing” instead of dynamic website testing. The web application is a *combination of front-end and back-end programming*.
The front-end will be HTML and CSS whereas back-end uses programming languages like PHP, Javascript, and ASP etc. With this backend, user/client can add or change the content on the website.

Testing a web application is not easy than testing a static website but not much difficult than testing an e-commerce website. Functionality testing is the most important thing to be performed while testing a web application. The web application may contain much-complicated functionality so tester needs to be very careful while testing.

There are two different types of web applications are there, one is no action will be carried out by the user in front-end (i.e. only back-end changes will reflect in front-end) the other is end-user will work in front-end itself (**for example** login, signup, newsletter subscription, and other similar actions). So testing should be done according to it.
Points to Remember:
The points which I mentioned in static website testing are to be included while testing a web application also. In addition to that, the following things are to be noted.

1) In GUI section, ***tooltip is compulsory*** for all fields and buttons, field alignment (spacing) should be done properly, disabled field/ buttons should be greyed out, fields/ buttons should be in standard format as in SRS, error message should be displayed if something goes wrong, pop-up message should only display at the center of the web page, drop-down menu should not be truncated.
Tab shortcut key should work in all fields and more.

2) In functionality section, if your web application is having login or sign up functionality then check the ***mandatory field validation***, form validation (i.e. number fields should accept only numbers, not alphabets), character restriction on fields (i.e. only these many characters can be entered).
Special characters and negative numbers restriction on fields, testing the email functionality, testing the document upload (i.e. only ***specified document type can be uploaded***), timeout functionality, sorting functionality, java script is working on compatible browsers etc should be tested.
3) When coming to back-end functionality section, test image uploading for broken images, text entering in the fields is working or not. Back-end update should ***reflect on front-end***, ***database testing*** (i.e. whether you can add new fields or deleting unwanted fields) all these things are to be performed.
Performance is not much necessary for a web application (dynamic website) since it has very less content. If you need you can do with the tools with which you are familiar. Pick-up some standard online performance tool, if you want to do simple performance testing.

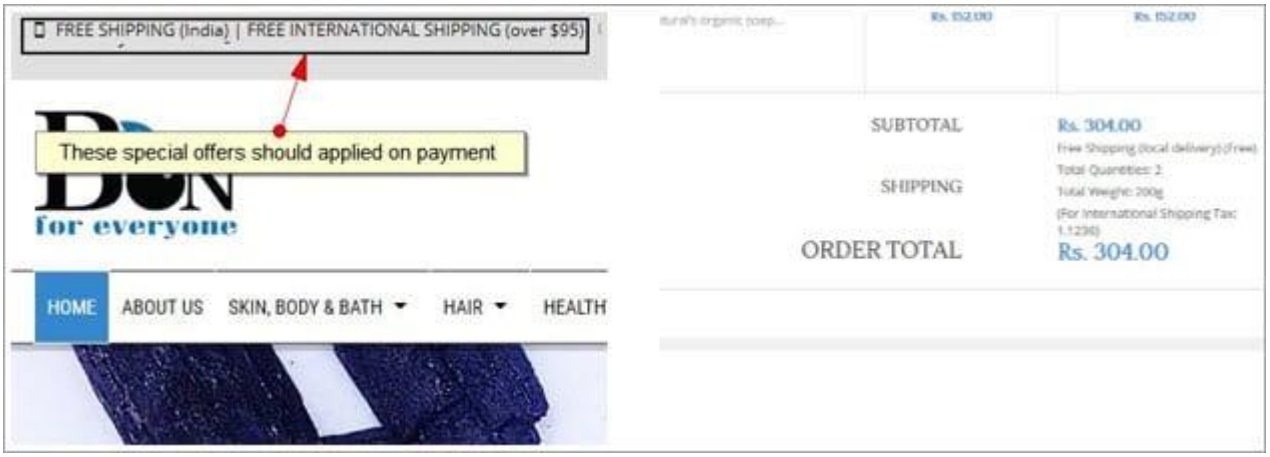
3) E-commerce Website

An e-commerce website is somewhat complicated when compared to the above two. The tester needs to be very cautious while testing an e-commerce site. There are huge things to be checked in e-commerce sites out of them I just cover some of my experienced issues on e-commerce website testing.

In the GUI section, you need to check all the features as in SRS and the same with the functionality. The functionality will be almost the same for all commercial websites.

Functionality-wise you need to check all pages such as the main page (includes featured products, special offers display, log in details, search functionality) product detail page, category page, placing an order, payment gateway everything has to be tested.

Points to Remember:
1) Check if the shopping cart is getting updated when you buy or increase the quantity. Check this functionality in all the pages and circumstances.
2) Check if special coupons and *offers are applied to correct orders* and you see the discounted price is displaying or not.



[This image explains about free shipping and how it is applied in the payment section]

3) Sometimes while updating a single product it will get multiplied by considering the number of variations in the product. So check whether the single product is displayed and its variations are displayed correctly. (I faced this problem)

4) Check if the filter option whether is working exactly. If filtering is been done, based on the category & pricing chosen?

5) While sign up, super validation should be done. Only the new user can sign up.

6) If an existing user, added a product to the shopping basket, the wish list section during their previous login should be saved and displayed during the next login too.

7) Compare products should work by comparing the products based on some specifications assigned in the back-end.

8) Check whether the Currency converter is working fine. Based on the country chosen the currency converter should display the relevant price and tax rates.

[On choosing the language Currency will be converted, here USD is meant to be default]

9) Generally many Plug-ins are used in an e-commerce (WordPress & similar) website, you need to be very careful. The plug-in installation may conflict or affect any other major functionality. So follow up with the plug-ins installation and its usage.

10) Check whether the social sharing option is working on the individual product or not.

11) Shipping cost should be generated based on the region selected. And also check the tax rate generation. (It may cause some legal problems, during the end-users purchase).

[In this image Shipping and the tax rate is calculated for France region]

12) Payment gateway should work only if valid card details are given. Validation should apply to the Card number and CCV code number. [It is better to keep validation on the card number field itself].

13) Email generation on each and every process during purchase should happen (sign up, product ordering, payment successful, order canceled, order received and other email triggers if any).

14) Check the live chat with some dumpy emails.

Note: Generally E-commerce website will not be developed for mobile compatibility and when coming to the mobile version an app will be generated. In some cases, they will not create an app instead a mobile compatible website will be created. In such cases, you need to check carefully to know if there any missing functionality and UI deviation.

These are some of the issues which I faced and noted while testing an E-commerce website. Apart from this, you need to check all the general things related to an e-commerce website.

4) Mobile Website

First of all, let's be clear about a mobile website. Generally people think both a mobile website and mobile application to be the same, but in reality, a mobile website is developed with HTML pages and can be viewed only with an internet connection.

But the mobile app is nothing but an application that can be downloaded and used later without an internet connection. Here many of us get confused and raise a question **What is the difference between mobile website & responsive website?**

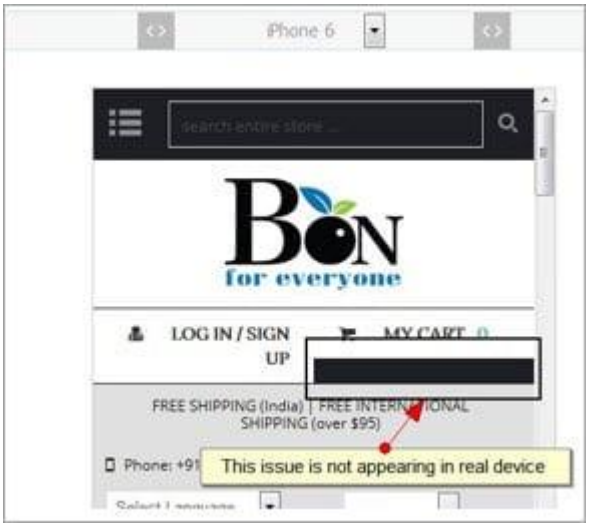
A responsive website means making the content fit into the mobile device size instead of creating a version whereas a mobile website is creating a new version that is not a reflection desktop version. In the mobile website, you will have only limited pages, and unwanted functionalities are removed here.

Testing a mobile website is somewhat tedious rather than other types of websites. It will have separate designs and you need to be careful while testing the functionalities.

Points to Remember:

Important points to consider while testing a mobile website:

- Usually, we will use an emulator for testing a mobile website and we can get ideal results but I always prefer you to test on real devices. I have faced many issues when I tested in real devices [Especially apple devices]. Real device specifications may conflict with the web pages developed.



[This image explains about simulator testing and the backline issue appearing in it.]

- GUI & usability testing are more important as it is not the reflection of the desktop version.
- Performance is another important factor to be considered for mobile website testing. Performance-related issues can be tracked when you test in the real devices.
- Check whether browsing normal web links from mobile is getting triggered by a mobile link.
- Check page scrolling, page navigation, text truncation, etc on the mobile website.

Best Web Testing Tools

There is a wide range of testing tools that are available for web app testing.

=> **Check this comprehensive list of Most Popular Web Application Testing Tools.**

Points to be considered while testing a Website

The websites are essentially **client/server applications** – with web servers and 'browser' clients.

Consideration should be given to the interactions between **HTML pages, TCP/IP communications, Internet connections, firewalls, applications that run in web pages** (such as applets, javascript, plug-in applications) and **applications that run on the server-side** (such as CGI scripts, database interfaces, logging applications, dynamic page generators, asp, etc.).

Additionally, there are a wide variety of servers and browsers with various versions of each. They include small but sometimes significant differences between them in terms of variations in connection speeds, rapidly changing technologies, and multiple standards & protocols. The end result of which testing for websites can become a major ongoing effort.

Sample test scenarios for testing a web application

Few other considerations to be included while testing a website are given below.

- What is the expected load on the server (e.g., number of hits per unit time)?
- What kind of performance is required under each load condition (such as web server response time, database query response times)?
- What kind of tools will be required for performance testing (such as web load testing tools, other tools already in-house that can be adapted, web robot downloading tools, etc.)?
- Who is the target audience? What kind of browsers will they be using? What kind of connection speeds will they be using? Are they intra-organizations (thus likely with

high connection speeds and similar browsers) or Internet-wide (thus with a wide variety of connection speeds and browser types)?
- What kind of performance is expected from the client-side (e.g., how fast should pages appear, how fast should animations, applets, etc. load and run)?
- Will the downtime for server and content maintenance/upgrades be allowed? If so, then how much?
- What kind of security (firewalls, encryption, passwords, etc.) will be required and what is it expected to do? How can it be tested?
- How reliable are the site's Internet connections required to be? And how does that affect the backup system or redundant connection requirements and testing?
- What process will be required to manage updates to the web site's content?
- What are the requirements for maintaining, tracking, and controlling page content, graphics, links, etc.?
- Which HTML specification will be adhered to? How strictly? What variations will be allowed for targeted browsers?
- Will there be any standard requirements for page appearance and/or graphics throughout a site or parts of a site??
- How will internal and external links be validated and updated? And how often? will it happen?
- Can testing be done on the production system, or will a separate test system be required?
- How are browser caching, variations in browser option settings, dial-up connection variability, and real-world internet ‘traffic congestion' problems to be accounted for testing?
- How extensive or customized are the server logging and reporting requirements; are they considered as an integral part of the system and do they require testing?
- How are CGI programs, applets, javascript, ActiveX components, etc. to be maintained, tracked, controlled, and tested?
- Pages should be 3-5 screens max unless the content is highly focused on a single topic. If larger, provide internal links within the page.
- The page layouts and design elements should be consistent throughout a site so that it's clear to the user that they are still on a site.
- Pages should be as browser-independent as possible, or pages should be provided or generated based on the browser type.
- All pages should have links external to the page; there should be no dead-end pages.
- The page owner, revision date, and a link to a contact person or organization should be included on each page.

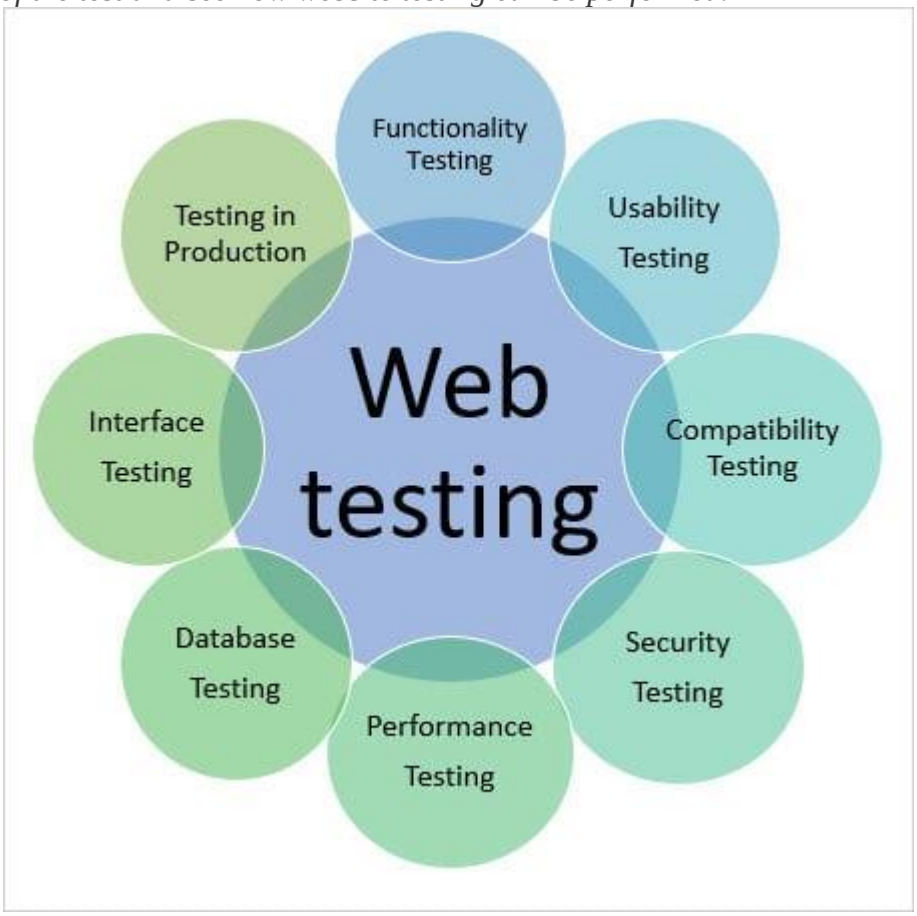
Web Testing FAQs

Below mentioned should be the various questions coming to a tester’s mind while thinking of a website that is already developed and can be exposed to the public:

- Is the website functioning as expected?
- Will the end-user find the website easy to browse?
- Is the website accessible on different devices possessed by end-users?
- Is the website secured enough?
- Is the website performance up to the mark?
- Is the data entered on a website stored accurately and persist across sessions?
- Is the website integrated well with other interfaces in the workflow?
- Will the website perform as expected even after going live?

To answer these questions, different testing techniques have been identified that can be used to test a web application.

Let's take an example of an e-commerce website that has been recently released to the QA team for testing.
We'll go through each one of the above-specified questions in detail to understand the scope of the test and see how website testing can be performed.



Is the website functioning as expected?
confirm that the website is functioning well, QA needs to perform functional testing.
During functional testing, different features of an application need to be validated against the requirements mentioned in the functional specification document.
Below are a few generic scenarios, a QA is expected to cover while performing functional testing of any website even if they are not mentioned in functional specifications:

- User navigation to different pages of the website and completing the end-to-end workflow
- If the user can select/deselect checkboxes
- If the user can select values from Dropdown fields
- If the user can select/deselect Radio buttons
- Different navigation buttons like Submit, Next, Upload etc. buttons are working well
- Calendars are loading properly and allowing the user to select a date
- Calculations are happening as implemented
- Search functionality is working if any
- Correct Information display
- Various internal & external links to other pages
- Correct Tab Order of the fields on web pages
- Mandatory and Optional fields should be verified for the positive and negative inputs
- Default values for each web field should be verified
- Email functionality is implemented for some action on the website

It’s important for websites to be compatible with search engines. Hence we should review websites for HTML syntax correctness, format & compliance standards like WS-I, ISO & ECMA.

Considering cookies, which are used to maintain login sessions, the website should be tested by enabling/disabling cookies or by using the mismatched domain. Testing can also be performed across sessions by resetting cookies to bring browsers back to the vanilla state.

QA should also validate that website cookies are always stored locally in an encrypted format.

Considering our e-commerce website, various links like Men’s Fashion, Women’s Fashion, Kid’s Fashion, Home Accessories, Electronic Appliances, Books, Movies & Music, etc. available on a web page should be clicked on and verified if the user navigates to the expected page.

Similarly, different functionalities like Login, Signup, Search Option, Filters, Sort Order, Add to Cart, etc. should be verified on different web pages like Login Page, Sign up Page, Product Details Page, Shopping Cart, Order Review, Payment, etc. The website should be checked for session/cookie management like session expiration and session storage etc.

Will the end-user find the website easy to browse?
Usability testing has to be performed to measure the website's ease of use for an end-user in the context of accessibility, searchability, and usefulness, etc.

Below mentioned are few of the test scenarios that should be verified while performing usability testing for a website:

- Website content should be informative, structured and linked logically so that user can understand easily

- Web page controls should be easy for users to navigate
- The website should have Help & Instruction documents uploaded
- The website should have the Search feature for end-user convenience
- Access to/from the Main menu to all pages should be there
- Website content should be verified for any spelling mistakes
- The website should follow defined guidelines in the context of background color, pattern, style, fonts, image placements, frames, borders, etc.
- The website should be accustomed to the translation feature considering the fact that it can be accessed by users from different nations with different languages, currencies, etc.

Few tools that can be used to perform usability testing are User Zoom and Reflector.
An e-commerce website should be customer-friendly, easy-to-navigate and attention-grabbing. All web pages should be verified for accessibility, fonts, styling, images, spelling mistakes and product relevant information. A website should be equipped with relevant help documents and customer support facilities.

Considering the increase in touchscreen-based interfaces we need to validate the accessibility of both key inputs and touch screen inputs. Similarly, images and website content should be validated for usability on different screen sizes (mobiles, laptops, and tabs, etc.).

Is the website accessible on different devices possessed by end-users?
Assuming that our website can be accessed by a range of users with a different set of devices, we need to ensure that the website runs well on all of them without any glitches.

To ensure the same, website compatibility checks should be done which comes with Compatibility Testing. During compatibility testing of a website, it is ensured that the website runs well on different browsers, Operating Systems & Devices like laptops, mobile phones, tablets, printers, etc.

Browsers Compatibility (Cross Browser Testing):
The website should work well with different browsers like Microsoft Internet Explorer, Microsoft Edge, Firefox, Google Chrome, Safari, and Opera. All active versions of these browsers should be verified with different browser features turned ON/OFF.

Also, while performing cross-browser testing, QA should also check for the optimal website performance across browsers.
Operating System Compatibility (Cross Platform Testing):
In order to identify potential user experience issues, a website should be tested on various platforms like Windows, Linux, Unix.MAC, Solaris, etc. so as to be sure of the OS compatibility.

Device Compatibility (Cross-Device Testing):
A website can be browsed through different devices like laptops, mobiles, tablets, etc. with different OS available like iOS, Android, Windows, etc. Hence, testing should be performed on the devices too covering the below scenarios.

- Website screen size should be adjustable as per the device
- A device should be screen rotation featured
- The website should not show up any loading issues on different devices with different network speeds
- Verify the website behavior when the device is in/out of network range
- Verify the website behavior on low CPU and Memory to support different form factors

For an e-commerce website, the compatibility check is one of the most important testing types. The customer base will be large and will access our website from different browsers, operating systems & devices.

Considering mobile platforms are becoming popular, we should ensure website load on small form factor under acceptable load time. It is also important to validate the use of different network speed to ensure it is usable for all customers.

Is the website secured enough?
Security testing is performed to uncover vulnerabilities in a system and ensure a website is secured.

Below is the checklist that can be verified while performing security testing:

- The website should be accessible to only authenticated users

- Website users should be able to perform only those tasks for which they are authorized
- The website should be verified for CAPTCHA fields for user identification
- Browser security settings should be verified while moving from secure to insecure pages
- Web Server protection should be there for inaccessible web directories or files
- Ensure restricted files should not download without appropriate access
- Sessions which got inactive should automatically get killed after a certain period of time
- All invalid and unauthorized attempts by end-users or intermittent system errors/failures should get logged for analysis purpose

Tools like Retina CS Community, Veracode, and SQL Map can be used to perform security testing of your website.

As a part of security testing, an e-commerce website should be validated for

1. Website Access Controls.
2. Any leakage of user personal info.
3. Secured Payment Methods.

Is the website performance up to the mark?

To check the performance of a website, performance testing can be done. It will evaluate the behavior of an application under a variety of workload conditions which could be a realistic scenario. If the system goes live without conducting performance tests, it may end up with issues like a slow running system or poor usability which likely will affect the brand image as well as market sales.

A website can be tested against load & stress.

Below given is the checklist for web performance testing:

- Website behavior should be observed under normal and peak load conditions
- Website's performance should be examined by measuring response time, speed, scalability and resource utilization
- Proper RCA (root cause analysis) should be done with a solution if a system breaks down or gets unstable at any point in time
- Network latency issues should be identified if any

An e-commerce website should be tested thoroughly using a set of simulated users during normal as well as peak load conditions which can be during 'Sale Season'.

During the sale, users accessing the website would multiply. Also, website behavior should be examined while multiple concurrent users accessing the same items or performing the same actions (like transactions or placing orders) on the website.

There are various tools available in the market for performance testing. Few of them are **LoadRunner, WinRunner, Silk Performer, JMeter, etc.**

Is the data entered on a website stored accurately and persist across sessions?
The database is one of the critical components of a web application that holds the complete information entered through a website. Hence, to make sure that correct user data is getting saved in database tables without any manipulations and to maintain data integrity below verifications should be performed.

- Verify data consistency across user interface i.e. Website UI and Database
- Verify that DB tables are updating properly whenever insert/update/delete actions are performed by a website application
- Verify the response time of technical queries and fine-tune them if required
- Check for DB connectivity and access permissions

As a QA team member testing e-commerce website, you can perform below activities and validate the changes each time in the corresponding database tables. This will make sure that website UI and DB, both are consistent.

1) Placing an Order for a product.
2) Canceling Product.
3) Opt to Exchange Product.
4) Opt to Return Product.

Is the website integrated well with other interfaces in the workflow?
Interface level testing is performed to check on the smooth interaction of the website with different interfaces like Web Server & Database Server.

During interface testing, the tester needs to make sure if the application requests are being sent properly to the database and correct information is displayed to the client as output. A webserver should not throw any denial exceptions at any point in time and the database should always stay in sync with the application.

Will the website perform as expected even after going live?
Once a product moves into a production environment, the regular inspection should be done to keep a check on quality control.

Below scenarios can be considered while verifying product in production:

- Web application tests should be executed periodically and test logs should be saved as proof of Service Level Agreement (SLA) compliant
- Auto-scaling systems and load balancers should be checked if in place and functioning
- Keep a check the end-user experiences and try to uncover defects or malicious attacks which typically goes unnoticed during QA testing
- Monitor the product response time during peak loads

- Execute edge level test cases in real-time to identify network failures, connection failures or interruption by an unexpected call

Conclusion

I have drafted this detailed tutorial with my years of experience testing the different websites.

Hope this article helps you understand the different facets of web application testing. Next time when you sit to write a test plan for your website do remember to validate various aspects beyond the functionality of the website.

How To Evaluate A Website?

1)Open the site

- The first thing students need to do is open the site.
- When looking through your Google search results, you may want to teach students to **open sites in new tabs**, leaving their search results in a tab for easy access later (e.g. right-click on the title and click "Open link in new tab").
- It can also be worthwhile to explain the **anatomy of a Google Search result** and the benefits of looking past the first few results. I go over this in more detail in my guide to teaching students how to research.

2) Skim read

- Next, skim read the site and determine whether you can read and understand the text. **If it's too complicated or difficult to understand, find another website.**
- Decide whether this is the sort of site that *might* provide you with the information you're looking for. If the site is difficult to navigate, cluttered with ads, or has other red flags like poor spelling or inappropriate content you might want to leave straight away.
- Skimming and scanning is the default way most people now consume new content so this now holds an important role in literacy education. A regularly quoted study from Nielsen Norman tells us that 79% of users always scan a new page they come across. Only 16% read word for word.
- Scanning and skim reading can be worth practicing in the classroom. E.g. give students one minute to look at a text and then share what they think it's all about. This is something that could be tried with emerging readers right up to higher level students.

3) Look for the answer to your question

- If you think the site might prove useful, you now need to **find out if the information on the site actually answers your question**. You could use a search box, navigation

menu, or pull up your own search box by pressing Control/Command F. Type in the keywords you're looking for.

- Stop skimming, and read more closely to see if this information is useful to you.

4) Consider the credibility of the author or website

- If the information is there, you need to consider the credibility of the author or website. Can you rely on the information?

- Here are some things you can look for on the website:

- **Domain** — sometimes domains that include .gov or .edu come from more trustworthy education or government sources.
- **Author information** — look at at the author bio or About page. How qualified is this person?
- **Design** — we can't judge a book (or website!) by its cover but sites that are cluttered, difficult to navigate, or look amateurish may be worth avoiding.
- **Sources** — trustworthy articles usually link to other sources or cite where their facts come from.

5) Consider the purpose of the site

The next step is to think about the purpose of the site and whether it meets your needs.

- Is the author trying to **make you think a certain way?** Are they biased or one-sided?
- Are they trying to **sell you something?** Sometimes ads might not be so obvious, for example, blog posts can be written to promote a product.
- Is the author's tone **calm and balanced?** Articles fueled by anger or extreme opinions are not going to be the best source of information.
- Do the **headlines match the article?** Or are they simply designed to hook readers?
- Is the author trying to educate the audience and present a **balanced and factual picture?** This is what you usually want.

6) Look for the date

Finally, it's important to consider whether the information is **current enough for your topic.** You can look for when the article was written or it might tell you when it was last updated. Sometimes URLs include dates as well.

Does it matter how old an article is? Well, that might depend on your topic. For example, if you're looking for the latest research on nutrition or a medical condition, the date might be very important. If you're looking for some facts about World War One, it might not matter if the information hasn't been updated in a few years.

If the site is no good, bounce back…

As the flowchart demonstrates, **if you're ever in doubt, just head back to your search results and try again.** You might want to alter your search terms based on the results you're provided with. Sometimes you need to change your keywords or be more specific.

Crosscheck

When you overcome all these hurdles and find some information that looks useful and reliable, it can be a good idea to crosscheck the information. So, have a look at a few other websites to see if they corroborate the information you've found.

It's important to remember that **you can't believe everything you read and it's essential to consider multiple perspectives.**

UNIT:4

Enterprise Resource Planning (ERP):

Enterprise resource planning (ERP) is defined as the ability to deliver an integrated suite of business applications. ERP tools share a common process and data model, covering broad and deep operational end-to-end processes, such as those found in finance, HR, distribution, manufacturing, service and the supply chain.
ERP applications automate and support a range of administrative and operational business processes across multiple industries, including line of business, customer-facing, administrative and the asset management aspects of an enterprise. ERP deployments are complex and expensive endeavors, and some organizations struggle to define the business benefits.
Look for business benefits in four areas: a catalyst for business innovation, a platform for business process efficiency, a vehicle for process standardization, and IT cost savings. Most enterprises focus on the last two areas, because they are the easiest to quantify; however, the first two areas often have the most significant impact on the enterprise.

Enterprise resource planning (**ERP**) is an enterprise-wide information system designed to coordinate all the resources, information, and activities needed to complete business processes such as order fulfillment or billing.

- An ERP system supports most of the business system that maintains in a single database the data needed for a variety of business functions such as

Manufacturing, Supply Chain Management, Financials, Projects, Human Resources and Customer Relationship Management.

- An ERP system is based on a common database and a modular software design. The common database can allow every department of a business to store and retrieve information in real-time. The information should be reliable, accessible, and easily shared. The modular software design should mean a business can select the modules they need, mix and match modules from different vendors, and add new modules of their own to improve business performance.

- Ideally, the data for the various business functions are integrated. In practice the ERP system may comprise a set of discrete applications, each maintaining a discrete data store within one physical database.

- The term ERP originally referred to how a large organization planned to use organizational wide resources. In the past, ERP systems were used in larger more industrial types of companies. However, the use of ERP has changed and is extremely comprehensive, today the term can refer to any type of company, no matter what industry it falls in. In fact, ERP systems are used in almost any type of organization – large or small.

- In order for a software system to be considered ERP, it must provide an organization with functionality for two or more systems. While some ERP packages exist that only cover two functions for an organization (QuickBooks: Payroll & Accounting), most ERP systems cover several functions.

- Today's ERP systems can cover a wide range of functions and integrate them into one unified database. For instance, functions such as Human Resources, Supply Chain Management, Customer Relations Management, Financials, Manufacturing functions and Warehouse Management functions were all once stand-alone software applications, usually housed with their own database and network, today, they can all fit under one umbrella – the **ERP system**.

ERP – Implementation is The Challenge

The Ideal ERP System:

An ideal ERP system is when a single database is utilized and contains all data for various software modules. These software modules can include:

- **Manufacturing:** Some of the functions include; engineering, capacity, workflow management, quality control, bills of material, manufacturing process, etc.
- **Financials:** Accounts payable, accounts receivable, fixed assets, general ledger and cash management, etc.
- **Human Resources:** Benefits, training, payroll, time and attendance, etc.
- **Supply Chain Management:** Inventory, supply chain planning, supplier scheduling, claim processing, order entry, purchasing, etc.
- **Projects:** Costing, billing, activity management, time and expense, etc.
- **Customer relationship management** (**CRM**): CRM is a term applied to processes implemented by a company to handle its contact with its customers. CRM software is used to support these processes, storing information on current and prospective customers. Information in the system can be accessed and entered by employees in different departments, such as sales, marketing, customer service, training, professional development, performance management, human resource development, and compensation. Details on any customer contacts can also be stored in the system. The rationale behind this approach is to improve services provided directly to customers and to use the information in the system for targeted marketing. While the term is generally used to refer to a software-based approach to handling customer relationships, most CRM software vendors stress that a successful CRM strategy requires a holistic approach. CRM initiatives often fail because implementation was limited to software installation without providing the appropriate motivations for employees to learn, provide input, and take full advantage of the information systems.
- **Data Warehouse:** Usually this is a module that can be accessed by an organization's customers, suppliers and employees. Data warehouse is a repository of an organization's electronically stored data. Data warehouses are designed to facilitate reporting and analysis. This classic definition of the data warehouse focuses on data storage. However, the means to retrieve and analyze data, to extract, transform and load data, and to manage the data dictionary are also considered essential components of a data warehousing system. Many references to data warehousing use this broader context. Thus, an expanded definition for data warehousing includes business intelligence tools, tools to extract, transform, and load data into the repository, and tools to manage and retrieve metadata. In contrast to data warehouses are operational systems which perform day-to-day transaction processing. The process of transforming data into information and making it available to the user in a timely enough manner to make a difference is known as data warehousing.

How can ERP improve a company's business performance?

ERP's best hope for demonstrating value is as a sort of battering ram for improving the way your company takes a customer order and processes it into an invoice and revenue—otherwise known as the order fulfillment process. That is why ERP is often referred to as back-office software. It doesn't handle the up-front selling process (although most ERP vendors have developed CRM software or acquired pure-play CRM providers that can do this); rather, ERP takes a customer order and provides a software road map for automating the different steps along the path to fulfilling it. When a customer service representative enters a customer order into an ERP system, he has all the information necessary to complete the order (the customer's credit rating and order history from the finance module, the company's inventory levels from the warehouse module and the shipping dock's trucking schedule from the logistics module, for example).

People in these different departments all see the same information and can update it. When one department finishes with the order it is automatically routed via the ERP system to the next department. To find out where the order is at any point, you need only log in to the ERP system and track it down. With luck, the order process moves like a bolt of lightning through the organization, and customers get their orders faster and with fewer errors than before. ERP can apply that same magic to the other major business processes, such as employee benefits or financial reporting.

That, at least, is the dream of ERP. The reality is much harsher.

Let's go back to those inboxes for a minute. That process may not have been efficient, but it was simple. Finance did its job, the warehouse did its job, and if anything went wrong outside of the department's walls, it was somebody else's problem. Not anymore. With ERP, the customer service representatives are no longer just typists entering someone's name into a computer and hitting the return key. The ERP screen makes them businesspeople. It flickers with the customer's credit rating from the finance department and the product inventory levels from the warehouse. Will the customer pay on time? Will we be able to ship the order on time? These are decisions that customer service representatives have never had to make before, and the answers affect the customer and every other department in the company. But it's not just the customer service representatives who have to wake up. People in the warehouse who used to keep inventory in their heads or on scraps of paper now need to put that information online. If they don't, customer service reps will see low inventory levels on their screens and tell customers that their requested item is not in stock. Accountability, responsibility and communication have never been tested like this before.

People don’t like to change, and ERP asks them to change how they do their jobs. That is why the value of ERP is so hard to pin down. The software is less important than the changes companies make in the ways they do business. If you use ERP to improve the ways your people take orders, manufacture goods, ship them and bill for them, you will see value from the software. If you simply install the software without changing the ways people do their jobs, you may not see any value at all—indeed, the new software could slow you down by simply replacing the old software that everyone knew with new software that no one does.

Implementation of an ERP System

Implementing an ERP system is not an easy task to achieve, in fact it takes lots of planning, consulting and in most cases 3 months to 1 year +. ERP systems are extraordinary wide in scope and for many larger organizations can be extremely complex. Implementing an ERP system will ultimately require significant changes on staff and work practices. While it may seem reasonable for an in house IT staff to head the project, it is widely advised that ERP implementation consultants be used, due to the fact that consultants are usually more cost effective and are specifically trained in implementing these types of systems.

One of the most important traits that an organization should have when implementing an ERP system is ownership of the project. Because so many changes take place and its broad effect on almost every individual in the organization, it is important to make sure that everyone is on board and will help make the project and using the new ERP system a success.

Usually organizations use ERP vendors or consulting companies to implement their customized ERP system. There are three types of professional services that are provided when implementing an ERP system, they are Consulting, Customization and Support.

Consulting Services – usually consulting services are responsible for the initial stages of ERP implementation, they help an organization go live with their new system, with product training, workflow, improve ERP’s use in the specific organization, etc.

Customization Services – Customization services work by extending the use of the new ERP system or changing its use by creating customized interfaces and/or underlying application code. While ERP systems are made for many core routines, there are still some needs that need to be built or customized for an organization.

Support Services- Support services include both support and maintenance of ERP systems. For instance, trouble shooting and assistance with ERP issues.

Advantages of ERP Systems:

There are many advantages of implementing an EPR system; here are a few of them:

- A totally integrated system
- The ability to streamline different processes and workflows
- The ability to easily share data across various departments in an organization
- Improved efficiency and productivity levels
- Better tracking and forecasting
- Lower costs
- Improved customer service

Disadvantages of ERP Systems:

While advantages usually outweigh disadvantages for most organizations implementing an ERP system, here are some of the most common obstacles experienced:
Usually many obstacles can be prevented if adequate investment is made and adequate training is involved, however, success does depend on skills and the experience of the workforce to quickly adapt to the new system.

- Customization in many situations is limited
- The need to reengineer business processes
- ERP systems can be cost prohibitive to install and run
- Technical support can be shoddy
- ERP's may be too rigid for specific organizations that are either new or want to move in a new direction in the near future.

Free and Open Source ERP software:

- Adempiere, a Java based ERP-System which started as a fork of Compiere
- Compiere, a Java based ERP-System
- Dolibarr, a PHP based ERP system
- ERP5, a Python based ERP system
- GNU Enterprise
- GRR (software), a PHP/MySQL -based, web-accessed free ERP system
- JFire, a Java based ERP-System from NightLabs
- Kuali Foundation
- LedgerSMB
- OFBiz
- OpenBlueLab
- Openbravo, a Java based ERP-System
- OpenERP (formerly Tiny ERP)
- Opentaps (Java based)
- OrangeHRM

- Postbooks from XTuple
- SQL-Ledger
- Stoq
- WebERP

What Is Supply Chain Management (SCM)?

Supply chain management is the management of the flow of goods and services and includes all processes that transform raw materials into final products. It involves the active streamlining of a business's supply-side activities to maximize customer value and gain a competitive advantage in the marketplace.

SCM represents an effort by suppliers to develop and implement supply chains that are as efficient and economical as possible. Supply chains cover everything from production to product development to the information systems needed to direct these undertakings.Explaining Supply Chain Management (SCM)

How Supply Chain Management Works:

Typically, SCM attempts to centrally control or link the production, shipment, and distribution of a product. By managing the supply chain, companies are able to cut excess costs and deliver products to the consumer faster. This is done by keeping tighter control of internal inventories, internal production, distribution, sales, and the inventories, of company vendors.

SCM is based on the idea that nearly every product that comes to market results from the efforts of various organizations that make up a supply chain. Although supply chains have existed for ages, most companies have only recently paid attention to them as a value-add to their operations.

In SCM, the supply chain manager coordinates the logistics of all aspects of the supply chain which consists of five parts:

- The plan or strategy
- The source (of raw materials or services)
- Manufacturing (focused on productivity and efficiency)
- Delivery and logistics
- The return system (for defective or unwanted products)

The supply chain manager tries to minimize shortages and keep costs down. The job is not only about logistics and purchasing inventory. According

to salary.com , supply chain managers, “make recommendations to improve productivity, quality, and efficiency of operations.”

Improvements in productivity and efficiency go straight to the bottom line of a company and have a real and lasting impact. Good supply chain management keeps companies out of the headlines and away from expensive recalls and lawsuits.

Supply Chains:

A supply chain is the connected network of individuals, organizations, resources, activities, and technologies involved in the manufacture and sale of a product or service. A supply chain starts with the delivery of raw materials from a supplier to a manufacturer and ends with the delivery of the finished product or service to the end consumer.

SCM oversees each touchpoint of a company's product or service, from initial creation to the final sale. With so many places along the supply chain that can add value through efficiencies or lose value through increased expenses, proper SCM can increase revenues, decrease costs, and impact a company's bottom line.

KEY TAKEAWAYS:

- Supply chain management (SCM) is the centralized management of the flow of goods and services and includes all processes that transform raw materials into final products.
- By managing the supply chain, companies are able to cut excess costs and deliver products to the consumer faster.
- Good supply chain management keeps companies out of the headlines and away from expensive recalls and lawsuits.

Example of SCM

Understanding the importance of SCM to its business, Walgreens Boots Alliance Inc. placed focused effort on transforming its supply chain in 2016. The company operates one of the largest pharmacy chains in the United States and needs to efficiently manage and revise its supply chain so it stays ahead of the changing trends and continues to add value to its bottom line.

As of July 5, 2016, Walgreens has invested in the technology portion of its supply chain. It implemented a forward-looking SCM that synthesizes relevant data and uses analytics to forecast customer purchase behavior, and then it works its way back up the supply chain to meet that expected demand.

For example, the company can anticipate flu patterns, which allow it to accurately forecast needed inventory for over-the-counter flu remedies, creating an efficient supply chain with little waste. Using this SCM, the company can reduce excess inventory and all of the inventories' associated costs, such as the cost of warehousing and transportation.

What is Data Warehousing?

Data warehousing is the process of constructing and using a data warehouse. A data warehouse is constructed by integrating data from multiple heterogeneous sources that support analytical reporting, structured and/or ad hoc queries, and decision making. Data warehousing involves data cleaning, data integration, and data consolidations.

Using Data Warehouse Information

There are decision support technologies that help utilize the data available in a data warehouse. These technologies help executives to use the warehouse quickly and effectively. They can gather data, analyze it, and take decisions based on the information present in the warehouse. The information gathered in a warehouse can be used in any of the following domains −

- **Tuning Production Strategies** − The product strategies can be well tuned by repositioning the products and managing the product portfolios by comparing the sales quarterly or yearly.
- **Customer Analysis** − Customer analysis is done by analyzing the customer's buying preferences, buying time, budget cycles, etc.
- **Operations Analysis** − Data warehousing also helps in customer relationship management, and making environmental corrections. The information also allows us to analyze business operations.

Integrating Heterogeneous Databases

To integrate heterogeneous databases, we have two approaches −

- Query-driven Approach
- Update-driven Approach

Query-Driven Approach

This is the traditional approach to integrate heterogeneous databases. This approach was used to build wrappers and integrators on top of multiple heterogeneous databases. These integrators are also known as mediators.

Process of Query-Driven Approach

- When a query is issued to a client side, a metadata dictionary translates the query into an appropriate form for individual heterogeneous sites involved.
- Now these queries are mapped and sent to the local query processor.
- The results from heterogeneous sites are integrated into a global answer set.

Disadvantages:

- Query-driven approach needs complex integration and filtering processes.
- This approach is very inefficient.
- It is very expensive for frequent queries.
- This approach is also very expensive for queries that require aggregations.

Update-Driven Approach:

This is an alternative to the traditional approach. Today's data warehouse systems follow update-driven approach rather than the traditional approach discussed earlier. In update-driven approach, the information from multiple heterogeneous sources are integrated in advance and are stored in a warehouse. This information is available for direct querying and analysis.

Advantages:

This approach has the following advantages −

- This approach provides high performance.
- The data is copied, processed, integrated, annotated, summarized and restructured in semantic data store in advance.
- Query processing does not require an interface to process data at local sources.

Functions of Data Warehouse Tools and Utilities

The following are the functions of data warehouse tools and utilities −

- **Data Extraction** − Involves gathering data from multiple heterogeneous sources.
- **Data Cleaning** − Involves finding and correcting the errors in data.
- **Data Transformation** − Involves converting the data from legacy format to warehouse format.

- **Data Loading** − Involves sorting, summarizing, consolidating, checking integrity, and building indices and partitions.
- **Refreshing** − Involves updating from data sources to warehouse.

Note − Data cleaning and data transformation are important steps in improving the quality of data and data mining results.

OR

Data Warehousing

A Database Management System (DBMS) stores data in the form of tables, uses ER model and the goal is ACID PROPERTIES. For example, a DBMS of college has tables for students, faculty, etc.

A **Data Warehouse** is separate from DBMS, it stores huge amount of data, which is typically collected from multiple heterogeneous source like files, DBMS, etc. The goal is to produce statistical results that may help in decision makings. For example, a college might want to see quick different results, like how is the placement of CS students has improved over last 10 years, in terms of salaries, counts, etc.

Need of Data Warehouse

An ordinary Database can store MBs to GBs of data and that too for a specific purpose. For storing data of TB size, the storage shifted to Data Warehouse. Besides this, a transactional database doesn't offer itself to analytics. To effectively perform analytics, an organization keeps a central Data Warehouse to closely study its business by organizing, understanding and using its historic data for taking strategic decisions and analyzing trends.

Data Warehouse vs DBMS

S.No.	Database	Data Warehouse
1.	A common Database is based on operational or transactional processing. Each operation is an indivisible transaction.	A Data Warehouse is based on analytical processing.
2.	Generally, a Database stores current and up-to-date data which is used for daily operations.	A Data Warehouse maintains historical data over time. Historical data is the data kept over years and can be used for trend analysis, make future predictions and decision support.
3.	A database is generally application specific. Example - A database stores related data, such as the student details in a school.	A Data Warehouse is integrated generally at the organization level, by combining data from different databases. Example - A data warehouse integrates the data from one or more databases, so that analysis can be done to get results, such as the best performing school in a city.
4.	Constructing a Database is not so expensive.	Constructing a Data Warehouse can be expensive.

Example Applications of Data Warehousing

Data Warehousing can be applicable anywhere where we have huge amount of data and we want to see statistical results that help in decision making.

- **Social Media Websites:** The social networking websites like Facebook, Twitter, Linkedin etc. are based on analyzing large data sets. These sites gather data related to members, groups, locations etc. and store it in a single central repository. Being large amount of data, Data Warehouse is needed for implementing the same.
- **Banking:** Most of the banks these days use warehouses to see spending patterns of account/card holders. They use this to provide them special offers, deals, etc.
- **Government:** Government uses data warehouse to store and analyze tax payment which is used to detect tax thefts.

There can be many more applications in different sectors like E-Commerce, Telecommunication, Transportation Services, Marketing and Distribution, Healthcare and Retail.

Q.1) What are the essential components of an information system? Highlight the characteristics of system and cite the importance of feedback in information systems.

Q.2) Discuss various types of information systems

Q.3) Describe the following features of Word Processor giving one example each:

(a) Mail merge

(b) Macro

(c) Auto text and find.

Q.4) How the internet works? Describe the features of internet.

Q.5) Write short notes on the following:

(a) Characteristics of a multimedia

(b) Internet and e-Business.

Q.6) Explain the steps involved, for each of the following in MS-Word:

(a) Changing Documents Margin

(b) Setting Page Margins

(c) What is a template?

(d) Table creation and adding/deleting rows.

Q.7) (a) What is a spread sheet? How various mathematical calculations are made in columns and rows? How it is useful to business managers?

(b) How would you draw a graph in a spreadsheet package? How would you write text in a spreadsheet? How would you merge two spreadsheets? How would you insert columns/rows in a spreadsheet?

Q.8) How can you use spreadsheet package for data base functions? Give suitable examples.

Q.9) Compare and contrast data and information with example

Q,10) Write short notes on the following:

(a) Office Automation

(b) Information system in business.

Q.11) Describe the advantages of word processor.

Q.12) Define Mail Merge. Difference between editing and formatting the text

Q.13) How to create worksheet? Explain function of worksheet

Q.14) Write short notes on the following: (a) Formatting Cells 5 (b) Creating Graphs.

Q.15) Explain internet with its background and history

Q.16) What do you mean by multimedia? Elaborate multimedia applications with example.

Q.17) What is enterprise resource planning? Explain it with benefits and applications?

Q.18) what is supply chain management? Explain it with principles?

Q.19) Give advantages and disadvantages of data warehousing.

Q.20) Explain the architecture of data warehousing?

Q.21) What do you mean by web-page? Explain types of web-pages?

Q.22) Write short note on:

a) website planning process

b) website and page development tools

Q.23) Explain website organisation? How can you maintain a good website?

Q.24) Explain the impact and future of IT in business organisation?

Q.25 generate html page for our own biodata (use all formatting tag)

Q.26) generate college admission form using html form **tag**

Q.27) Explain in brief the history of internet.

Q.28) Explain features of HTML?

Q.29) Define web page? Explain two types of web page?

Q.30) What is FORM? Give different object of form with tag?

Q.31) Write an HTML table tag sequence that outputs the following:
50 pcs 100 500
10 pcs 5 50

Q.32) What are the new elements which are available in HTML5?

Q.33) How do you insert a comment in HTML ?

Q.34) What are some of the common lists that can be used when designing a page? Explain?