

SUBJECT CODE : IT8005

Strictly as per Revised Syllabus of
ANNA UNIVERSITY
Choice Based Credit System (CBCS)
Semester - VIII (IT) Professional Elective - V

ELECTRONIC COMMERCE

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Published by :



Amit Residency, Office No.1, 412, Shaniwar Peth,
Pune - 411030, M.S. INDIA, Ph.: +91-020-24495496/97
Email : sales@technicalpublications.org Website : www.technicalpublications.org

Printer :

Yogiraj Printers & Binders
Sr.No. 10/1A,
Ghule Industrial Estate, Nanded Village Road,
Tal. - Haveli, Dist. - Pune - 411041.

ISBN 978-93-90041-29-9



9 789390 041299

AU 17

PREFACE

The importance of **Electronic Commerce** is well known in various engineering fields. Overwhelming response to our books on various subjects inspired us to write this book. The book is structured to cover the key aspects of the subject **Electronic Commerce**.

The book uses plain, lucid language to explain fundamentals of this subject. The book provides logical method of explaining various complicated concepts and stepwise methods to explain the important topics. Each chapter is well supported with necessary illustrations, practical examples and solved problems. All the chapters in the book are arranged in a proper sequence that permits each topic to build upon earlier studies. All care has been taken to make students comfortable in understanding the basic concepts of the subject.

The book not only covers the entire scope of the subject but explains the philosophy of the subject. This makes the understanding of this subject more clear and makes it more interesting. The book will be very useful not only to the students but also to the subject teachers. The students have to omit nothing and possibly have to cover nothing more.

We wish to express our profound thanks to all those who helped in making this book a reality. Much needed moral support and encouragement is provided on numerous occasions by our whole family. We wish to thank the **Publisher** and the entire team of **Technical Publications** who have taken immense pain to get this book in time with quality printing.

Any suggestion for the improvement of the book will be acknowledged and well appreciated.

Authors

Avinash Jha

Mihirkumar Ashokbhai Mishra

Dedicated to Parents, Friends and Students.

SYLLABUS

Electronic Commerce - (IT8005)

UNIT - I Introduction to E-Commerce and Technology Infrastructure

Working of Web - HTML Markup for Structure - Creating simple page - Marking up text - Adding Links - Adding Images - Table Markup - Forms - HTML5. **(Chapter - 1)**

UNIT - II Building an E-Commerce Website, Mobile Site and Apps

Systematic approach to build an E-Commerce : Planning, System Analysis, System Design, Building the system, Testing the system, Implementation and Maintenance, Optimize Web Performance - Choosing hardware and software - Other E-Commerce Site tools - Developing a Mobile Website and Mobile App. **(Chapter - 2)**

UNIT - III E-Commerce Security and Payment Systems

E-Commerce Security Environment - Security threats in E-Commerce - Technology Solutions : Encryption, Securing Channels of Communication, Protecting Networks, Protecting Servers and Clients - Management Policies, Business Procedure and Public Laws - Payment Systems. **(Chapter - 3)**

UNIT - IV Business Concepts in E-Commerce

Digital Commerce Marketing and Advertising strategies and tools - Internet Marketing Technologies - Social Marketing - Mobile Marketing - Location based Marketing - Ethical, Social, Political Issues in E-Commerce. **(Chapter - 4)**

UNIT - V Project Case Study

Case Study : Identify Key components, strategy, B2B, B2C Models of E-commerce Business model of any e-commerce website - Mini Project : Develop E-Commerce project in any one of Platforms like Woo-Commerce, Magento or Opencart. **(Chapter - 5)**

TABLE OF CONTENTS

Unit - I

Chapter - 1	Introduction to E-Commerce and Technology Infrastructure	(1 - 1) to (1 - 66)
1.1	What is E-Commerce?	1 - 2
1.2	Working of Web.....	1 - 2
1.2.1	How the Web Works	1 - 3
1.3	HTML Markup for Structure	1 - 3
1.3.1	Structure of an HTML Document	1 - 3
1.3.2	Basic Tags of HTML	1 - 5
1.3.3	HTML Element	1 - 9
1.3.4	HTML Attribute	1 - 9
1.4	Creating First HTML Page	1 - 11
1.4.1	HTML Elements Formatting	1 - 14
1.5	HTML Links.....	1 - 21
1.5.1	The target Attribute in HTML Link	1 - 22
1.5.2	Absolute URLs Vs. Relative URLs	1 - 23
1.5.3	Use of Image, Email Address and Button as a LINK	1 - 23
1.5.4	Link Title	1 - 26
1.6	HTML Images	1 - 27
1.6.1	The src Attribute	1 - 27
1.6.2	The alt Attribute.....	1 - 28
1.6.3	Image Size.....	1 - 29
1.6.4	Images in Another Folder or on Another Server/Website	1 - 30
1.6.5	HTML Background Images.....	1 - 31

1.7 Table Markup.....	1 - 34
1.8 HTML Forms.....	1 - 39
1.8.1 The <form> Element	1 - 40
1.8.2 HTML Form Attributes.....	1 - 49
1.9 HTML5.....	1 - 56
1.10 Part A : Short Answered Questions (2 Marks Each).....	1 - 58
1.11 Part B : Long Answered Questions.....	1 - 65

Unit - II

Chapter - 2 Building an E-Commerce Website, Mobile Site and Apps (2 - 1) to (2 - 40)

2.1 Systematic Approach to Build an E-Commerce	2 - 2
2.2 Planning	2 - 3
2.2.1 System Analysis	2 - 3
2.2.2 System Design	2 - 5
2.2.3 Building the System.....	2 - 6
2.2.3.1 Build Your Own Vs Outsourcing.	2 - 7
2.2.3.2 Host Your Own Vs Outsourcing.	2 - 9
2.2.4 Testing the System.....	2 - 10
2.2.5 Implementation and Maintenance	2 - 11
2.3 Optimize Web Performance	2 - 12
2.4 Choosing Software.....	2 - 13
2.4.1 Simple Vs Multi-Tiered Website Architecture.....	2 - 13
2.4.2 Web Server Software.....	2 - 15
2.4.3 Site Management Tools	2 - 16
2.4.4 Dynamic Page Generation Tools.....	2 - 16
2.4.5 Application Servers	2 - 18
2.4.6 E-Commerce Merchant Server Software Functionality	2 - 19
2.4.7 Choosing an E-Commerce Software Platform.....	2 - 20

2.5 Choosing Hardware	2 - 21
2.5.1 Right-Sizing Your Hardware Platform : The Demand Side	2 - 21
2.5.2 Right-Sizing Your Hardware Platform : The Supply Side.....	2 - 22
2.6 Other E-Commerce Site Tool	2 - 24
2.6.1 Website Design : Basic Business Considerations.....	2 - 24
2.6.2 Tools for Search Engine Optimization	2 - 26
2.6.3 Tools for Interactivity and Active Content.....	2 - 27
2.6.3.1 Common Gateway Interface (CGI)	2 - 27
2.6.3.2 Active Server Pages (ASP) and ASP.NET	2 - 27
2.6.3.3 Java, Java Server Pages (JSP) and JavaScript	2 - 28
2.6.3.4 ColdFusion	2 - 28
2.6.3.5 ActiveX and VBScript.	2 - 29
2.6.3.6 PHP, Ruby on Rails (RoR) and Django.	2 - 29
2.6.4 Personalization Tools.....	2 - 30
2.7 Developing a Mobile Website and Mobile App.....	2 - 30
2.7.1 Planning and Building A Mobile Presence	2 - 32
2.7.2 Mobile Presence : Design Considerations	2 - 33
2.7.3 Cross-Platform Mobile App Development Tools.....	2 - 34
2.7.4 Mobile Presence : Performance and Cost Considerations	2 - 35
2.8 Part A : Short Answered Questions (2 Marks Each).....	2 - 36
2.9 Part B : Long Answered Questions.....	2 - 39

Unit - III

Chapter - 3 E-Commerce Security and Payment Systems	
	(3 - 1) to (3 - 32)
3.1 E-Commerce Security Environment.....	3 - 2
3.2 Security Threats in E-Commerce	3 - 5
3.3 Technology Solutions.....	3 - 10
3.4 Management Policies, Business Procedure and Public Laws.....	3 - 19

3.4.1 A Security Plan : Management Policies	3 - 20
3.4.2 The Role of Laws and Public Policy.....	3 - 22
3.5 E-Commerce Payment Systems.....	3 - 23
3.6 Part A : Short Answered Questions (2 Marks Each).....	3 - 25
3.7 Part B : Long Answered Questions.....	3 - 31

Unit - IV

Chapter - 4 Business Concepts in E-Commerce (4 - 1) to (4 - 28)

4.1 Digital Commerce Marketing and Advertising Strategies and Tools	4 - 2
4.1.1 The Website as a Marketing Platform	4 - 2
4.1.2 Traditional Online Marketing and Advertising Tools	4 - 3
4.1.2.1 Search Engine Marketing and Advertising	4 - 4
4.1.2.2 Display Ad Marketing	4 - 7
4.1.2.3 Types of Display Ads	4 - 8
4.1.2.4 Email Marketing	4 - 10
4.1.2.5 Affiliate Marketing	4 - 11
4.1.2.6 Lead Generation Marketing.	4 - 12
4.2 Internet Marketing Technologies	4 - 14
4.2.1 Web Transaction Logs	4 - 14
4.2.2 Supplementing the Logs : Cookies and other Tracking Files	4 - 15
4.3 Social Marketing	4 - 16
4.4 Mobile Marketing	4 - 18
4.5 Location based Marketing	4 - 19
4.5.1 Types of Location-Based Marketing.....	4 - 19
4.5.1.1 Geotargeting	4 - 19
4.5.1.2 Geofencing.	4 - 20
4.5.1.3 Beaconing	4 - 20
4.5.1.4 Mobile Targeting	4 - 21

4.6 Ethical, Social, Political Issues in E-Commerce	4 - 21
4.6.1 Public Policy Issues in E commerce	4 - 22
4.6.2 Basic Ethical Concepts : Responsibility Accountability & Liability	4 - 22
4.6.3 Privacy and Information Rights.....	4 - 23
4.7 Part A : Short Answered Questions (2 Marks Each).....	4 - 24
4.8 Part B : Long Answered Questions.....	4 - 27

Unit - V

Chapter - 5 Project Case Study	(5 - 1) to (5 - 12)
5.1 Identify Key Components	5 - 2
5.2 Major Business-To-Consumer (B2C) Business Models	5 - 8
5.3 Major Business-To-Business (B2B) Business Models.....	5 - 10
5.4 Part A : Short Answered Questions (2 Marks Each).....	5 - 11
5.5 Part B : Long Answered Questions.....	5 - 12

Solved Model Question Paper	(M - 1) to (M - 2)
------------------------------------	---------------------------

Notes

UNIT- I

1

Introduction to E-Commerce and Technology Infrastructure

Syllabus

Working of Web - HTML Markup for Structure - Creating simple page - Marking up text - Adding Links - Adding Images - Table Markup - Forms - HTML5.

Contents

- 1.1 *What is E-Commerce?*
- 1.2 *Working of Web*
- 1.3 *HTML Markup for Structure*
- 1.4 *Creating First HTML Page*
- 1.5 *HTML Links*
- 1.6 *HTML Images*
- 1.7 *Table Markup*
- 1.8 *HTML Forms*
- 1.9 *HTML5*
- 1.10 *Part A : Short Answered Questions (2 Marks Each)*
- 1.11 *Part B : Long Answered Questions*

1.1 What is E-Commerce?

- Now a day the companies like Amazon, Flipkart, eBay, Google, Apple, and Facebook are the part of our life. Same way the companies like uber, ola, zomato are also the part of our life we can say. All these and these types of companies are serving on-demand services in various fields from home appliances to the travel and hotels. E-commerce (Electronic Commerce or Internet Commerce) signifies to buying and selling of goods or services using the internet, addition with that the transaction of the money and data to execute these services are executes using internet. In another word, selling of physical product online refers to the e-commerce. E-commerce also describes any kind of commercial transaction that is facilitated through the internet. Small businesses, large companies/ corporations, and independent freelancers have lots of benefits from the e-commerce, which enables them to sell their products and services that was not possible or they are difficult with traditional offline retail.
- There are four business models for the e-commerce :
 1. Business to Business (B2B)
 2. Business to Customer (B2C)
 3. Customer to Customer (C2C)
 4. Customer to Business (C2B).
- The various examples of the e-commerce companies are Amazon, Flipkart, eBay, Fiverr, Upwork, Olx, Quikr etc.

1.2 Working of Web

- The web physically consists of the following :
 - The **personal computer** at which you sit to the web.
 - A **web browser** that is the software installed on your computer, which helps you to serf/browse the web.
 - An **internet connection** which is provided by an ISP and which will connects you to the internet to reach to any website.
 - A **web server** that is the computer on which a website is hosted.
 - **Routers and Switches** which are the combination of software and hardware who takes your request and pass to appropriate web server.
- The Web is a kind of client-server system where your computer is a client and the remote computers that store electronics files are the servers.

1.2.1 How the Web Works

- When you enter something like <https://technicalpublications.org/> the request goes to the special computer (it may be single or multiple computers, but request will be sent to one of these computers) on the internet which is known as DNS – Domain Name Servers. The routers and switches routes all the requests. The DNS keep tables of machine names and their IP addresses. When you type <https://technicalpublications.org/> it gets translated into a number. This number identifies the computer that serves the Technical Publication website for you.
- To view any page on the web, you must start the process by requesting a page using your web browser. The browser asks a DNS to translate the requested domain name into an IP address. The request then sent by the browser to the server for the page you want, using a standard call Hypertext Transfer Protocol (HTTP).
- It is essential for the server that it should constantly be to the internet and always ready to serve pages to visitors. When a server receives a request, it looks for the requested document and returns that document to the web browser. Meanwhile the server logs the client's IP address, the requested document, and the date and time it requested. These information varies server to server.
- When any request made for the web page actually it requires web browser to request more than one file from the web server like HTML page, any images, style sheets, and other resources used in the web page. Each of these files including the main page needs a URL to identify each item, and this item is sent by the web server to the web browser. Then the web browser collects all this information and displays them in the form of web page.

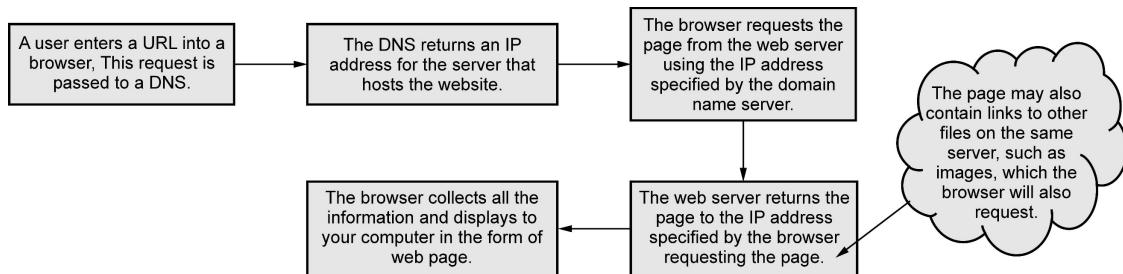


Fig. 1.1.1 : Working of web

1.3 HTML Markup for Structure

1.3.1 Structure of an HTML Document

- The <HTML> is a markup language which is used by the browser to manipulate text, images and other contents to display it in required format.

- One of the most important parts in the HTML document is Tags. Some predefined tags are used by HTML which tells the browser about content display priority. Here display priority means how to display a particular given content. For Example, if you want to create a paragraph, you must use the paragraph tag(`<p></p>`) . Same way if you wants to insert an image you must use the img tag(``). There are basically two types of tags in HTML :
 - Paired Tags** which come in a pair, that is they have both opening (`<>`) and closing (`</>`) tags.
 - Singular Tags** which do not required to be closed.
- Fig. 1.3.1 is an example of (``) tag in HTML, which tells the browser to bold the text inside it.



Fig. 1.3.1 An example of HTML tag

- An HTML document is basically divided into two parts :
 - HEAD** which contains the information about the HTML document like Title of the page, version of the HTML, Meta Data, etc.
 - Body** which contains everything designer/user want to display on the Web Page.
- Fig. 1.3.2 shows the code which is must for every web page.

```
<!DOCTYPE html>

<html>
  <head>
    <title>

      </title>
    </head>

    <body>

      </body>
  </html>
```

Fig. 1.3.2 Required HTML code for every web page

- Every web page must contain the code which is given in the Fig. 1.3.2. The explanation of each tag used in Fig. 1.3.2 is as below :
 - `<!DOCTYPE html>` tag is used to tells the HTML version.
 - `<html>` is called HTML root element and used to wrap all the code.
 - `<head>` tag contains metadata, title, page CSS etc. All the HTML elements that can be used inside `<head>` elements are :
 - `<style>`
 - `<title>`
 - `<base>`
 - `<noscript>`
 - `<script>`
 - `<meta>`
- `<body>` tag is used to enclosed all the data which a web page has from text to links. All of the contents that we see rendered in the browser is contained within this element.

1.3.2 Basic Tags of HTML

1. Heading Tags

- Each and every document should be start with a heading. You can use various size for that headings. HTML has six levels of heading and for that we have to use the elements `<h1>`, `<h2>`, `<h3>`, `<h4>`, `<h5>`, and `<h6>`. While you use these tag for displaying any heading, the browser adds one line before and one line after that heading.
- Example :

```
<!DOCTYPE html>
<html>

<head>
    <title>Heading Example</title>
</head>

<body>
    <h1>Heading 1</h1>
    <h2>Heading 2</h2>
    <h3>Heading 3</h3>
    <h4>Heading 4</h4>
    <h5>Heading 5</h5>
```

```
<h6>Heading 6</h6>
</body>

</html>
```

Output for the above example is as given in below

Heading 1

Heading 2

Heading 3

Heading 4

Heading 5

Heading

2. Paragraph Tag

- If you want to add any paragraph in your web page you have to add `<p>` tag. Each paragraph of the text should be in between `<p>` and `</p>` that is opening and closing paragraph tag.
- Example :

```
<!DOCTYPE html>
<html>

    <head>
        <title>Paragraph Tag Example</title>
    </head>

    <body>
        <p>A first paragraph of text.</p>
        <p>A second paragraph of text.</p>
        <p>A third paragraph of text.</p>
    </body>

</html>
```

The output for the above code is as shown in the below

A first paragraph of text.

A second paragraph of text.

A third paragraph of text.

3. Line Break Tag

- Any text following `
` tag, it starts from the next line. This tag is an example of an empty element in which you do not required opening and closing tag because there is nothing to go in between these tags.
- It is required to have a space between br and forward slash (`
`) because if we omit this space the older browsers will have trouble rendering the line break. In addition with that if we miss the forward slash character and just use `
` it is not valid in XHTML.
- Example

```
<!DOCTYPE html>
<html>
  <head>
    <title>Line Break Example</title>
  </head>
  <body>
    <p>Hello<br />
      You are showing interest for reading this book.<br />
      Thanks<br />
      Ansh</p>
  </body>
</html>
```

The output of above example is as shown in the below

Hello

You are showing interest for reading this book.

Thanks

Ansh

4. Centering Content

- If you want to put the content in the center of the page then you need to use **<center>** tag as shown in the below example.

```
<!DOCTYPE html>
<html>

    <head>
        <title>Centring Content Example</title>
    </head>

    <body>
        <p>This text is without center tag.</p>

        <center>
            <p>This text is with the center tag.</p>
        </center>
    </body>

</html>
```

The output of the above example is as shown below

This text is without center tag.

This text is with center tag.

5. Horizontal Line

- If you want to break-up section of a document horizontally then horizontal lines are used and for that you need to add **<hr>** tag from where you want to break-up your document contents. The **<hr>** tag creates a lien to the next line of content where you used the tag till the right margin of the page and the further content/document will be displayed from the next line.
- The below example explain the same.

```
<!DOCTYPE html>
<html>

    <head>
        <title>Horizontal Line Example</title>
    </head>

    <body>
        <p>Before Horizontal Line </p>
        <hr />
```

```
<p>After using Horizontal Line</p>
</body>

</html>
```

The output of the above example is as shown in below

Before Horizontal Line

After Horizontal Line

1.3.3 HTML Element

- In the HTML file if the statement/code is in the form of a start tag, some content, and an end tag then that code/ statement is said as an HTML element.

```
<tag_name> some_content</tag_name>
```

- So we can say an HTML element is everything from the start tag to the end tag. For example,

```
<h1>Heading 1</h1>
<p>A paragraph</p>
```

- Here `<h1>...</h1>` and `<p>...</p>` are the HTML tag but `<h1>Heading 1</h1>` and `<p>A paragraph</p>` are the HTML elements.
- HTML element with no content are called empty element. The example of the empty element is `
` tag. The `
` tag defines a line break. It is an empty element without a closing tag.

1.3.4 HTML Attribute

- The characteristics of an HTML element which is placed inside element's opening tag are called an **attribute**. Attribute provides additional information to the HTML element. These attributes are in the form of `name="value"` where the name is the property you want to set and value is what you want the value of the property to be set and always put within quotations. All these HTML attribute values are case-insensitive. The below example explains the one of the usage of HTML attribute.

- Demo

```
<!DOCTYPE html>
<html>

<head>
  <title>Attribute Example</title>
</head>

<body>
```

```
<p align = "left">Left aligned</p>
<p align = "center">Center aligned</p>
<p align = "right">Right aligned</p>
</body>

</html>
```

The output of the above code is as shown in below

Left aligned

Center aligned

Right aligned

- The most commonly used HTML attributes are

- ID,
- Title,
- Class,
- Style

- **The Id Attribute :**

- If you want to uniquely identify any element within an HTML page then the **id** attribute can be used. A unique identifier helps to identify just that element and its content with the id you provided to that tag. To distinguish between two elements of the same name in a single web page, we can use the id attribute.

- Example :

```
<p id = "html">This text explains what is HTML</p>
<p id = "css">This text explains what is Cascading Style Sheet</p>
```

- **The Title Attribute :**

- If you want to provide suggested title for the element then you need to use title attribute. The syntax for the title attribute is same as the syntax if the id attribute. Though the behaviour of this attribute depends upon the element, it often displayed as a tooltip when cursor comes over the element, also sometime it displays when the element is loading.

- Example

```
<h1 title = "Hello HTML!">Heading tag with title attribute</h1>
```

- **The class attribute**

- The class attribute is used to associate an element with a style sheet to specify the class of element.
- Example

```
class = "className1 className2 className3"
```

- **The style attribute**

- If you want to specify CSS rules within the element then the style attribute will be used.
- Example :

```
<!DOCTYPE html>
<html>

    <head>
        <title>The style Attribute</title>
    </head>

    <body>
        <p style = "font-family:arial; color:#FF0000;">Technical Publications</p>
    </body>
</html>
```

The output of the above example is explained in below

Technical Publications

1.4 Creating First HTML Page

- While creating you any HTML page you have to follow the following steps.

Step 1 : Creating the HTML page

- Open any text editor like notepad or notepad++ of your computer and create a new file.
- It is recommended to use Notepad on Windows Operating System,TextEdit on Mac and VI editor on Unix/Linux Operating System.
- It is not recommended to use WordPad or word for HTML.
- Once you get all the basic rules and functionalities than you can switch to the tools like Dreamweaver.

Step 2 : Prepare some HTML code in the newly created file.

- Here is a sample code typed in the newly created file.

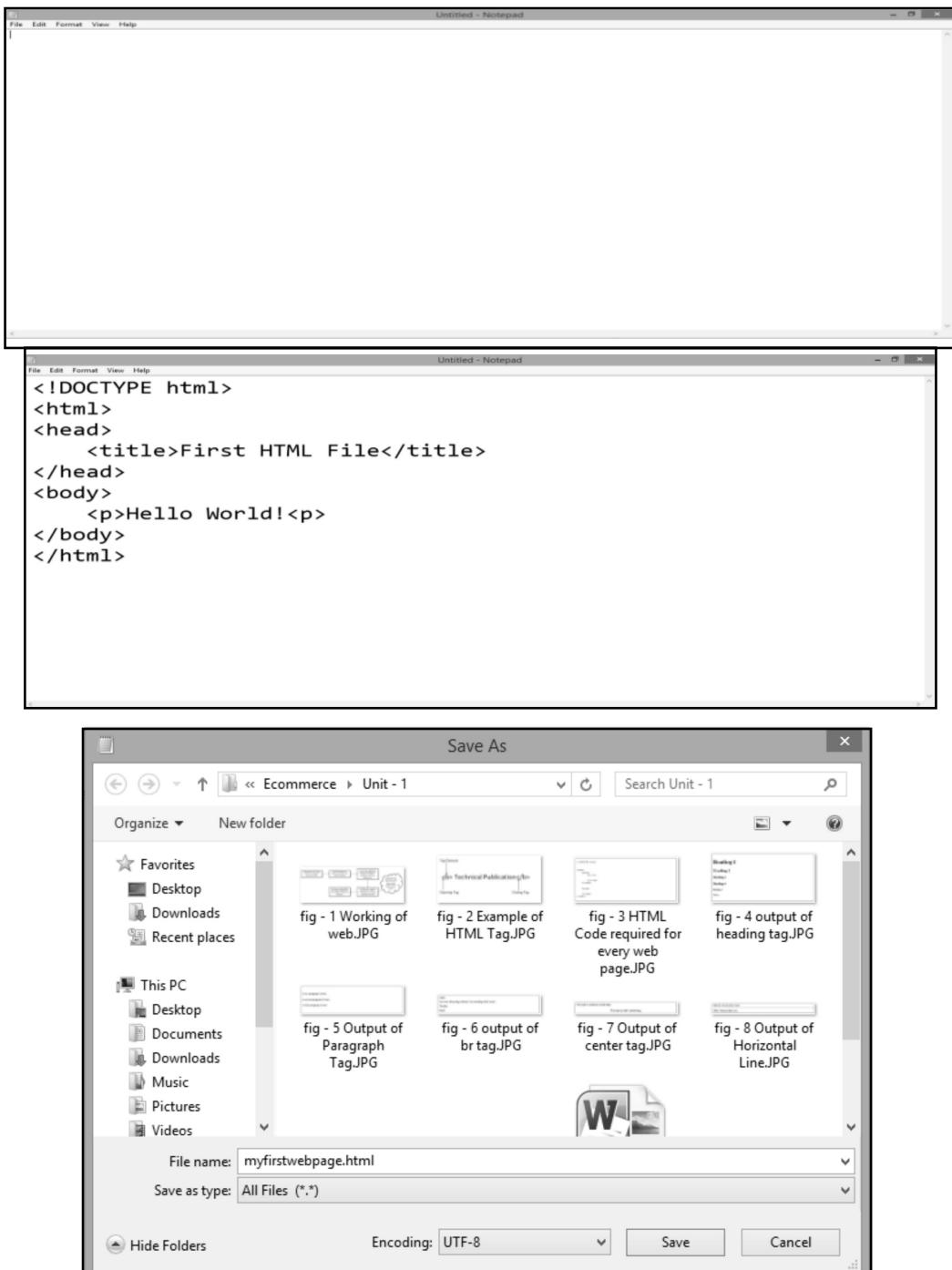
```
<!DOCTYPE html>
<html>
  <head>
    <title>First HTML File</title>
  </head>
  <body>
    <p>Hello World!<p>
  </body>
</html>
```

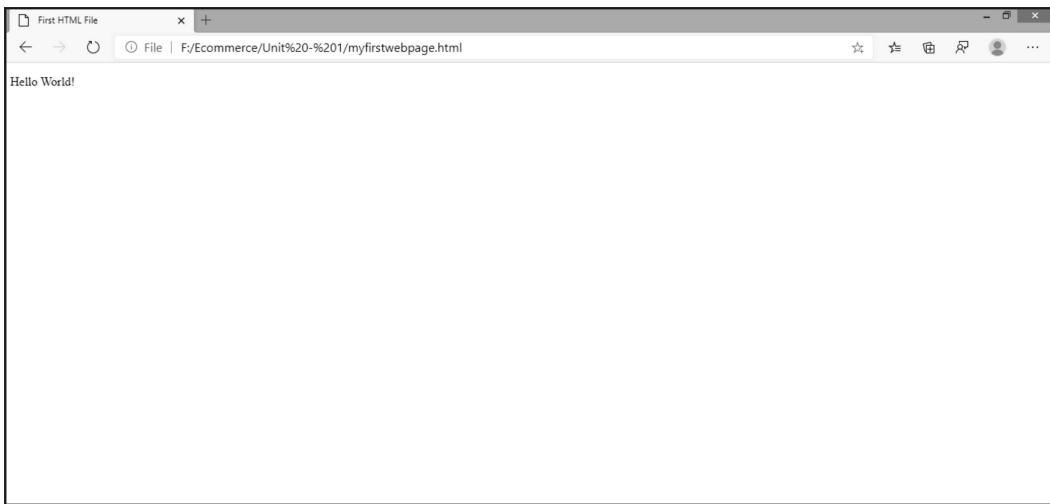
- The 1st line of the code i.e. <!DOCTYPE html> instructs the web browser that the given document is in the HTML5 document. It is also case-insensitive. So we can say this line is the document type declaration.
- A DOCTYPE declaration appears at the top of a web page before all other elements.
- The doctype declaration itself is not an HTML tag.
- Every HTML document requires a document type declaration to insure that your pages are displayed correctly.
- The <html>, <head> and <body> tags make up the basic skeleton of every web page.
- The <head> tag is used for the providing the information about the document like title of the document (using <title> tag) etc.
- Content inside the <head> and </head> are invisible to users with one exception: the text between <title> and </title> tags which appears as the title on a browser tab.
- The <body> element contains the actual content which will be reflected in the web browser and displayed to the user. This content may be paragraphs, links, images, tables and so on.

Step 3 : Saving the file

- The extension of your file must be .html. Let we say the name of the newly create file where you typed above code is “myfirstwebpage.html”.
- Now if you wants to open the same file in any web browser available in your computer, navigate to your file and then double click on it.
- It will open in the default web browser.

- o If it is failed to open by above procedure the open your web browser and then drag your file to that web browser.
- o The following figures show all the steps.





1.4.1 HTML Elements Formatting

- We can format elements of the HTML to display special type of text. Here are some commonly used tags for the same.
 - **** - Bold text
 - **** - Important text
 - **<i>** - Italic text
 - **** - Emphasized text
 - **<mark>** - Marked text
 - **<small>** - Smaller text
 - **** - Deleted text
 - **<ins>** - Inserted text
 - **<sub>** - Subscript text
 - **<sup>** - Superscript text
- Let's see an example of each tag.
 - a) **** - Bold text and **** - Important text
 - The HTML **** element defines bold text, without any extra importance. But the HTML **** element defines text with strong importance. The content inside is typically displayed in bold.

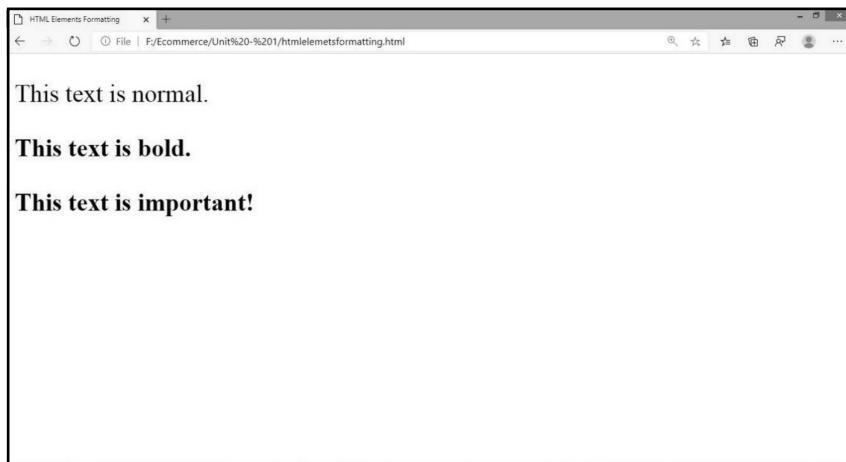
```
<!DOCTYPE html>
<html>
<head>
  <title>HTML Elements Formatting</title>
</head>
```

```
<body>
<p>This text is normal.</p>

<p><b>This text is bold.</b></p>

<p><strong>This text is important!</strong></p>
</body>
</html>
```

- o The code will be reflected in the web page as shown below.



b) *<i>* - Italic text and ** - Emphasized text

- o The HTML *<i>* element defines a part of text in an alternate voice or mood. The content inside is typically displayed in italic. The *<i>* tag is often used to indicate a technical term, a phrase from another language like a thought, a ship name, etc.
- o The HTML ** element defines emphasized text. The content inside is typically displayed in italic. A screen reader will pronounce the words in ** with an emphasis, using verbal stress.

```
<!DOCTYPE html>
<html>
  <head>
    <title>HTML Elements Formatting</title>
  </head>
  <body>
    <p>This text is normal.</p>
    <p><i>This text is italic.</i></p>
    <p><em>This text is emphasized.</em></p>
  </body>
</html>
```

- o The code will be reflected in the web page as shown below.

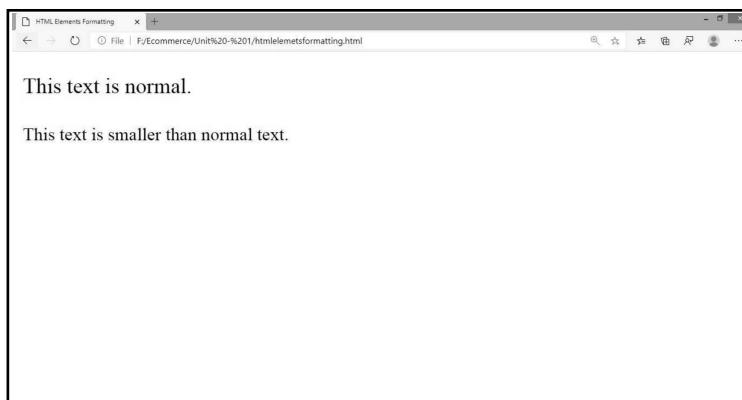


c) **<small>** - Smaller text

- o The HTML <small> element defines smaller text compared with the normal text.
The following code explains the same.

```
<!DOCTYPE html>
<html>
  <head>
    <title>HTML Elements Formatting</title>
  </head>
  <body>
    <p>This text is normal.</p>
    <p><small>This text is smaller than normal text.</small></p>
  </body>
</html>
```

- o The below figure is the web browser view of the above code.



e) <mark> - Marked text

- The HTML <mark> element defines text that should be marked or highlighted. Consider the following example.

```
<!DOCTYPE html>
<html>
    <head>
        <title>HTML Elements Formatting</title>
    </head>
    <body>
        <p>Do not forget to buy <mark>movie tickets</mark> today.</p>
    </body>
</html>
```

- The output of the above example is as shown in the below figure.

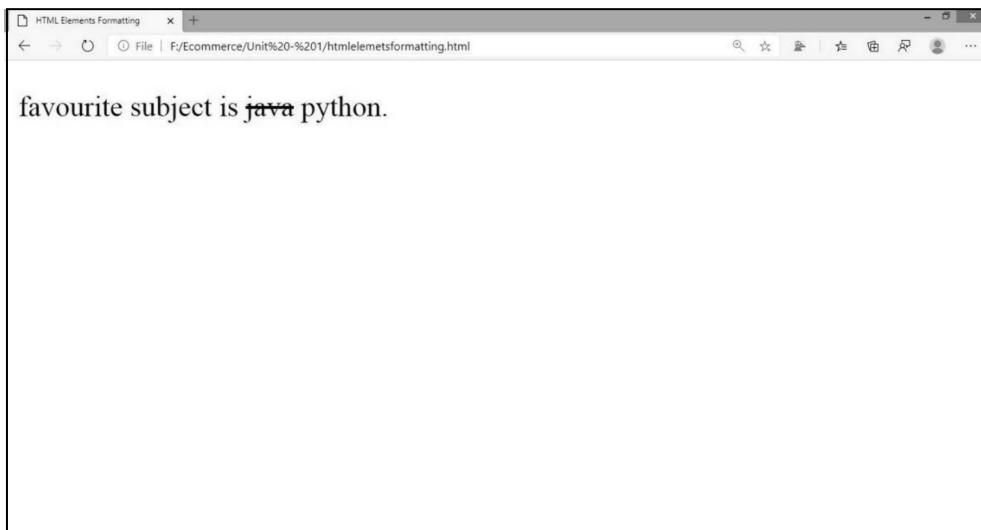


e) - Deleted text

- If you want to display a line through deleted text than you have to use the HTML element. This element defines text that has been deleted from the document.
- Consider the following example.

```
<!DOCTYPE html>
<html>
    <head>
        <title>HTML Elements Formatting</title>
    </head>
    <body>
        <p>favourite subject is <del>java</del> python.</p>
    </body>
</html>
```

- The web browser view of the above code is as shown in the below figure.



f) **<ins>** - Inserted text

- o To insert a text into document where that text must be underlined, the <ins> element we have to use. Consider the following example.

```
<!DOCTYPE html>
<html>
    <head>
        <title>HTML Elements Formatting</title>
    </head>
    <body>
        <p>favourite subject is <del>java</del> <ins>python</ins>.</p>
    </body>
</html>
```

- o The web browser view of the above code is as shown in the below figure.

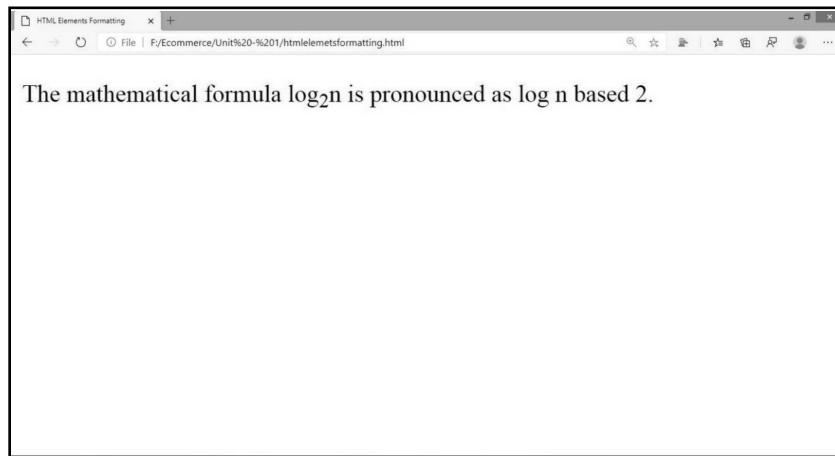


g) <sub> - Subscript text

- o The subscript text is defined by the HTML <sub> element. The subscript text is used in many formulas like H₂O, log₂n. Consider the following example.

```
<!DOCTYPE html>
<html>
    <head>
        <title>HTML Elements Formatting</title>
    </head>
    <body>
        <p>The mathematical formula log<sub>2</sub>n is pronounced as log n based 2.</p>
    </body>
</html>
```

- o The web browser view of the above code is as shown in the below figure.



The HTML <sub> element defines subscript text. Subscript text appears half a character below the normal line, and is sometimes rendered in a smaller font. Subscript text can be used for chemical formulas, like H₂O

h) <sup> - Superscript text

- o The superscript text is defined by the HTML <sup> element. The superscript text is used in many formulas like a²b², xⁿ+yⁿ. Consider the following example.

```
<!DOCTYPE html>
<html>
    <head>
        <title>HTML Elements Formatting</title>
    </head>
    <body>
        <p>(a+b)2=a2+2ab+b2</p>
    </body>

```

```
</body>  
</html>
```

- The web browser view of the above code is as shown in the below figure.



- The below table summaries all these text formatting elements.

Tag	Description
	Defines bold text
	Defines emphasized text
<i>	Defines a part of text in an alternate voice or mood
<small>	Defines smaller text
	Defines important text
<sub>	Defines subscripted text
<sup>	Defines superscripted text
<ins>	Defines inserted text
	Defines deleted text
<mark>	Defines marked/highlighted text

Table 1.4.1 HTML text formatting elements

1.5 HTML Links

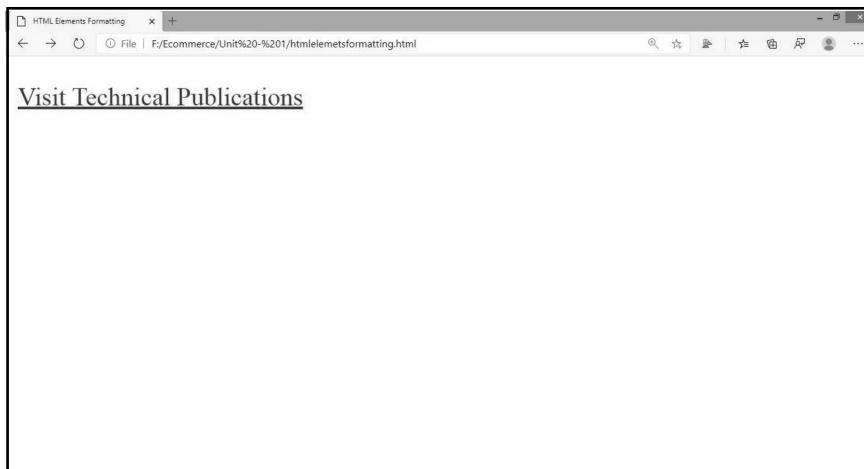
- Links allow users to click and redirect from page to page. Nowadays all the web pages almost contains the links. All the HTML links are called as hyperlinks. When you click on any hyperlink you will be moved from one page/document to another page/document. The mouse arrow will turn into a little hand, when you move the mouse over a link. The HTML tag tag defines hyperlink. If you want to use this tag you have to follow the following syntax.

```
<a href="url">link text</a>
```

- Here the href is the most important attribute of the element as it indicates the link's destination. The link text is the part which will be displayed or visible to the reader on web browser. While user will click in the link text, user will be redirected to the specified URL address. Consider the following example.

```
<!DOCTYPE html>
<html>
  <head>
    <title>HTML Elements Formatting </title>
  </head>
  <body>
    <p><a href="https://technicalpublications.org/">Visit Technical Publications</a> </p>
  </body>
</html>
```

- The output of the above example is as shown in the given figure.



Note : By default, the links will appear as follows in the web browser

- An unvisited link -> underlined and blue colour
- A visited link -> underlined and purple colour
- An active link -> underlined and red colour

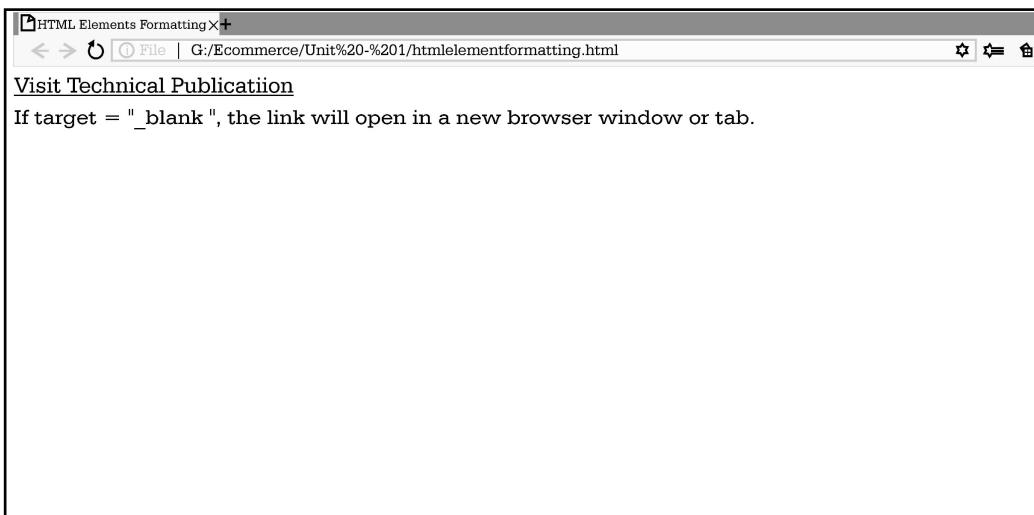
These links can be displayed in another colour if you add CSS for the links.

1.5.1 The target Attribute in HTML Link

- While user clicks on the link on the web browser, by default that page will be displayed in the current browser window. If you want to change this, the **target** attribute must be specified in the HTML link element. Where to open the linked document is specified by the **target** attribute. The target attribute can be having one of the following values:
 - _self** – Default. Opens the document in the same window/tab as it was clicked
 - _blank** – Opens the document in a new window or tab
 - _parent** – Opens the document in the parent frame
 - _top** – Opens the document in the full body of the window
- Consider the following example

```
<!DOCTYPE html>
<html>
    <head>
        <title>HTML Elements Formatting</title>
    </head>
    <body>
        <p><a href="https://technicalpublications.org/" target="_blank">Visit Technical Publications</a></p>
        <p>If target = "_blank", the link will open in a new browser window or tab.</p>
    </body>
</html>
```

- The output of the above code is as given in the below figure.



1.5.2 Absolute URLs Vs. Relative URLs

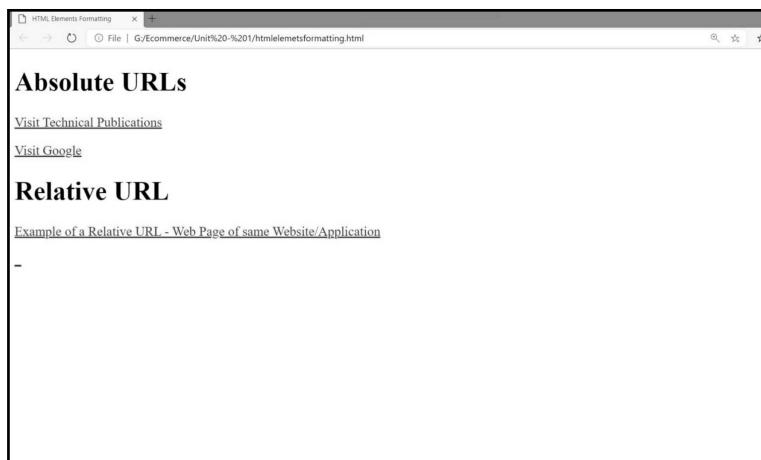
- An absolute URL is a full web address in the `href` attribute. E.g. `http://www.technicalpublications.com`. In both the above examples we have used the absolute URL.
- A local link that is a link to a page within the same website is specified with a relative URL. These relative URLs are without the "https://www" part.

Consider the following example.

```
<!DOCTYPE html>
<html>
    <head>
        <title>HTML Elements Formatting</title>
    </head>
    <body>
        <p><h1>Absolute URLs</h1></p>
        <p><a href="https://technicalpublications.org/" target="_blank">Visit Technical
            Publications</a></p>
        <p><a href="https://www.google.com" target="_blank">Visit Google</a></p>

        <p><h1>Relative URL</h1></p>
        <p><a href="relative_url.html" target="_blank">Example of a Relative URL - Web Page of
            same Website/Application</p>
    </body>
</html>
```

- The web browser view of the above example is as shown in the below figure.



1.5.3 Use of Image, Email Address and Button as a LINK

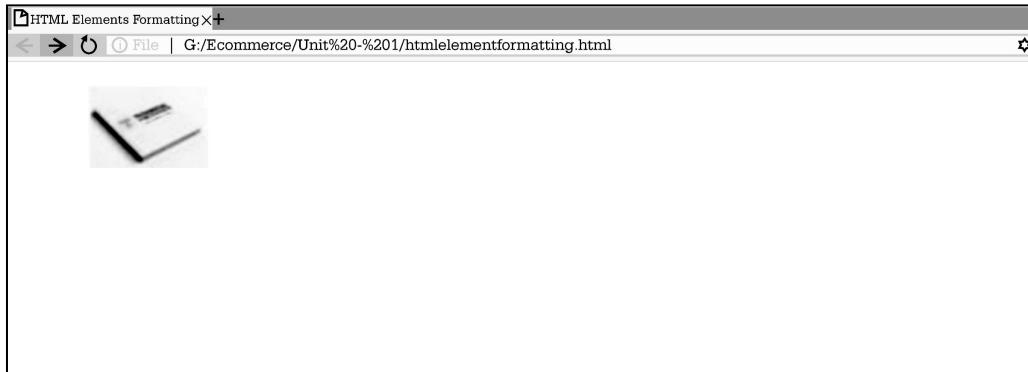
- Till now we have seen the examples of the text as a link for the `<href>` attribute in

the HTML <a> element. In place of text we can use Images, email address and button as a link in HTML

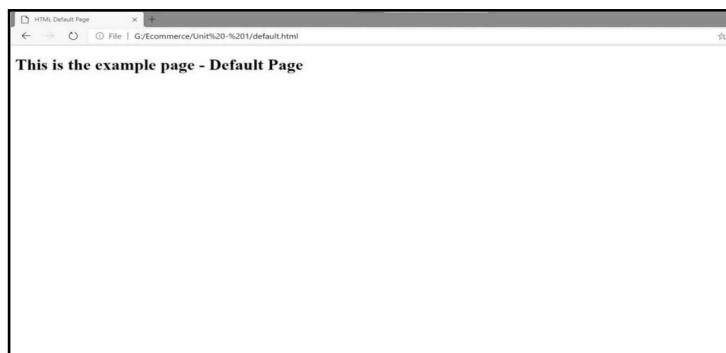
- o To use image as a link, you have to use tag inside the <a> tag. Consider the following example.

```
<!DOCTYPE html>
<html>
  <head>
    <title>HTML Elements Formatting</title>
  </head>
  <body>
    <p><a href="default.html">
      
    </a></p>
  </body>
</html>
```

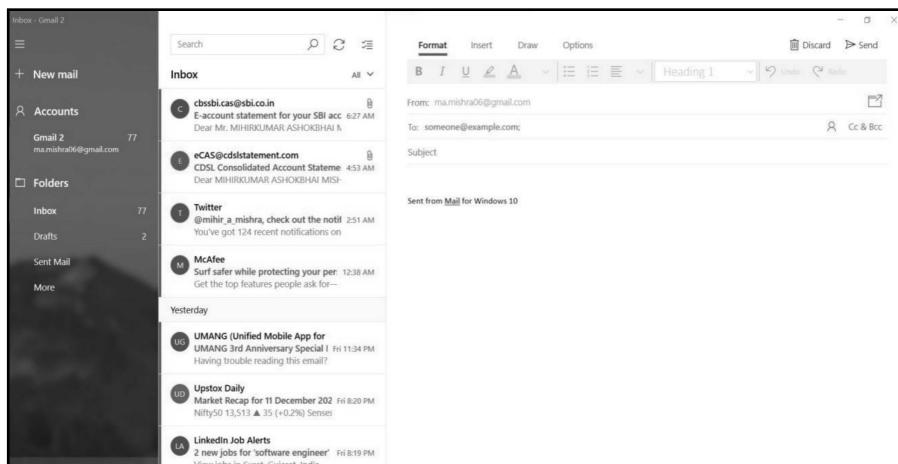
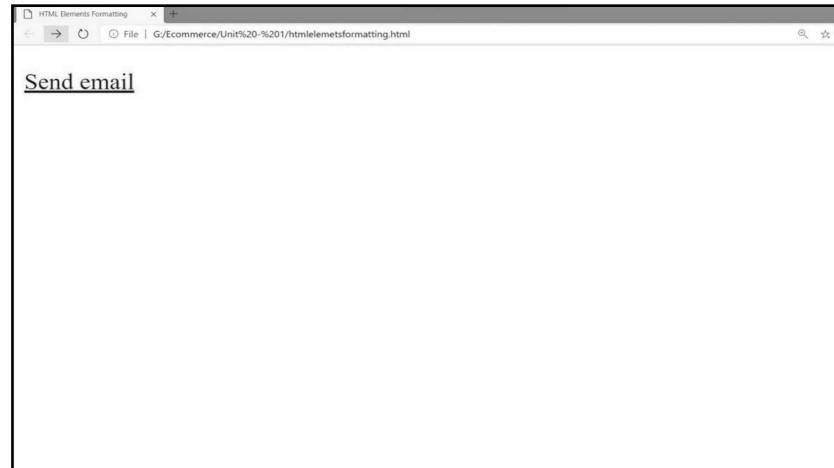
- o The web browser view of the same is as shown in the below figure.



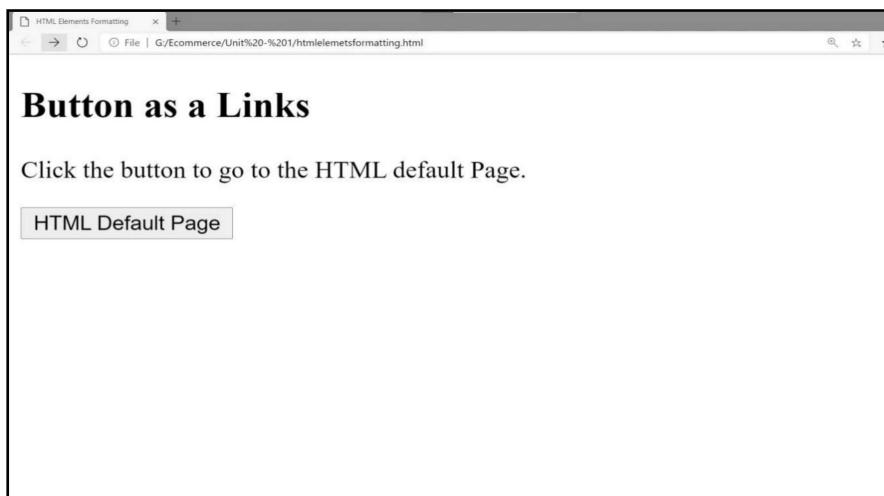
- While you click on the image it will be redirected to the default.html page as shown in the below figure.



- If you want to use email address as a link, use **mailto:** inside the **href** attribute. This will create a link that opens the user's email program to let them send a new email. Consider the following example.
- While you click on the link (in this example – send email), it will allow you to send an email and for that it will open default application set for sending an email or it will ask for an application if default application is yet not set in your system.



- Javascript code, which allows you to specify what happens at certain events, such as a click of a button is required to use button as a link. Consider the following example.

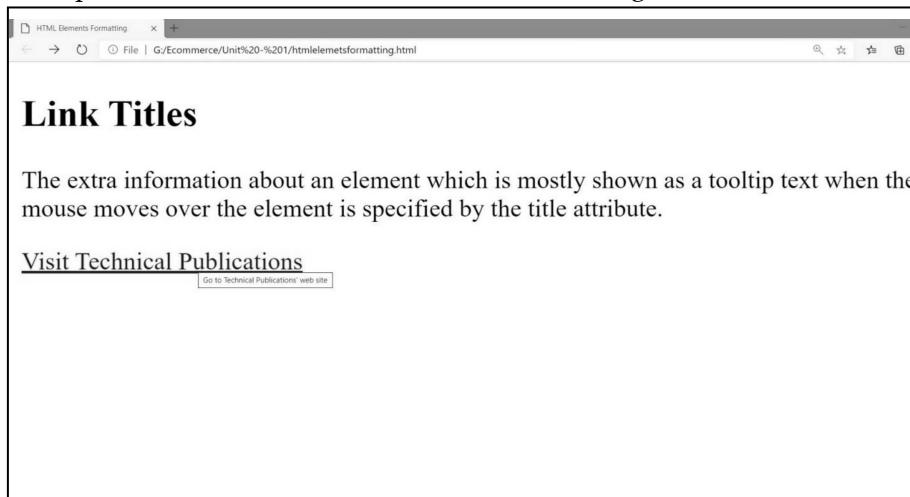


1.5.4 Link Title

- The extra information about an element which is mostly shown as a tooltip text when the mouse moves over the element is specified by the *title* attribute. Consider the following example.

```
<!DOCTYPE html>
<html>
  <head>
    <title>HTML Elements Formatting</title>
  </head>
  <body>
    <h2>Link Titles</h2>
    <p>The extra information about an element which is mostly shown as a tooltip text when the mouse moves over the element is specified by the title attribute.</p>
    <a href="https://technicalpublications.org" title="Go to Technical Publications' web site">Visit Technical Publications</a>
  </body>
</html>
```

- The output of the above code is as shown in below figure.



1.6 HTML Images

- Any web page can be look attractive if you will add the good images in the web page. If you want to add an image in a web page, you need to use the HTML `` tag. Images are not technically inserted into a web page, but these images are linked to the web page. A holding space for the reference image creates by the `` tag. It is an empty tag, it does not have a closing tag and it contains two attributes. These two required attributes are :
 - `src` – used to specify the path to the image
 - `alt` – used to specify and alternate text for the image
- The syntax for the `` tag with these two attribute is:

```

```

1.6.1 The `src` Attribute

- The `src` attribute is the required URL path to the image. When a web page loads, it is the task of the browser to gets the image(s) from a web server and inserts that image(s) into the page. So it is mandatory that the image is actually stays in the same location in relation to the web page. If it fails, your visitors will get a broken link icon. In this situation the browser will show the broken link icon and alt text.

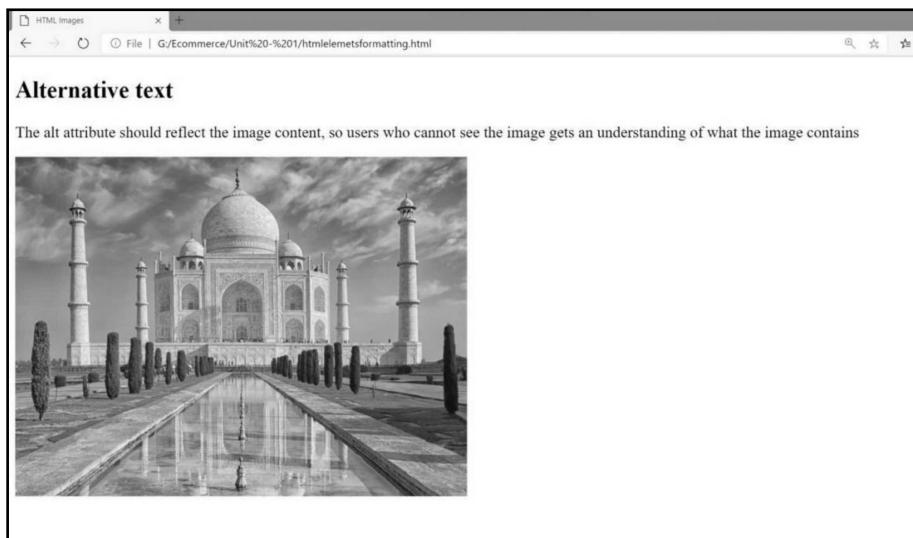
1.6.2 The alt Attribute

- An alternate text for an image provides by the second required **alt** attribute. If the user can not view the image (because of slow connection, an error in the **src** attribute, or if the user uses a screen reader), these text will be displayed on the web browser.

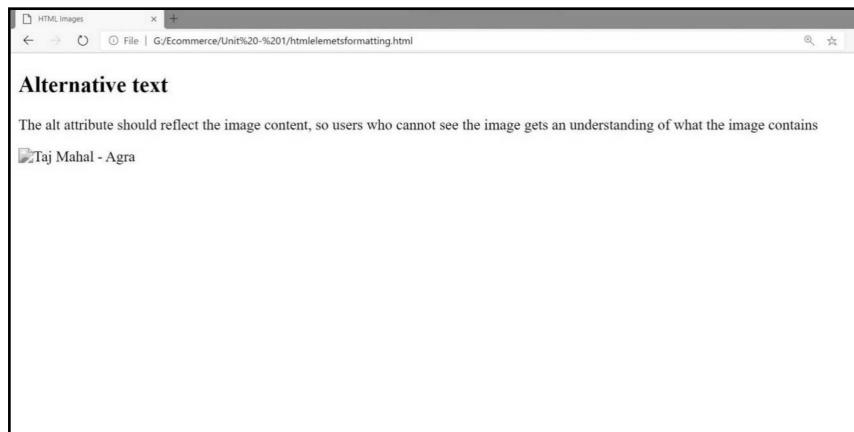
```
<!DOCTYPE html>

<html>
    <head>
        <title>HTML Images</title>
    </head>
    <body>
        <h2>Alternative text</h2>
        <p>The alt attribute should reflect the image content, so users who cannot see the image gets an understanding of what the image contains</p>
        
    </body>
</html>
```

- This code will be reflected to the web page as shown in the below figure.



- Now consider that instead of tajmahal.jpg you have typed tajmahal123.jpg then the output will be as shown in the below figure.

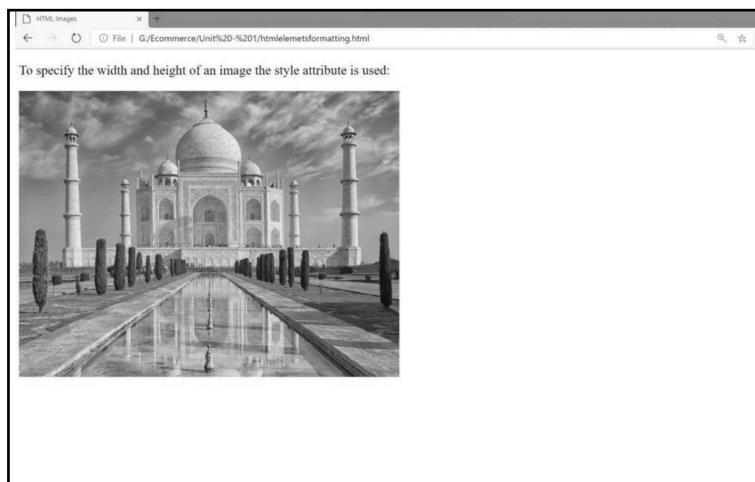


1.6.3 Image Size

- To specify the width and height of an image the style attribute is used. Consider the following example.

```
<!DOCTYPE html>
<html>
  <head>
    <title>HTML Images</title>
  </head>
  <body>
    <p>To specify the width and height of an image the style attribute is used:</p>
    
  </body>
</html>
```

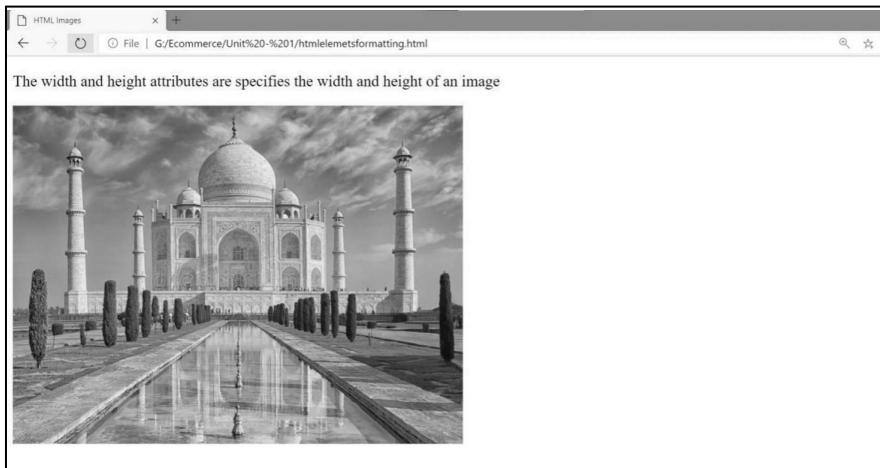
- The web browser view of the above code is as shown below :



- Instead of using style attribute you can use width and height attributes. The width and height attribute of an image always defines width and height in pixels, no need to specify px externally. The following example explains the same.

```
<!DOCTYPE html>
<html>
  <head>
    <title>HTML Images</title>
  </head>
  <body>
    <p>The width and height attributes are specifies the width and height of an image</p>
    
  </body>
</html>
```

- The web browser view is as shown in the figure.



1.6.4 Images in Another Folder or on Another Server/Website

- You must include the folder name in `src` attribute if you have your images in a sub folder or in another folder. Same way if you want to point to an image on another server, you must specify an absolute URL i.e. full URL in the `src` attribute. Consider the following example.

```
!DOCTYPE html>
<html>
  <head>
    <title>HTML Images</title>
  </head>
  <body>
    <p>You must include the folder name in src attribute if you have your images in a sub folder or in another folder.</p>
```

```

</body>
</html>
```

- The web browser view of the above code is :



- The following table provides the list of common image types which we can use in HTML.

Abbreviation	File Format	File Extension
APNG	Animated Portable Network Graphics	.apng
GIF	Graphics Interchange Format	.gif
ICO	Microsoft Icon	.ico, .cur
JPEG	Joint Photographic Expert Group image	.jpg, .jpeg, .jfif, .pjpeg, .ppj
PNG	Portable Network Graphics	.png
SVG	Scalable Vector Graphics	.svg

Table 1.6.1 : Common image types allowed in HTML

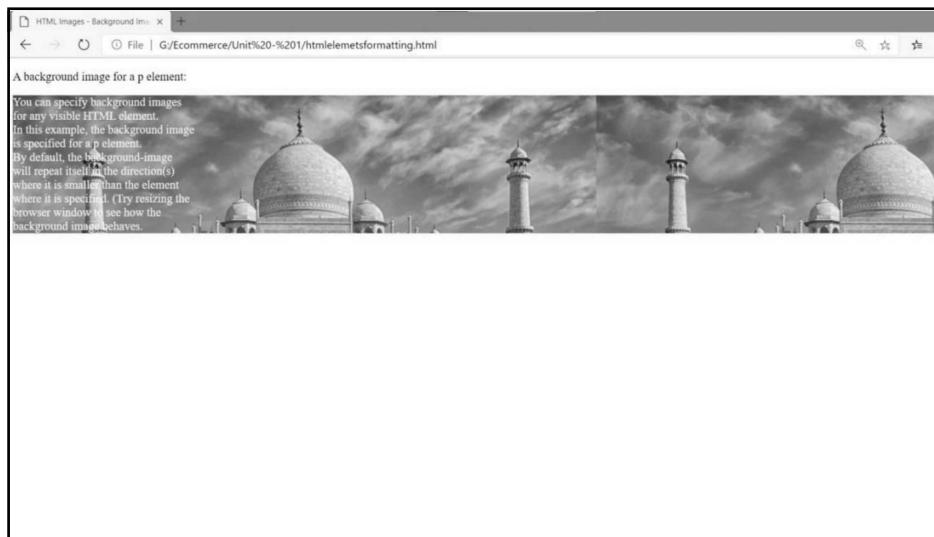
1.6.5 HTML Background Images

- You can specify a background image for almost all the html elements. You can use the HTML style attribute and the CSS background-image property to add a

background image on the HTML elements. Consider the following example followed by the web browser view of the same.

```
<!DOCTYPE html>
<html>
  <head>
    <title>HTML Images - Background Images</title>
  </head>
  <body>
    <p>A background image for a p element:</p>

    <p style="background-image: url('tajmahal.jpg');color:white">
      You can specify background images<br>
      for any visible HTML element.<br>
      In this example, the background image<br>
      is specified for a p element.<br>
      By default, the background-image<br>
      will repeat itself in the direction(s)<br>
      where it is smaller than the element<br>
      where it is specified. (Try resizing the<br>
      browser window to see how the<br>
      background image behaves.
    </p>
  </body>
</html>
```



- The background image on the `<body>` element must be specified by you if you want the entire page to have a background image. The same is explained in the below example followed by the web browser view of the same.

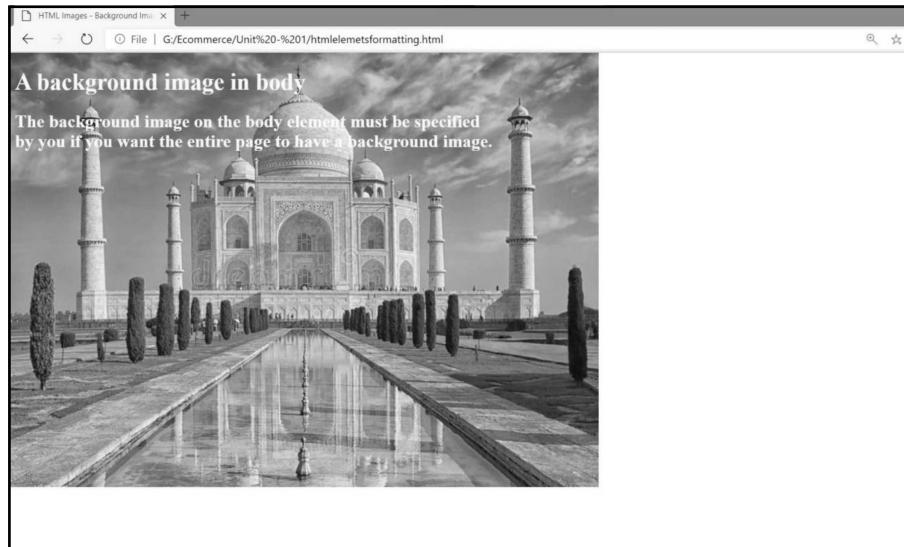
```
<!DOCTYPE html>
<html>
    <head>
        <style>
            body {
                background-image: url('tajmahal.jpg');
            }
        </style>
    </head>
    <body style="color:white">
        <p><h1>A background image in body</h1></p>
        <p><h2>The background image on the body element must be specified<br> by you if you want the entire page to have a background image.</h2></p>
    </body>
</html>
```



- If the background image is smaller than the element, the image will repeat itself, horizontally and vertically, until it reaches the end of the element. The background-repeat property set to no-repeat to avoid the background image from repeating itself. Consider the following example followed by the web browser view of the same.

```
<!DOCTYPE html>
<html>
    <head>
        <style>
            body {
```

```
background-image: url('tajmahal.jpg');
background-repeat: no-repeat;
}
</style>
<title>HTML Images - Background Images</title>
</head>
<body style="color:white">
<p><h1>A background image in body</h1></p>
<p><h2>The background image on the body element must be specified<br> by you if you want the entire page to have a background image.</h2></p>
</body>
</html>
```



1.7 Table Markup

- To arrange data into rows and column, HTML tables are used by the web developers. An HTML table defines by the `<table>` tag. A `<tr>` tag defines each table row, a `<th>` tag defines each table header and a `<td>` tag defines each table data/cell. The text in `<th>` elements are by default bold and centered. Similarly the text in `<td>` elements are by default regular and left-aligned.

```
<!DOCTYPE html>
<html>
  <head>
    <title>HTML Tables</title>
  </head>
  <body>
    <p><h2>Basic HTML Tables</h2></p>
    <table style="width:100%">
```

```
<tr>
    <th>Firstname</th>
    <th>Lastname</th>
    <th>Age</th>
</tr>
<tr>
    <td>Mihir</td>
    <td>Mishra</td>
    <td>30</td>
</tr>
<tr>
    <td>Avinash</td>
    <td>Jha</td>
    <td>29</td>
</tr>
<tr>
    <td>Ansh</td>
    <td>Mishra</td>
    <td>25</td>
</tr>
</table>
</body>
</html>
```

- The web browser view of the same is as shown in the below figure.

Firstname	Lastname	Age
Mihir	Mishra	30
Avinash	Jha	29
Ansh	Mishra	25

If you want to add a border to a table, you need to use the CSS border property.

```
<!DOCTYPE html>
<html>
    <head>
        <title>HTML Tables</title>
        <style>
            table, th, td {
                border: 1px solid black;
            }
        </style>
    </head>
    <body>
        <p><h2>Basic HTML Tables with border</h2></p>
        <table style="width:100%">
            <tr>
                <th>Firstname</th>
                <th>Lastname</th>
                <th>Age</th>
            </tr>
            <tr>
                <td>Mihir</td>
                <td>Mishra</td>
                <td>30</td>
            </tr>
            <tr>
                <td>Avinash</td>
                <td>Jha</td>
                <td>29</td>
            </tr>
            <tr>
                <td>Ansh</td>
                <td>Mishra</td>
```

```
<td>25</td>  
</tr>  
</table>  
</body>  
</html>
```

- The web browser view of the above code is as shown in the figure.

A screenshot of a web browser window titled "HTML Tables". The page content is titled "Basic HTML Tables with border". It displays a simple table with three columns: "Firstname", "Lastname", and "Age". The table has a border and contains the following data:

Firstname	Lastname	Age
Mihir	Mishra	30
Avinash	Jha	29
Ansh	Mishra	25

Fig. 1.7.1 : HTML table with border

- To let the borders collapse into one border, add the CSS border-collapse property as follows:

```
table, th, td {  
    border: 1px solid black;  
    border-collapse: collapse;  
}
```

- After updating the above code we will get a web page view as shown in the below figure.

A screenshot of a web browser window titled "HTML Tables". The page content is titled "Basic HTML Tables with border". It displays the same table as the previous figure, but with the "border-collapse: collapse;" CSS rule applied. As a result, the individual cell borders have collapsed into a single overall border for the entire table, giving it a cleaner appearance.

Firstname	Lastname	Age
Mihir	Mishra	30
Avinash	Jha	29
Ansh	Mishra	25

- Cell padding specifies the space between the cell content and its borders.

```
th, td {  
    padding: 15px;  
}
```

- By default, table headings are bold and centered. If you want to left-align the table headings, use the CSS text-align property.

```
th {  
    text-align: left;  
}
```

- Border spacing specifies the space between the cells. If you want to set the border spacing for a table, use the CSS border-spacing property.

```
table {  
    border-spacing: 15px;  
}
```

- If you want to make a cell span more than one column then you have to use the colspan attribute.

```
<table style="width:100%">  
    <tr>  
        <th>Name</th>  
        <th colspan="2">Telephone</th>  
    </tr>  
    <tr>  
        <td>Mihir Mishra</td>  
        <td>123456789</td>  
        <td>987654321</td>  
    </tr>  
</table>
```

- If you want to make a cell span more than one row you need to use the rowspan attribute.

```
<table style="width:100%">  
    <tr>  
        <th>Name:</th>  
        <td>Avinash Jha</td>  
    </tr>  
    <tr>  
        <th rowspan="2">Telephone:</th>  
        <td>123456789</td>  
    </tr>  
    <tr>  
        <td>987654321</td>  
    </tr>  
</table>
```

- If you want to add a caption to a table then you need to use the <caption> tag.

```
<table style="width:100%">
    <caption>Monthly savings</caption>
    <tr>
        <th>Month</th>
        <th>Savings</th>
    </tr>
    <tr>
        <td>January</td>
        <td>₹10000</td>
    </tr>
    <tr>
        <td>February</td>
        <td>₹10000</td>
    </tr>
</table>
```

- If you want to define a special style for one particular table you have to add an id attribute to the table.

```
<table id="t01">
    <tr>
        <th>Firstname</th>
        <th>Lastname</th>
        <th>Age</th>
    </tr>
    <tr>
        <td>Mihir</td>
        <td>Mishra</td>
        <td>30</td>
    </tr>
</table>
```

Now you can define a special style for this table as follows.

```
#t01 {
    width: 100%;
    background-color: #f1f1c1;
}
```

1.8 HTML Forms

- If you want to collect user input where these input most often sent to a server you have to use an HTML form.

1.8.1 The <form> Element

- To create an HTML form for the user input, the HTML <form> element is used. The different types of inputs such as text field, checkboxes, radio buttons, etc. are contained by the HTML <form> element. So it is called the container for such types of the input. Consider the following code segment.

```
<form>
.
.
form elements
.
</form>
```

- The various form elements are :
 1. <input>
 2. <label>
 3. <select>
 4. <textarea>
 5. <button>
 6. <fieldset>
 7. <legend>
 8. <datalist>
 9. <output>
 10. <option>
 11. <optgroup>
- Let's we discuss these elements with an example.

1. The <input> element

- The <input> element is one which is the most used element. Depending on the type of attribute, the <input> element can be displayed. Consider the following example followed by the web browser view of the same.

```
<!DOCTYPE html>
<html>
    <head>
        <title>HTML Form</title>
    </head>
    <body>
        <p><h2>The input element</h2></p>
        <form action="/htmlelementsformatting.html">
            <label for="fname">First name:</label><br>
            <input type="text" id="fname" name="fname"><br><br>
            <input type="submit" value="Submit">
        </form>
    </body>
</html>
```

The input element

First name:

Submit

Here are the different input types you can use in HTML:

a)	<code><input type="button"></code>	b)	<code><input type="checkbox"></code>
c)	<code><input type="color"></code>	d)	<code><input type="date"></code>
e)	<code><input type="datetime-local"></code>	f)	<code><input type="email"></code>
g)	<code><input type="file"></code>	h)	<code><input type="hidden"></code>
i)	<code><input type="image"></code>	j)	<code><input type="month"></code>
k)	<code><input type="number"></code>	l)	<code><input type="password"></code>
m)	<code><input type="radio"></code>	n)	<code><input type="range"></code>
o)	<code><input type="reset"></code>	p)	<code><input type="search"></code>
q)	<code><input type="submit"></code>	r)	<code><input type="tel"></code>
s)	<code><input type="text"></code>	t)	<code><input type="time"></code>
u)	<code><input type="url"></code>	v)	<code><input type="week"></code>

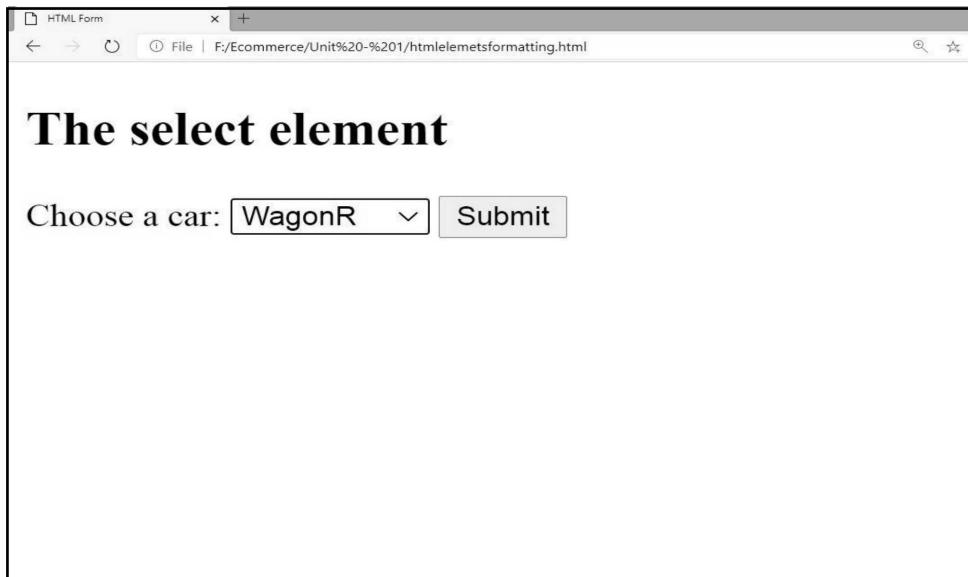
2. The `<label>` Element

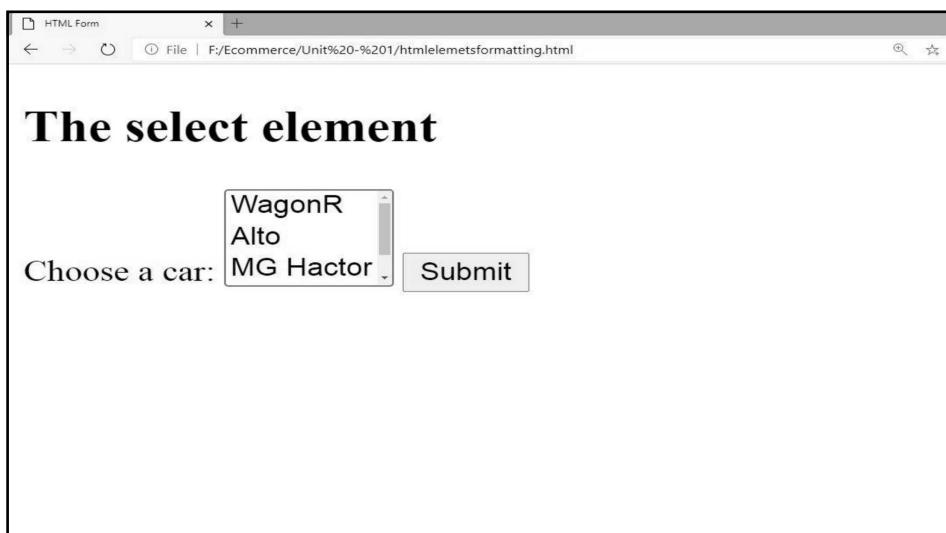
- A label for several form elements are defined by the `<label>` element. The `<label>` element help users who have difficulty clicking on very small region such as radio buttons or check boxes because it toggles the radio button or check boxes when the user clicks the text within the `<label>` element. The `id` attribute of the `<input>` element should be same as the `for` attribute of the `<label>` tag to bind them together.

3. The <select> element

- The dropdown list is defined by the <select> element. Consider the following example followed by the figure of the web browser view of the same.

```
<!DOCTYPE html>
<html>
  <head>
    <title>HTML Form</title>
  </head>
  <body>
    <p><h2>The select element</h2></p>
    <form action="/htmlelementsformatting.html">
      <label for="cars">Choose a car:</label>
      <select id="cars" name="cars">
        <option value="WagonR">WagonR</option>
        <option value="alto">Alto</option>
        <option value="mghactor">MG Hactor</option>
        <option value="audi">Audi</option>
      </select>
      <input type="submit">
    </form>
  </body>
</html>
```





- Here, an option that can be selected are defined by the `<option>` element. By default, the first item in the drop-down list is selected. Suppose you want to specify the number of visible values then you have to use `size` attribute in `<select>` element. If you are going to change the line `<select id="cars" name="cars">` by `<select id="cars" name="cars" size=3>`, the changes made by is as shown in the below figure.

4. The `<textarea>` element

- This element allows multi-line input field that is a text area. The `rows` attribute and the `cols` attribute specifies the visible number of lines in the text area and the visible width of a text respectively. Consider the following example followed by the figure of web browser view of the code.

```
<!DOCTYPE html>  
<html>  
  <head>  
    <title>HTML Form</title>  
  </head>  
  <body>  
    <p><h2>The Text Area - a multi-line input field.</h2></p>  
    <form action="/htmlelementsformatting.html">  
      <textarea name="message" rows="10" cols="30">The cat was playing in the  
garden.</textarea>  
      <br>  
    </select>  
    <input type="submit">  
  </form>  
</body>
```

```
</html>
```

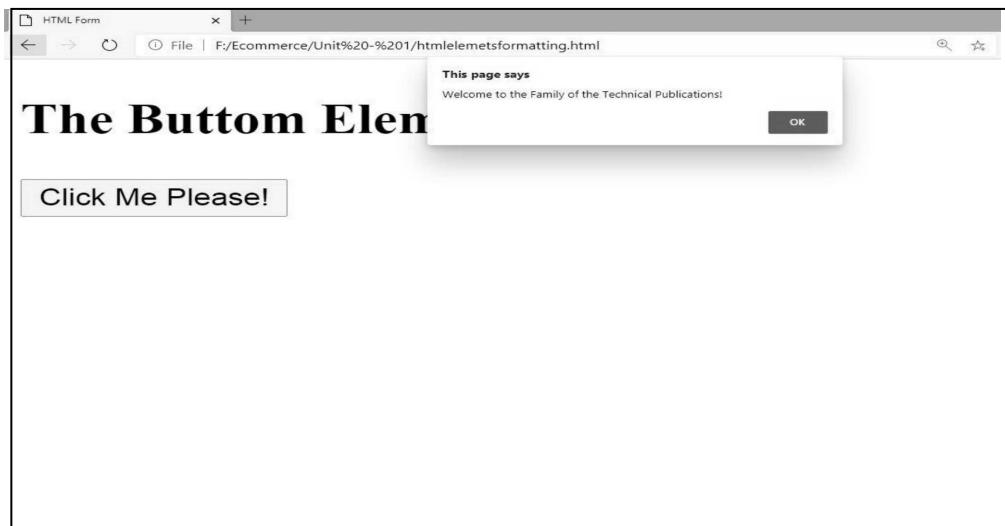
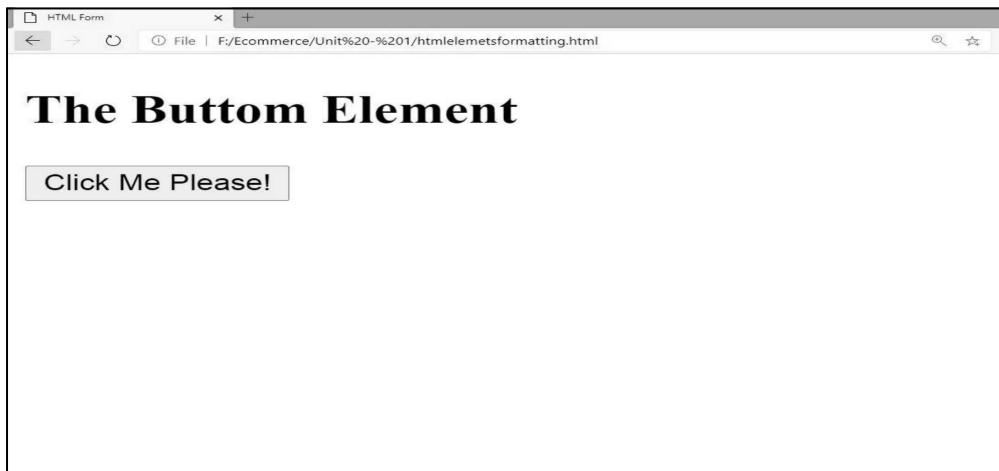
The screenshot shows a web browser window titled "HTML Form". The address bar indicates the file is located at "F:/Ecommerce/Unit%20-%201/htmlelementsformatting.html". The main content area contains the text "The cat was playing in the garden." within a multi-line text input field. Below the text area is a "Submit" button.

- By using CSS we can change the size of the text area.

5. The <button> element

- A clickable button can be defined by the <button> element. Consider the following example of the <button> element followed by the web browser view of the code.

```
<!DOCTYPE html>
<html>
  <head>
    <title>HTML Form</title>
  </head>
  <body>
    <p><h2>The Button Element</h2></p>
    <button type="button" onclick="alert('Welcome to the Family of the Technical Publications!')">Click Me Please!</button>
  </body>
</html>
```



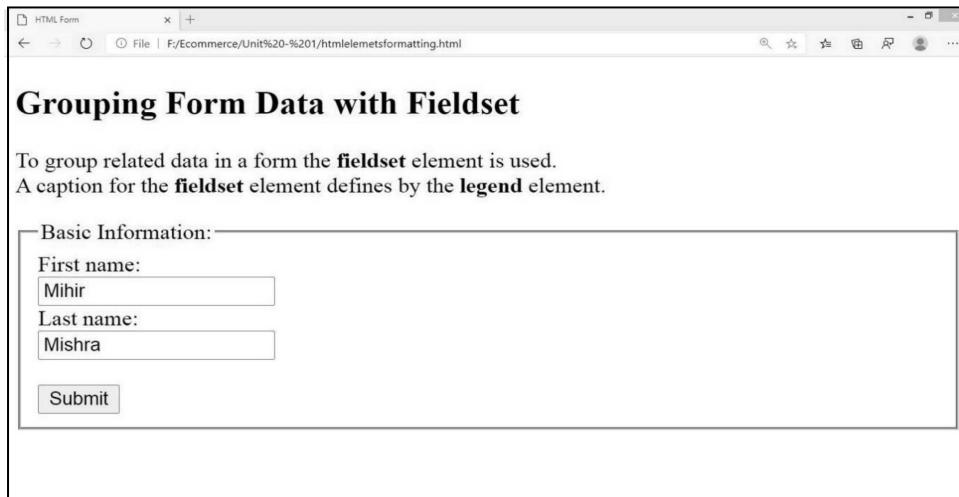
6. The <fieldset> and <legend> Elements

- To group related data in a form the <fieldset> element is used. A caption for the <fieldset> element defines by the <legend> element. The following example explains these two elements.

```
<!DOCTYPE html>
<html>
  <head>
    <title>HTML Form</title>
  </head>
  <body>
    <p><h2>Grouping Form Data with Fieldset</h2></p>
    <p>To group related data in a form the <b>fieldset</b> element is used.<br>A caption for the <b>fieldset</b> element defines by the <b>legend</b> element.</p>
```

```
<form action="/htmlelementsformatting.html">
<fieldset>
    <legend>Basic Information:</legend>
    <label for="fname">First name:</label> <br>
    <input type="text" id="fname" name="fname" value="Mihir"> <br>
    <label for="lname">Last name:</label> <br>
    <input type="text" id="lname" name="lname" value="Mishra"> <br> <br>
    <input type="submit" value="Submit">
</fieldset>
</form>
</body>
</html>
```

- The following figure shows the web browser view of the above code.



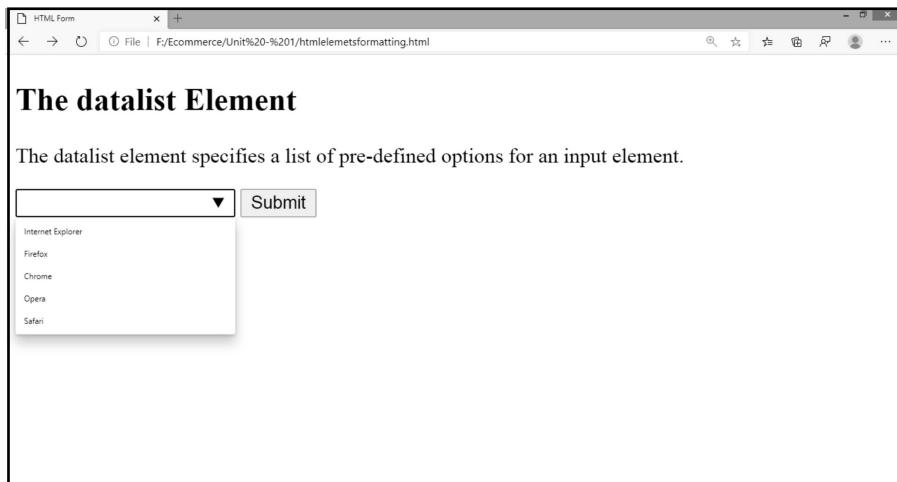
7. The <datalist> Element

- If you want to specify a list of pre-defined options for an <input> element you have to use the <datalist> element. User will see a drop-down list of the pre-defined options as their input data. The **id** attribute of the <datalist> element must refer the **list** attribute of the <input> element. Consider the following example.

```
<!DOCTYPE html>
<html>
    <head>
        <title>HTML Form</title>
    </head>
    <body>
        <p><h2>The datalist Element</h2></p>
        <p>The datalist element specifies a list of pre-defined options for an input element.</p>
        <form action="/htmlelementsformatting.html">
```

```
<input list="browsers" name="browser">
<datalist id="browsers">
    <option value="Internet Explorer">
    <option value="Firefox">
    <option value="Chrome">
    <option value="Opera">
    <option value="Safari">
</datalist>
<input type="submit">
</form>
</body>
</html>
```

- The following figure shows the web browser view of the above code.



8. The <output> Element

- The result of a calculation is represented by the <output> element. Consider the following example.

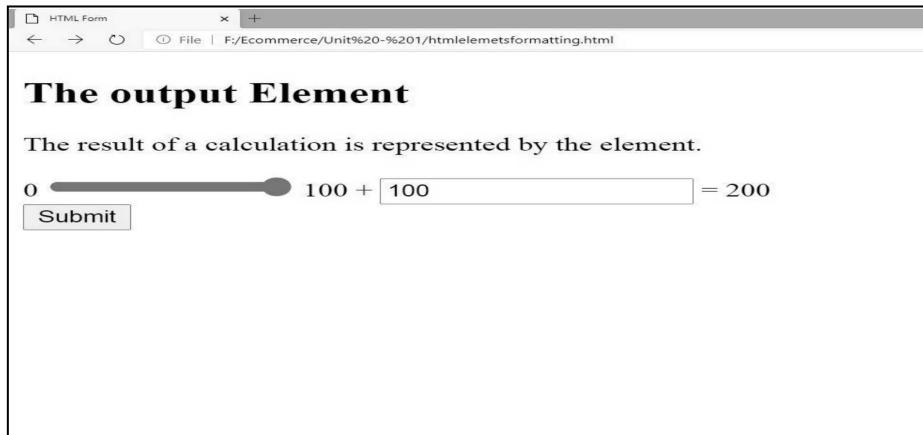
```
<!DOCTYPE html>
<html>
    <head>
        <title>HTML Form</title>
    </head>
    <body>
        <p><h2>The output Element</h2></p>
        <p>The result of a calculation is represented by the <output> element.</p>
        <form action="/htmlelementsformatting.html"
oninput="x.value=parseInt(a.value)+parseInt(b.value)">
            0
            <input type="range" id="a" name="a" value="50">
```

```

100 +
<input type="number" id="b" name="b" value="50">
=
<output name="x" for="a b"></output>
<br>
<input type="submit">
</form>
</body>
</html>

```

- The below figure shows the web browser view of the above code.



- The following table summarises all these elements.

Tag	Description
<form>	Defines an HTML form for user input
<input>	Defines an input control
<textarea>	Defines a multiline input control (text area)
<label>	Defines a label for an <input> element
<fieldset>	Groups related elements in a form
<legend>	Defines a caption for a <fieldset> element
<select>	Defines a drop-down list
<optgroup>	Defines a group of related options in a drop-down list
<option>	Defines an option in a drop-down list
<button>	Defines a clickable button
<datalist>	Specifies a list of pre-defined options for input controls
<output>	Defines the result of a calculation

Table 1.8.1 : The input types in HTML form

1.8.2 HTML Form Attributes

1. The Action Attribute

- When the form is submitted which actions to be performed are defined by the action attribute. Normally, when the user clicks in the submit button, the form data is sent to a file on the server. If the action attribute is omitted, the action is set to the current page. Consider the following example.

```
<html>
  <head>
    <title>HTML Form</title>
  </head>
  <body>
    <p><h2>The output Element</h2></p>
    <form action=".actionPage.html">
      <label for="fname">First name:</label><br>
      <input type="text" id="fname" name="fname" value="Mihir"><br>
      <label for="lname">Last name:</label><br>
      <input type="text" id="lname" name="lname" value="Mishra"><br><br>
      <input type="submit" value="Submit">
    </form>
  </body>
</html>
```

- The below two figure shows the web browser view of the same.



- Once you click on the submit button it will do the action on the specified page that is actionPage.html and execute the code of that page. The web browser view of the actionPage.html is as shown in the below figure.



2. The Target Attribute

- The target attribute specifies where to display the response that is received after submitting the form. The target attribute can have one of the following values :

Value	Description
_blank	The response is displayed in a new window or tab
_self	The response is displayed in the current window
_parent	The response is displayed in the parent frame
_top	The response is displayed in the full body of the window
framename	The response is displayed in a named iframe

Table 1.8.2 : The target attributes

- The _self is the default value; the meaning of the _self is that the response will be open in the current window. Consider the following example of the target attribute.

```
<!DOCTYPE html>
<html>
  <head>
    <title>HTML Form</title>
  </head>
```

```
<body>

<p><h2>The form target attribute</h2></p>

<p>When submitting this form, the result will be opened in a new browser tab:</p>

<form action=". /actionPage.html" target="_blank">

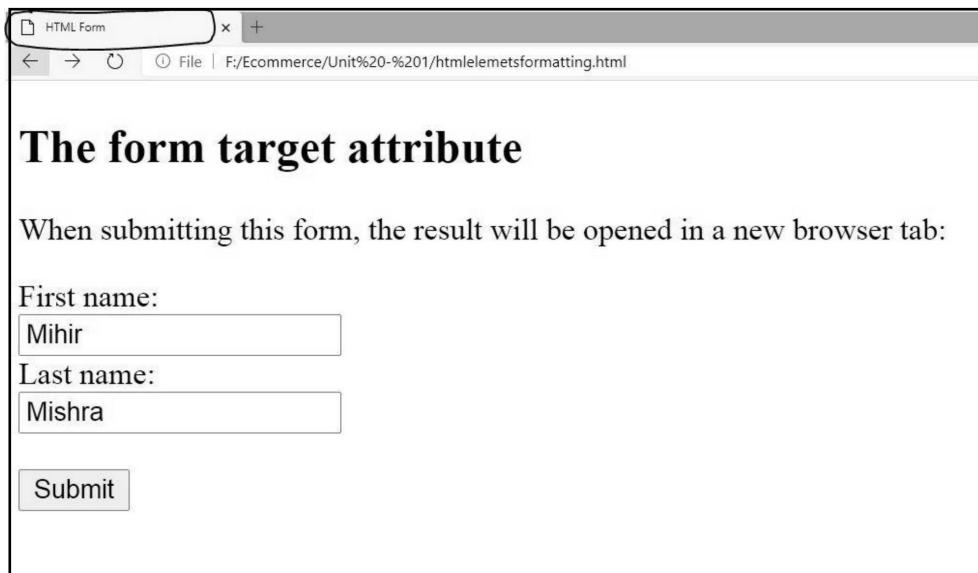
    <label for="fname">First name:</label><br>
    <input type="text" id="fname" name="fname" value="Mihir"><br>
    <label for="lname">Last name:</label><br>
    <input type="text" id="lname" name="lname" value="Mishra"><br><br>
    <input type="submit" value="Submit">

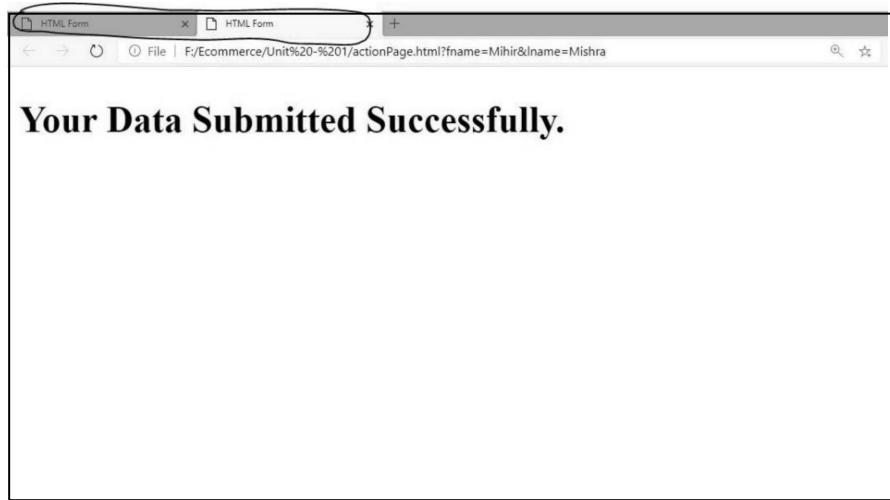
</form>

</body>

</html>
```

- The following two figures shows you the web browser view of the above code followed by the actionPage.html which opens in the new tab as we use target="_blank".





3. The Method Attribute

- When submitting the form data, how you are sending data is specified by the method attribute. The form data can be sent as URL variable with method "get" or as HTTP post transaction with method "post".
- The Get method appends the form data to the URL in name/value pair. It is recommended to never use get method to send sensitive data as the submitted form data is visible in the URL. You have to keep in mind that the maximum length of the URL is 2048 characters that is the length of the URL is limited. The get method is useful for form submission where a user wants to bookmark the result. The get method is good for non-secure data like query string in the search engines.
- The post method appends the form data inside the body of the HTTP request so the submitted form data is not shown in the URL. The post method does not have any size limitations and it can be used to send large amount of data. The form submission with post cannot be bookmarked.
- The get method is the default HTTP method for submitting the form data. It is recommended to use post method if the form data contains personal or sensitive information.
- Consider the following example of get method.

```
<!DOCTYPE html>
<html>
  <head>
    <title>HTML Form</title>
```

```
</head>

<body>

<p><h2>The method Attribute</h2></p>

<p>This form will be submitted using the GET method:</p>

<form action="./actionPage.html" target="_blank" method="get">

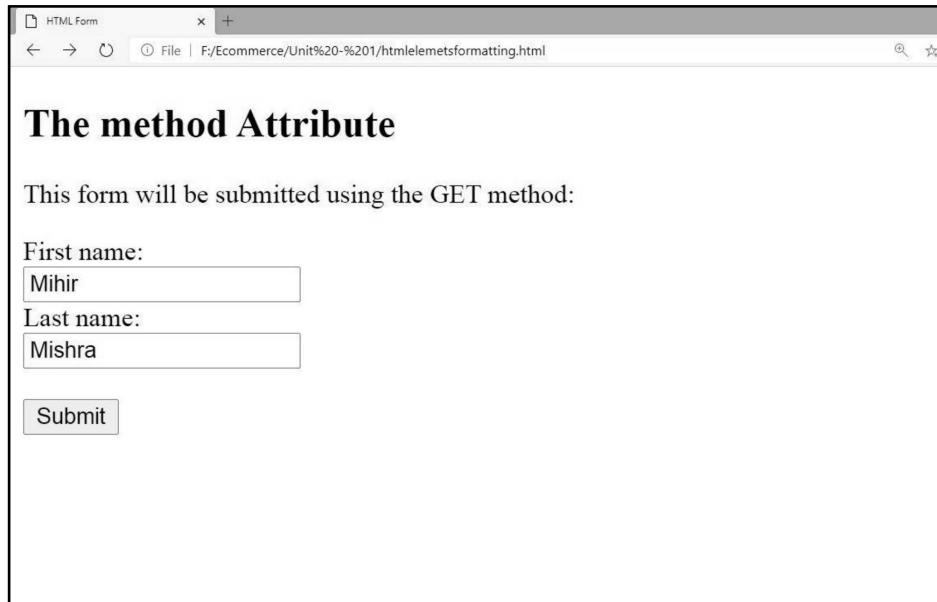
    <label for="fname">First name:</label> <br>
    <input type="text" id="fname" name="fname" value="Mihir"> <br>
    <label for="lname">Last name:</label> <br>
    <input type="text" id="lname" name="lname" value="Mishra"> <br> <br>
    <input type="submit" value="Submit">

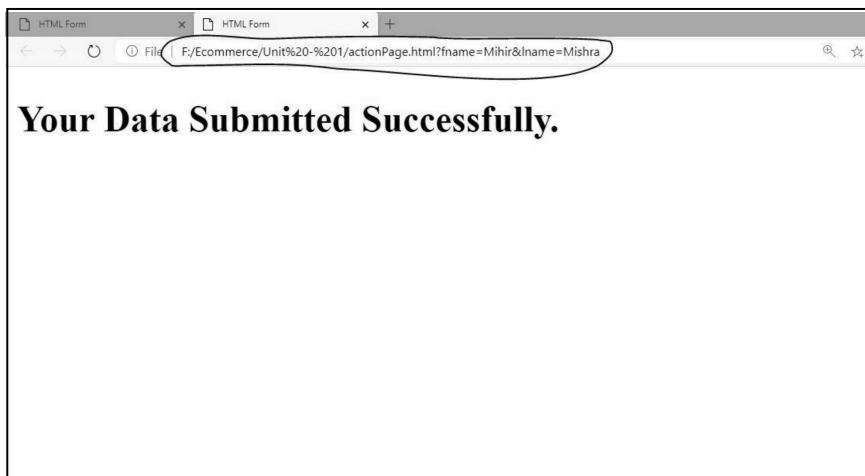
</form>

</body>

</html>
```

- The following two figures shows how the data send through the URL and the sent data are visible in the URL.





- Now consider the same example with the POST method.

```
<!DOCTYPE html>
<html>
  <head>
    <title>HTML Form</title>
  </head>
  <body>
    <p><h2>The method Attribute</h2></p>
    <p>This form will be submitted using the POST method:</p>
    <form action=".//actionPage.html" target="_blank" method="post">
      <label for="fname">First name:</label><br>
      <input type="text" id="fname" name="fname" value="Mihir"><br>
      <label for="lname">Last name:</label><br>
      <input type="text" id="lname" name="lname" value="Mishra"><br><br>
      <input type="submit" value="Submit">
    </form>
  </body>
</html>
```

- The following figures show how the POST method works. You can observe in the second figure that the data does not visible in the URL.

The method Attribute

This form will be submitted using the POST method:

First name:
Mihir

Last name:
Mishra

Submit

Your Data Submitted Successfully.

- The following table explain some <form> attributes.

Attribute	Description
accept-charset	Specifies the character encodings used for form submission
action	Specifies where to send the form-data when a form is submitted
autocomplete	Specifies whether a form should have autocomplete on or off

enctype	Specifies how the form-data should be encoded when submitting it to the server (only for method="post")
method	Specifies the HTTP method to use when sending form-data
name	Specifies the name of the form
novalidate	Specifies that the form should not be validated when submitted
rel	Specifies the relationship between a linked resource and the current document
target	Specifies where to display the response that is received after submitting the form

Table 1.8.3 : The <form> attributes

1.9 HTML5

- HTML5 is the fifth version of HTML. Many elements are removed or modified from HTML5. There are many differences between HTML and HTML5 which are discussed below :

HTML	HTML5
It didn't support audio and video without the use of flash player support.	It supports audio and video controls with the use of <audio> and <video> tags.
It uses cookies to store temporary data.	It uses SQL databases and application cache to store offline data.
Does not allow JavaScript to run in browser.	Allows JavaScript to run in background. This is possible due to JS Web worker API in HTML5.
Vector graphics is possible in HTML with the help of various technologies such as VML, Silver-light, Flash, etc.	Vector graphics is additionally an integral part of HTML5 like SVG and canvas.
It does not allow drag and drop effects.	It allows drag and drop effects.
Not possible to draw shapes like circle, rectangle, triangle etc.	HTML5 allows to draw shapes like circle, rectangle, triangle etc.
It works with all old browsers.	It supported by all new browser like Firefox, Mozilla, Chrome, Safari, etc.

Older version of HTML are less mobile-friendly.	HTML5 language is more mobile-friendly.
Doctype declaration is too long and complicated.	Doctype declaration is quite simple and easy.
Elements like nav, header were not present.	New element for web structure like nav, header, footer etc.
Character encoding is long and complicated.	Character encoding is simple and easy.
It is almost impossible to get true GeoLocation of user with the help of browser.	One can track the GeoLocation of a user easily by using JS GeoLocation API.
It can not handle inaccurate syntax.	It is capable of handling inaccurate syntax.
Attributes like charset, async and ping are absent in HTML.	Attributes of charset, async and ping are a part of HTML5.

Table 1.9.1 : The difference between HTML and HTML5

- There are many HTML elements which have been modified or removed from HTML5. Some of them are listed below :

Element	In HTML5
<applet>	Changed to <object>
<acronym>	Changed to <abbr>
<dir>	Changed to
<frameset>	Removed
<frame>	Removed
<noframes>	Removed
<strike>	No new tag. CSS is used for this
<big>	No new tag. CSS is used for this
<basefont>	No new tag. CSS is used for this
	No new tag. CSS is used for this

<center>	No new tag. CSS is used for this
<tt>	No new tag. CSS is used for this

Table 1.9.2 : Some modified or removed elements in HTML5

Many new elements are added in HTML5 like nav, audio, figcaption, progress, command, time, datalist, video, figure, meter, data, section, time, aside, canvas, summary, rp, rt, details, wbr, header, footer, keygen, embed, article, hgroup, bdi, mark, output, source, track, section, ruby and many more.

1.10 Part A : Short Answered Questions (2 Marks Each)

Q.1 What is E-commerce ?

Ans. :

- E-commerce (Electronic Commerce or Internet Commerce) signifies to buying and selling of goods or services using the internet, addition with that the transaction of the money and data to execute these services are executes using internet.
- In another word, selling of physical product online refers to the e-commerce.
- E-commerce also describes any kind of commercial transaction that is facilitated through the internet. Small businesses, large companies/ corporations, and independent freelancers have lots of benefits from the e-commerce, which enables them to sell their products and services that was not possible or they are difficult with traditional offline retail.
- There are four business models for the e-commerce:
 1. Business to Business (B2B),
 2. Business to Customer (B2C),
 3. Customer to Customer (C2C),
 4. Customer to Business (C2B).

Q.2 Write short notes on the following HTML Tags with an example. (2 Marks each)

a. Heading	b. Paragraph	c. Line Breakup
d. Centering Content	e. Horizontal Line	

Ans. : a. Heading Tag

- Each and every document should be start with a heading. You can use various size for that headings. HTML has six levels of heading and for that we have to use the elements <h1>, <h2>, <h3>, <h4>, <h5>, and <h6>. While you use these tag for

displaying any heading, the browser adds one line before and one line after that heading.

- Example :

```
<!DOCTYPE html>
<html>

<head>
    <title>Heading Example</title>
</head>

<body>
    <h1>Heading 1</h1>
    <h2>Heading 2</h2>
    <h3>Heading 3</h3>
    <h4>Heading 4</h4>
    <h5>Heading 5</h5>
    <h6>Heading 6</h6>
</body>

</html>
```

- Output for the above example is

Heading 1

Heading 2

Heading 3

Heading 4

Heading 5

Heading

b. Paragraph Tag

- If you want to add any paragraph in your web page you have to add **<p>** tag. Each paragraph of the text should be in between **<p>** and **</p>** that is opening and closing paragraph tag.
- Example :

```
<!DOCTYPE html>
<html>
```

```
    <head>
```

```
<title>Paragraph Tag Example</title>
</head>

<body>
    <p>A first paragraph of text.</p>
    <p>A second paragraph of text.</p>
    <p>A third paragraph of text.</p>
</body>

</html>
```

- The output for the above code is

```
A first paragraph of text.

A second paragraph of text.

A third paragraph of text.
```

c. Line Breakup Tag

- Any text following `
` tag, it starts from the next line. This tag is an example of an empty element in which you do not required opening and closing tag because there is nothing to go in between these tags.
- It is required to have a space between br and forward slash (`
`) because if we omit this space the older browsers will have trouble rendering the line break. In addition with that if we miss the forward slash character and just use `
` it is not valid in XHTML.
- Example

```
<!DOCTYPE html>
<html>
    <head>
        <title>Line Break Example</title>
    </head>
    <body>
        <p>Hello<br />
        You are showing interest for reading this book.<br />
        Thanks<br />
        Ansh</p>
    </body>
</html>
```

- The output for the above code is :

Hello
You are showing interest for reading this book.
Thanks
Ansh

d. Centering Content Tag

- If you want to put the content in the center of the page then you need to use <center> tag as shown in the below example.

```
<!DOCTYPE html>
<html>

    <head>
        <title>Centring Content Example</title>
    </head>

    <body>
        <p>This text is without center tag.</p>

        <center>
            <p>This text is with the center tag.</p>
        </center>
    </body>

</html>
```

- The output of the above example is

Hello
You are showing interest for reading this book.
Thanks
Ansh

e. Horizontal Line Tag

- If you want to break-up section of a document horizontally then horizontal lines are used and for that you need to add <hr> tag from where you want to break-up your document contents. The <hr> tag creates a lien to the next line of content where you used the tag till the right margin of the page and the further content/document will be displayed from the next line.

- The below example explain the same.

```
<!DOCTYPE html>
<html>

    <head>
        <title>Horizontal Line Example</title>
    </head>

    <body>
        <p>Before Horizontal Line </p>
        <hr />
        <p>After using Horizontal Line</p>
    </body>

</html>
```

- The output of the above example is

Before Horizontal Line

After Horizontal Line

Q.3 What is the difference between an absolute links and a relative links?

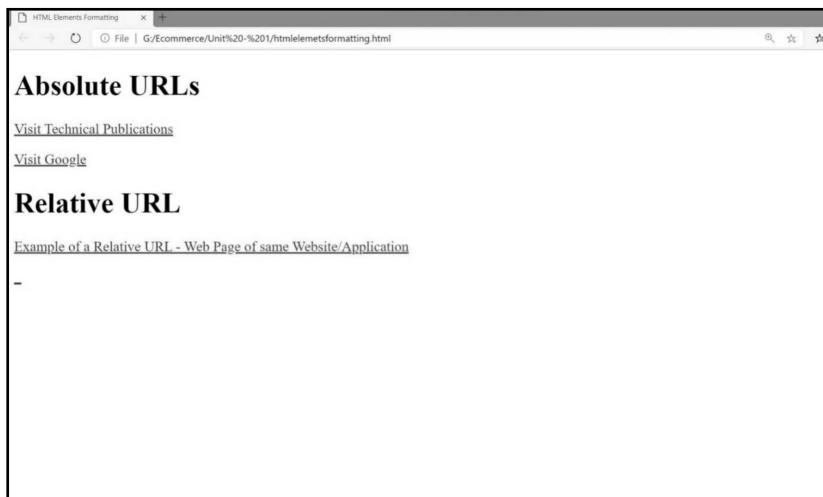
Ans. :

- An absolute URL is a full web address in the href attribute. E.g. <http://www.technicalpublications.com>. In both the above examples we have used the absolute URL.
- A local link that is a link to a page within the same website is specified with a relative URL. These relative URLs are without the "https://www" part.
- Consider the following example.

```
<!DOCTYPE html>
<html>
    <head>
        <title>HTML Elements Formatting</title>
    </head>
    <body>
        <p><h1>Absolute URLs</h1></p>
        <p><a href="https://technicalpublications.org/" target="_blank">Visit Technical Publications</a></p>
        <p><a href="https://www.google.com" target="_blank">Visit Google</a></p>
        <p><h1>Relative URL</h1></p>
    </body>
</html>
```

```
<p><a href="relative_url.html" target="_blank">Example of a Relative URL - Web Page of same Website/Application</p>
</body>
</html>
```

- The web browser view of the above code is as shown below :



Q.4 Explain “src” and “alt” attributes of the <image> tag of HTML with an example.

Ans. :

- Any web page can be look attractive if you will add the good images in the web page. If you want to add an image in a web page, you need to use the HTML tag. Images are not technically inserted into a web page, but these images are linked to the web page. A holding space for the reference image creates by the tag. It is an empty tag, it does not have a closing tag and it contains two attributes. These two required attributes are:
 - **src** – used to specify the path to the image
 - **alt** – used to specify and alternate text for the image
- The syntax for the tag with these two attribute is :

```

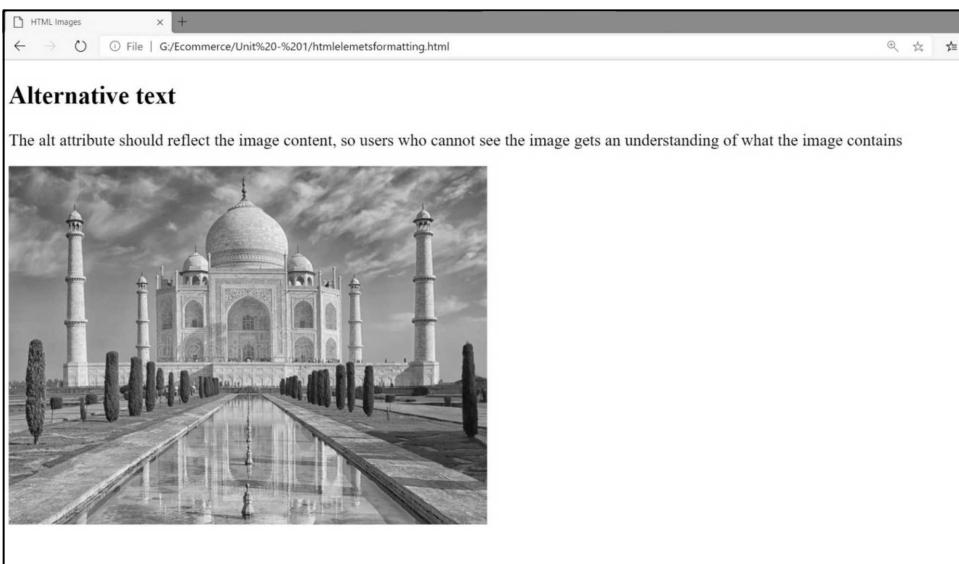
```

- The **src attribute** is the required URL path to the image. When a web page loads, it is the task of the browser to gets the image(s) from a web server and inserts that image(s) into the page. So it is mandatory that the image is actually stays in the same location in relation to the web page. If it fails, your visitors will get a broken link icon. In this situation the browser will show the broken link icon and alt text.
- An alternate text for an image provides by the second required alt attribute. If the

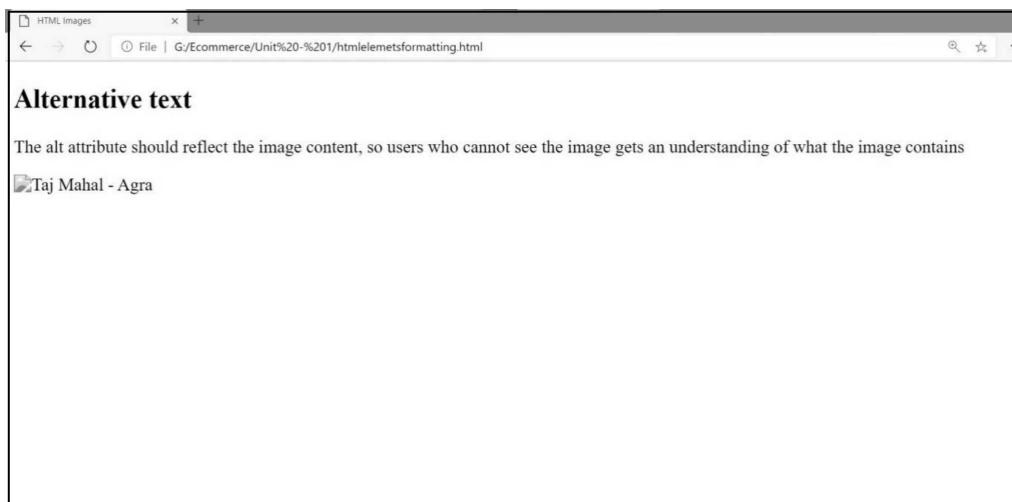
user can not view the image (because of slow connection, an error in the src attribute, or if the user uses a screen reader), these text will be displayed on the web browser.

```
<!DOCTYPE html>
<html>
  <head>
    <title>HTML Images</title>
  </head>
  <body>
    <h2>Alternative text</h2>
    <p>The alt attribute should reflect the image content, so users who cannot see the image gets an understanding of what the image contains</p>
    
  </body>
</html>
```

- This code will be reflected to the web page as



- Now consider that instead of tajmahal.jpg you have typed tajmahal123.jpg then the output will be as shown in the below figure.



1.11 Part B : Long Answered Questions

1. Explain how the web works. (Refer section 1.2)
2. Explain the structure of the HTML Document with an example. (Refer section 1.3.1)
3. Give the difference between HTML element and the HTML attributes. Explain with an example. (Refer sections 1.3.3 and 1.3.4)
4. Write down steps for creating the first HTML page. (Refer section 1.4)
5. Explain HTML formatting elements with an example. (Refer section 1.5)
6. Explain HTML links with an example. (Refer section 1.6)
7. How we can use images, email address and buttons as a link in the HTML? (Refer section 1.6.3)
8. Explain various form elements of HTML forms. (Refer section 1.9)



Notes

UNIT- II

2

Building an E-Commerce Website, Mobile Site and Apps

Syllabus

Systematic approach to build an E-Commerce : Planning, System Analysis, System Design, Building the system, Testing the system, Implementation and Maintenance, Optimize Web Performance – Choosing hardware and software – Other E-Commerce Site tools – Developing a Mobile Website and Mobile App.

Contents

- 2.1 *Systematic Approach to Build an E-Commerce*
- 2.2 *Planning*
- 2.3 *Optimize Web Performance*
- 2.4 *Choosing Software*
- 2.5 *Choosing Hardware*
- 2.6 *Other E-Commerce Site Tool*
- 2.7 *Developing a Mobile Website and Mobile App*
- 2.8 *Part A : Short Answered Questions (2 Marks Each)*
- 2.9 *Part B : Long Answered Questions*

2.1 Systematic Approach to Build an E-Commerce

- Knowledge of business, social issues, technology and systematic approach are required for building a successful e-commerce presence. E-commerce is simply too important to be in any way left absolutely to technologists and software engineers.
- The two major challenges are as follow :
 - Developing a clear understanding of business objective:
This need you to prepare a plan for developing your company's online presence
 - Knowing how to pick the correct technology to accomplish those objective:
This challenge needs you to have some basic e-commerce infrastructure knowledge.
- Even in case the development work of e-commerce application is outsourced, then also it is advisable to have development plan and some knowledge of basic issues related to e-commerce infrastructure like capability, cost and constraints. Without proper knowledge and plan, you won't be able to make proper choices regarding e-commerce within your company.
- For example, consider you are a project manager for medium-sized industrial parts company in Bangalore. ₹ 15,00,000/- were allotted to you for building an e-commerce presence of your company. The main objective will be to sell and provide services to company's customers, who are majorly small metal fabricating and machine shops, and to engage customers through websites, mostly through user forums and blogs.
- First, you must make choices in some major areas like Management, Hardware Architecture, Software, HR, Design and Telecommunications.
- On the organizational and HR fronts, you should unite a group of people who have abilities expected to develop and manage a successful e-commerce presence. This group will make the critical choices about business objectives and strategy, design, technology, and social and information policies. The whole development effort should be firmly overseen on the off chance that you hope to avoid the disasters that have happened at certain organizations. You will likewise have to make choices regarding software, hardware, and telecommunications infrastructure. The requests of your clients should drive your decisions of technology. Your clients will need technology that empowers them to discover what they need effectively, see the product, buy the product, and afterward get the product from your distribution centers quickly. You will likewise need to be careful about design. Whenever you have recognized the key choice areas, you should consider a plan for the project.

2.2 Planning

- The next step towards developing an e-commerce website is creating a plan. To handle a complex problem, for example, building an e-commerce website, you should continue systematically through a series of steps.
- One approach is the systems development life cycle. The SDLC is an approach for understanding the business objectives of any system and designing a fitting solution. Embracing a life cycle approach doesn't ensure success, yet it is obviously better than having no plan by any means.
- The SDLC technique also helps in making documents that convey objectives, significant milestones, and the uses of resources to management.
- The system development life cycle contains following major phases
 - System analysis
 - System design
 - Building the system
 - Testing the system
 - Implementation and maintenance.

2.2.1 System Analysis

- In this step of SDLC, we will identify what we want this e-commerce website to do for our firm. The key point is to let the business choices drive the technology, not the reverse. This will guarantee that your technology platform is lined up with your business. We will expect here that you have recognized a business system and picked a plan of action to accomplish your strategic objectives.
- One approach to start is to recognize the particular business objectives for your website, and then build a list of system functionalities and information requirements. Business objectives are nothing but the abilities you need your website to have.
- System functionalities are kinds of information systems capacities you will need in order to accomplish your business objectives. The information requirements for a system are the information components which the system must produce in order to accomplish the business objectives. This list of information requirement are required to be given to system programmers and developers in order to let them understand what as a manager you expect them to do.

- Table 2.2.1 explains some essential business objectives, system functionalities, and information requirements for a typical e-commerce website. As appeared in the table, there are ten fundamental business objectives that an e-commerce website should convey. These objectives should be converted into a description of system functionalities and eventually into a set of precise information requirements. To a large extent, the business objectives of an e-commerce website are not that different as those of a conventional retail store. The genuine difference lies in the system functionalities and information requirements. In an e-commerce website , the business objectives should be given completely in digital form.

Business Objective	System Functionality	Information requirements
Display goods	Digital catalogs	Dynamic text and graphics catalog
Provide product details	Product database	Product description, stocking numbers, inventory levels
Customize/Personalize product	Customer on-site tracking	Site log for every customer visit; data mining ability to identify similar customer paths and suitable responses
Engage customers in conversations	On-site blog, user forums	Software with blogging and community forum facility
Execute a transaction	Shopping cart/payment system	Secure credit card clearing, multiple payment options
Accumulate customer details	Customer database	Name, address, phone, and e-mail for all customers; online customer registration
Provide after-sale customer support	Sales database	Customer ID, product, date, payment, shipment date
Coordinate marketing/advertising	Ad server, e-mail server, e-mail, campaign manager, ad banner Manager	Site behavior log of prospects and customers linked to e-mail and banner ad campaigns

Understand marketing effectiveness	Site tracking and reporting system	Number of unique visitors, pages visited, products purchased, identified by marketing campaign
Provide production and supplier links	Inventory management system	Product and inventory levels, supplier ID and contact, order quantity data by product

Table 2.2.1 System analysis : Business objective, system functionality and Information requirement for e-commerce website

2.2.2 System Design

- Once the business objectives and system functionalities are identified and have prepared a list of information requirements, you can start to think on how these functionalities can be conveyed through website.
- The system design can be divided into two parts: physical design and logical design. A logical design contains a data flow diagram which explains the flow of data in your e-commerce website, the processing function which should be performed and the database which will be used. It also contains details regarding security and emergency backup procedures which will be initiated, and the controls which will be used in system.
- The logical design is then translated in a physical design which contains physical components. For example, the physical design provides details about the type of server to be used, the software needs to be purchased, required telecommunication link size, system backup and security policy and so on.
- For a simple logical design of website which delivers catalog web pages in HTML in response to the HTTP requests received from client browser is shown in Fig. 2.2.1(a), while physical design corresponding to the logical design is shown in Fig. 2.2.1(b).
- Every main process can be divided into lower level designs which are more accurate in recognizing exactly how the data flows and which are different equipment are involved.

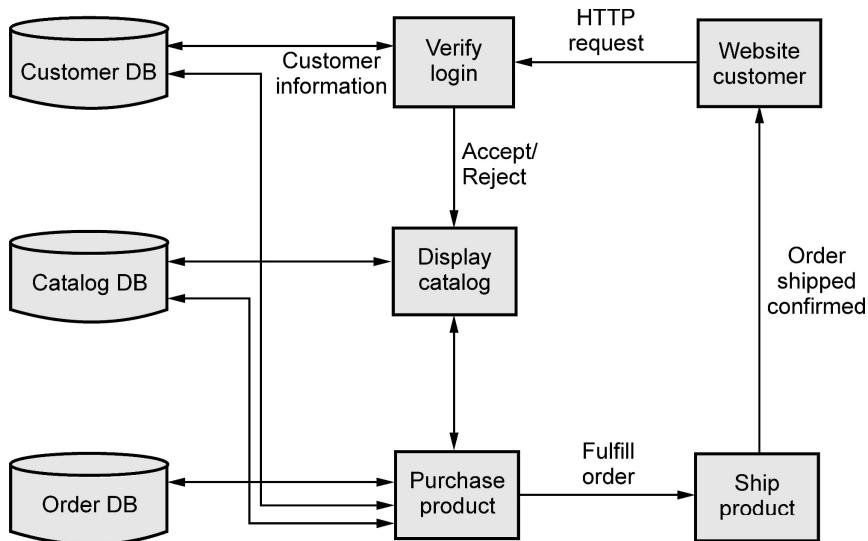


Fig. 2.2.1 (a) Simple data flow for e-commerce website

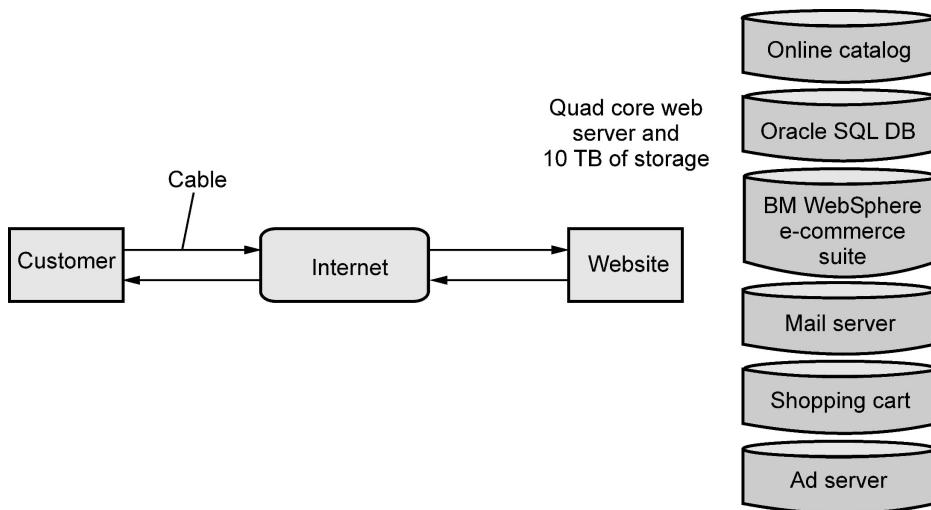


Fig. 2.2.1 (b) Simple physical design

2.2.3 Building the System

- Since, you now have proper understanding of logical and physical design for your website, you can start thinking about how to go bout building the website. Depending on the budget available, you have various options.
- These options starts from building everything to outsourcing everything. In outsourcing, to provide the services involved in building website outside vendor is hired instead of using in-house resource.
- Another option that you have to make is whether the website is hosted at your

company's own server or the hosting is outsourced to web host provider.

- These choices are independent of one another, but are considered at the same time. There are few outside vendors available you will design, build and host your website, while other vendors will either host or build your website, but will not do both. Fig. 2.2.2 show the options available.

		Building Site	
		In-house	Outsource
Hosting	In-house	Completely In-house Build: In Host: In	Mixed Responsibility Build: Out Host: In
	Site	Mixed Responsibility Build: In Host: Out	Completely Outsourced Build: Out Host: Out
	Outsource		

Fig. 2.2.2 Options in hosting and building site

2.2.3.1 Build Your Own Vs Outsourcing

- There are various choices available, if you have chosen to build your own website. For creating your website, you should make use of pre-built website template available unless you are skilled enough. For instance, Yahoo Aabaco Small Business (formerly known as Yahoo Stores) provides website templates which requires you to insert only graphics, text and other required data along with infrastructure to run a e-commerce website after it is created.
- WordPress is less costly and most commonly used website building tool. It has an advance content management system. A database software which is designed for managing structured and unstructured data and different object in the website environment, is known as Content Management System (CSM). It give a centralized control structure to manage content of website to web designers and managers.
- WordPress also have number of in-built widgets and plug-ins which you can use to extend website functionality. Revenue-generating ads, affiliates, and sponsors are the major sources of revenue for WordPress websites.
- Website building tools similar to WordPress are provided by wix, weebly and google sites. These are few less costly options to create a website, while these are restricted to the functionality and look and feel provided by the templates and infrastructure

provided by these third party vendors.

- In case you have proper knowledge and experience of programming, then you can opt for building the website yourself from scratch. There are various types of tools available, some tools like Microsoft visual studio and Adobe dreamweaver helps to build everything from scratch, while some prepackaged website building tools are available which can create an advanced website which is custom-built as per your requirement. Fig. 2.2.3 shows different tools available for building website.

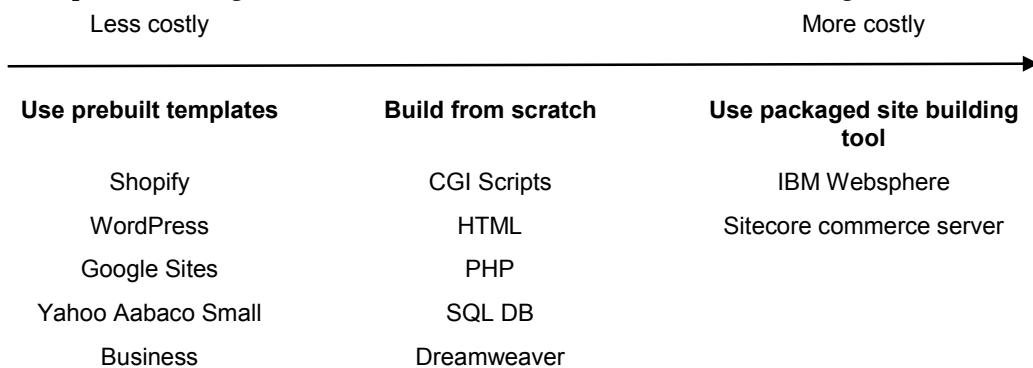


Fig. 2.2.3 Tool for building own e-commerce website

- There are number of risks involved in building your website on your own. Provided the complexity of functionality like credit card authentication, shopping cart, payment processing, order processing and inventory management, the cost will be higher, as are the risk of performing poor job.
- As you will be rebuilding the kind of website which other specialized firms have already developed, and your staff may require longer time which would delay your entry in the market. Because of all this your efforts can fail. On the brighter side, you might be better able to develop a website which has all the functionality that you want and more importantly you will learn the art of developing in-house, which will help you in case you need to make some changes because of change in business strategy.
- In selected to purchase more costly site- building packages, then you will be buying the software which is tested under all circumstances. By this you can enter into market sooner. However, to make proper choice, you will need to evaluate multiple software which can take long time. You might want to customize the package as per your requirement and perhaps you will hire another vendor to do customization work. As the number of customization increases, the cost associated with it also increase.

- In the past, traditional retailers who wanted an e-commerce website have developed the website by themselves, as they had skilled staff and had high budget to invest on the IT capes like telecommunications and database. However, as the e-commerce application have become more advance, the larger retailer nowadays depend on third party vendor to fulfill their website related needs.
- Small startup firms might build their own website from scratch using the in-house technical resources in order to keep the expenses low. Medium-size startup firms may buy site design and technical expertise from outside vendor.

2.2.3.2 Host Your Own Vs Outsourcing

- Majority of businesses opt to outsource hosting of their website and pay vendor to host their website, this means it is responsibility of hosting company to make sure the website is live 24×7 . By opting to pay monthly rental for hosting, the businesses don't have to worry about many associated technical aspects.
- You can even opt to co-locate. In co-location facility, your company buys or takes on lease a web server but the server is located at vendor's premises. Maintenance of communications line, facility and machinery is taken care by vendor. Co-location has expanded with the expansion of virtualization where one server is capable of operating multiple websites at a time with multiple OS and which has multiple processors. In such cases, you do not purchase the server but rent its capabilities on monthly basis. Below is list of major hosting/ cloud service providers :
 - Bluehost
 - Azure
 - Amazon Web Services (AWS) EC2
 - Godaddy
 - SoftLayer(IBM)
 - Hostway
 - Rackspace
 - Verizon Cloud.
- Co-location involve renting space for hardware, so you can consider renting virtual space on cloud service provider's infrastructure. Since the cloud services are reliable and less costlier, it is taking place of co-location. Contrary to co-location, hardware is not owned by your firm. Cloud service providers provides virtual technology, standard infrastructure and pay as per usage billing system.

- As the cost of servers are falling very fast, the cost of hosting is also decreasing. Also telecommunications costs have also fallen. Due to this, most of hosting service provider wants to be different than other hosting providers by providing various ad-on services like marketing, design of site, optimization and other services.
- There are number of drawbacks in outsourcing hosting. In case you opt for a vendor, ensure that you select such a vendor which have the capability to grow along with you. You will also need to understand type of security provisioned for taking backup copies of your website, activity monitoring and security track record.
- Many fortune 500 companies own their private cloud data centers in order to control the web environment. Diversely, if you are small company, there are various risk involved in hosting you own website. Your cost will go high than in case you opted for outsourcing hosting, since being a small firm you will not have that much power to procure low cost telecommunication and hardware. You will need to procure software and hardware, have a space to setup hardware infrastructure, rent telecommunication lines, developing security & backup policy and hire a staff yourself.

2.2.4 Testing the System

- Testing of the system needs to be done once the system is developed. Based on the system's size, this process can become lengthy and challenging. Testing is needed irrespective of whether it is built in-house or it is outsourced. A complex e-commerce website will have number of routes through the website, each of this should be documented and after that tested.
- It is important to note that testing is generally under-budgeted. Testing and rebuilding can consume around 50 % of your budget allocated for e-commerce website. In unit testing website's different modules are tested one at a time.
- In system testing, website is tested in a same way that a normal user would at the time of using system. In acceptance testing, company's key personnel and managers in production, marketing, sales and general management uses the system as deployed on testing server. Acceptance testing confirms that the system satisfies the business objectives.
- Split testing is another type of testing in which two different versions of website is shown to different users to check which one performs better. This testing is also known as A/B testing. In template testing, same content is tested across different design or layouts.

- The flow through a sequence of pages is compared in funnel testing to check which results in conversion in higher percentage.
- In multivariate testing specific element on web page is identified and different version of every element is created. After that unique combination of every element and version is created to test. It helps in identifying most optimal color, format, layout and content.

2.2.5 Implementation and Maintenance

- Majority of people think that once the system deployment is done, the process is over. Where as only the starting phase of process is completed, the operational phase of the system has just started.
- There are various reasons for system breaking down and many of these reasons are unknown. Hence the system needs periodic testing, checking and repair. Maintenance of system after deployment is very important but is neglected few times. A very large e-commerce website costing around ₹ 1 lac will likely need around ₹ 5 lac to 7 lac budget for maintenance.
- As e-commerce websites are kind of site which always in process of upgradation, correction and enhancement, the cost of maintenance of such site are higher. It is found in maintenance of traditional system that 20% of time is given to responding to emergency situations and debugging the code. Another 20 % is dedicated to changes in reports, data files and update in links to the databases. The remaining 60 % of time is provided to making change and enhancement of system and general administration. E-commerce websites are never completed, there is always something going on in development.
- The long-term success of an e-commerce website relies on a dedicated employee referred to as web team, whose only responsibility is to monitor and as per market situation adapt the website. This web team needs to be multi-skilled, so this team will have designer, programmer and business managers taken from production, marketing and sale support.
- One of the initial job of the web team is to check customer's feedback on the website and reply to that feedback as required. Another job is to build a systematic testing and monitoring plan which is to be followed on weekly basis to make sure everything is working properly, prices are correct and pages are updated. A larger business might have number of web pages, most of them linked, which need systematic monitoring.

- The web being very competitive market, maintenance is one of the important factor, as you may lose on customers due to dysfunctional website.

2.3 Optimize Web Performance

- If you are small company making use of already available design and hosting websites such as WordPress, you will not have to worry regarding hardware, software and techniques to optimize website since the vendor will provide this expertise. On the contrary, in case you are building your e-commerce website in-house, then you will have to consider these issues.
- The major aim of website is to deliver content to customers and to complete transactions. From a commerce view the website will become more effective when these two aims are achieved.
- If you are marketing executive or a manager, then you will want the site to function in such a way that it fulfills customer's needs. You will need to ensure that for achieving this business aims your websites need to be optimized.
- Website performance optimization is more complex than it appears to be and it includes three elements which are page content, page generation and page delivery. Selection of Hardware and Software are also one of the major element in optimization of website.
- Usage of proper techniques and style for designing page and content can decrease the response time by up to five seconds. Reducing unnecessary white spaces and HTML comments, using efficient graphics and avoiding not so required links to other web pages in website, these are few steps needs to taken in order to optimize performance of your website.
- Speed of page generation can be upgraded by assigning separate server to execute particular function, and making use of different devices from vendor to speed up these servers. Using a single server or multiple servers to execute number of jobs decreases throughput by more than 50 %. Page delivery speed can be increased by either increasing local bandwidth or by using special content delivery networks.

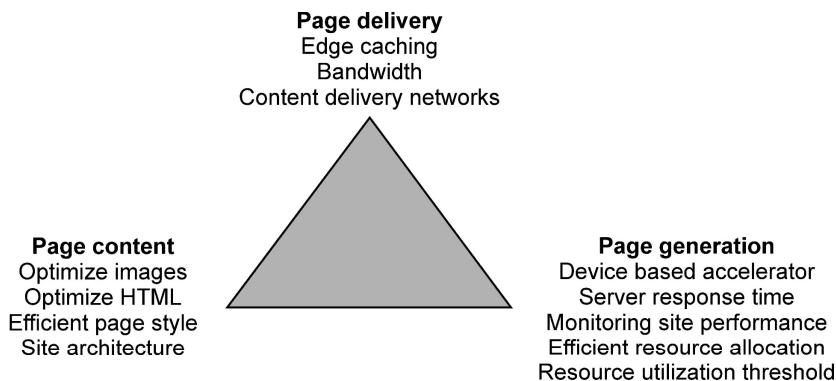


Fig. 2.3.1 Element in website optimization

2.4 Choosing Software

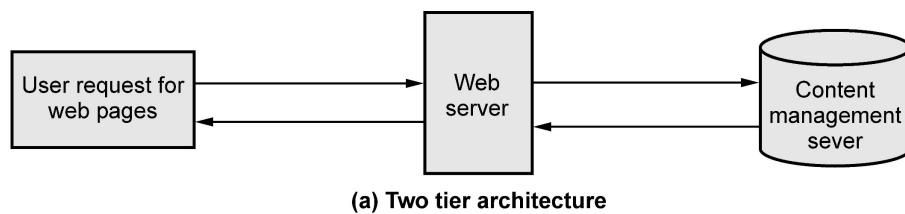
- In addition to telecommunications, hardware and software add up to the infrastructure of an e-commerce website. As a manager responsible for creating e-commerce website, you will need to have basic information about both, hardware and software.

2.4.1 Simple Vs Multi-Tiered Website Architecture

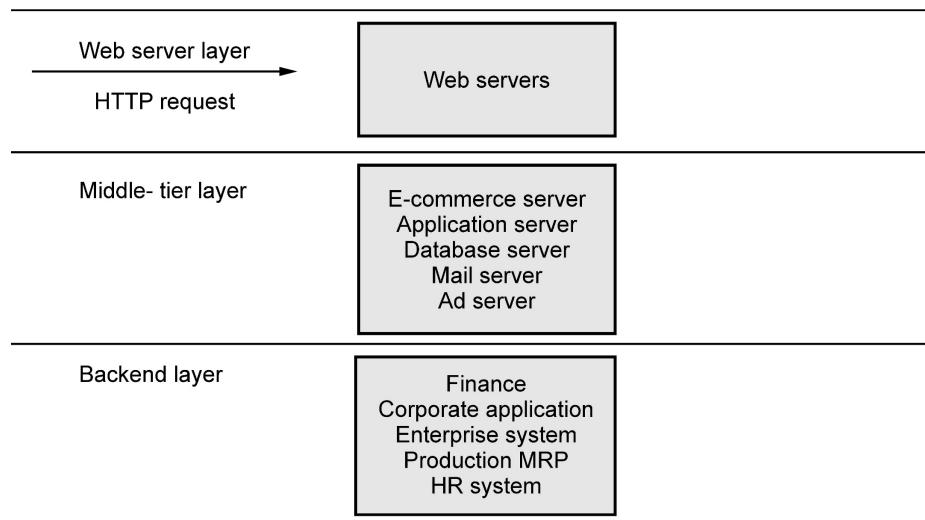
- Preceding the improvement in e-commerce, sites basically delivered web pages to users who were making requests through their browsers for HTML pages with content of different sorts. Site programming was properly very simple, it comprised of a server PC running fundamental web server software. We may consider this arrangement a single tier system architecture. System architecture refers to the arrangement of software, machinery, and jobs in a data system expected to accomplish a particular functionality. Numerous sites began this way, there are no money related exchanges. A huge number of websites till now perform this way. Requests can generally be brought in by phone and not taken online.
- Nonetheless, the advancement of e-commerce needs significantly more interactive functionality, for example, the capacity to respond to user request, take client orders for services and merchandise, clear credit card on the fly, counsel cost and item databases, and even change promoting on the screen dependent on user attributes. This sort of extended functionality required the advancement of web application servers and a multi-tiered system architecture to deal with the processing loads. Web application servers, are specific software programs that play out a wide variety of transaction processing needed by e-commerce.
- Along with having specific application servers, e-commerce websites should have

the option to pull data from and add data to preexisting corporate databases. These older databases which originate before the e-commerce time are called back-end or legacy databases. Enterprises have made huge investments in these systems to store their data on users, employees, product and sellers. These back-end systems comprise an extra layer in a multi-tiered site.

- Fig 2.4.1 shows complex multi-tier architecture and two-tier architecture for e-commerce site. In two-tier architecture, a web server responds to HTTP requests for web pages and a database server provides backend data storage. In a multi-tier architecture, conversely, the web server is connected to a middle-tier layer that typically incorporates a series of application servers that perform particular jobs, as well as to a backend layer of existing corporate systems containing product, customer, and pricing information. A multi-tiered website generally utilizes several physical computers, each running portion of the software applications and sharing the workload across number of physical computers.



(a) Two tier architecture



(b) Multi-tier architecture

Fig. 2.4.1 Two-tier and multi-tier e-commerce website architecture

2.4.2 Web Server Software

- In order to respond to the requests from users for HTML web pages, all e-commerce websites need a web server software.
- Along with selecting a web server, you will have to select an operating system for your website's computers. Apache is leading web server software which works with Unix and Linux operating systems. Unix is the original programming language of the Internet and Web, and Linux is a derivative of Unix designed for the personal computer.
- Worldwide community of internet innovators have developed Apache. Apache is an open source software and it also comes preinstalled on many of IBM web servers.
- There are number of utility software programs developed for Apache which can provide all the features needed for an e-commerce website. Knowledge on Unix or Linux is required for using Apache.
- Internet Information Services(IIS) by Microsoft is also majorly used web server software. IIS is based on Windows OS and is compatible with a wide choice of Microsoft utility and support programs.
- There are also number of smaller providers or open source web server software available. The web pages user sees will look the same irrespective of the development environment.
- Microsoft suite of development tools have number of advantages as they are powerful, integrated and easy to use. The Unix OS, on the contrary is more reliable and stable, and there is a community which builds and tests Unix-based web server software.
- Below are some basic functionalities provided by all web servers :

HTTP request processing

Receive and respond to client requests for web pages

Security Service/Transport Layer Security

Verify username and password, process public/private key information and certificate needed for credit card transaction processing

File Transfer Protocol

Allows transfer of larger files from one server to another.

Search Engine

Keyword search capability, site content indexing

Data Capture

Log file of all website visits, duration, time of visit and referral source

E-mail

Ability to send, receive and store e-mail messages

Site management tools

Calculate and display website statistics like number of unique visitors, source of request and web page request

2.4.3 Site Management Tools

- In case you want your site to be keep working, and also want to know how well it is working, then you need a site management tools. It helps to verify that the links on the web pages are still valid and also helps in identifying files on the website which are not linked with any web page. It also helps to report the errors and problems that user may face while using it.
- Customers don't like websites on which they face error like "Page not found". Dead links are the links to URLs which have either been deleted or moved, such links can cause error message for users who are trying to access that link. On regular basis if all the links are checked then that will help in preventing frustration and irritation in user, who might opt to take their business to some other properly functioning website.
- Site management tools also helps in understanding behavior of customers on your e-commerce site. You can buy site management tools like Webtrends, in order to efficiently monitor marketing effectiveness campaign and customer purchases, also keep record of page visit and hit count data.

2.4.4 Dynamic Page Generation Tools

- Development of dynamic page generation tools is one the major innovations took place in website operation. Before e-commerce came into the picture, websites were mainly having static content as HTML pages.
- The successful e-commerce website's contents are always changing. There are new products and advertising, news events, changing prices and user testimonials.
- E-commerce websites should effectively communicate with users who not only request web pages but also request for product, cost, availability and information

regarding inventory. eBay is one of the most dynamic sites. The content on such sites changes every minute.

- The dynamic and complex nature of e-commerce websites needs various specialized tools along with static HTML pages. Perhaps one of the most significant is dynamic page generation tool. In this the contents of web page are stored in database as objects, in place of keeping it as hard-coded in HTML. Once the web page request is sent by user, the contents for that particular web page are retrieved from the database.
- The objects can be fetched from database by using Active Server Pages (ASP), Common Gateway Interface (CGI), Java Server Pages (JSP), or other server-side scripting programs. These ways are more effective than working directly with HTML code.
- Changing contents of a database is more simple than changing HTML page coding. Application can access data from any database with the help of an Open Database Connectivity (ODBC). It acts as a translator between database and application. ODBC drivers are available for majority of database management systems which are provided by organizations like SAP, Oracle, Sybase and IBM. Java Database Connectivity (JDBC) is a kind of ODBC driver which acts as a translator between various databases and applications written in Java programming language. Nowadays there are different web development platform available which permits developer to directly access database, which make ODBC/JDBC drivers needless.
- Dynamic page generation tool provides e-commerce various capabilities which generate revenue and profitability edge over traditional commerce. It helps in reducing menu cost, the cost which is charged by vendors for making update in price and description of product. It also allows simpler online market segmentation, by which you can sell the same product to various markets. For example, you may want different variety of same ad banner based on number of times the customer has seen that banner. For car ad, initially you may want to highlight brand and unique features. In the next viewing you may want to highlight superlatives like "most family friendly" s that user can compare it with other brands.
- The same ability makes it possible to do cost-free differentiation in price, by which you can sell the same product at different price to different customers. For example, you may want to sell the same product to government agencies and to other companies, but using different marketing strategy. Depending on the cookies placed on user's computer, or from question's response asked on website to user

regarding if they are from corporation or from government agency, you can select different promotional material for different customers.

- You may want to give low prices to loyal customers and can take full price from first time user. Dynamic page generation tool permit you to address different users with different pricing and message.
- It also allows using Content Management System (CMS), which is used to manage and create web page content. A CMS segregates presentation and design of web page content from the process of content creation. All the web page content is stored in the database and are connected dynamically to the website.
- A CMS generally contains templates which can be applied automatically to existing as well as to new content, WYSIWYG editing tools which makes it simpler to describe and edit content, workflow, data management tools and collaboration. Generally, an experienced developer is required to install the system initially, but later, content of web pages can be managed and modified by nontechnical staff.
- There are number of commercial CMSs available like IBM, OpenText, Adobe, PaperThin, Sitecore, Oracle, also have hosted SaaS (software as a service) model by Acquia, Crownpeak and Clickability. Various open source content management systems are also available like Joomla, WordPress, Drupal etc.

2.4.5 Application Servers

- Particular business features needed in websites are provided by web application server. The basic objective of application server is to segregate business applications from front end content on web pages and back-end information regarding connecting database.
- Application servers are a type of middleware software which acts as a medium connecting customers to traditional corporate system as well as all features required to operate e-commerce.
- In the early years, various software companies have build separate program for every function, but by the passing time, these programs are getting replaced by integrated software tools which merges all required features for an e-commerce website into a single development environment.
- There are number of application servers available, few of which are as follows:
 - a. *Proxy server*
Monitors and handles access to main web server, also implements firewall protection

- b. *Mail Server*
Manages emails
 - c. *Catalog Display*
Provides product price and description database
 - d. *Transaction Processing*
Takes order and processes payments
 - e. *List Server*
Creates and provide mailing list, also handles email marketing campaigns
 - f. *Chat Server*
Creating environment for sending online text in real-time and audio communication with customers
 - g. *Audio/Video Server*
Stores and supply streaming media content
 - h. *Database Server*
Stores product, product price and customer information
 - i. *Ad Serverz*
Manages web-enabled database of advertising banners which allows personalized display and modification of ads depending on behaviour of customer.
 - j. *B2B Server*
For commercial transactions providing buying, selling and linking marketplaces.
 - k. *Auction Server*
For regulating online auctions providing transaction environment.
- There are various software vendors available which provides application server software. Many of such features are available free of cost for Linux and Unix environment. Majority of businesses opts to use merchant server software an integrated software tool.

2.4.6 E-Commerce Merchant Server Software Functionality

- E-commerce merchant server software provides basic feature required for selling product online, which includes online catalog, online shopping cart to take order and online credit card transaction processing

Online Catalog

- A company who are willing to sell products online should have online catalog or list of products, available on their site. For permitting creation of custom made online catalog merchant server software includes database capability.
- The complexity and sophistication of the catalog will differ based on the size of firm and its product lines. Simple list along with text description and possible color photos of product will be posted by companies having smaller product lines or small companies. A larger company may choose to add different types of detailing like sound, animation or videos to the catalog. Nowadays larger companies uses streaming video for catalog.

Shopping Cart

- Online shopping cart is similar to real-world shopping cart, both of these permits to reserve required products in preparation for checkout. The major distinction is that the online type of shopping cart is part of merchant server software situated on the web server, and permits users to select product, review product they have chosen, modify their selection as required, and making purchase by clicking a button. The merchant server software automatically stores shopping cart data.

Credit Card Processing

- A website's shopping cart works in coexistence with credit card processing software, which verifies user's credit card details and after that credit the amount to company's account and debit to the card at checkout. Integrated e-commerce application suites typically provide the software for this feature. Otherwise, you will need to arrange different credit card processing mediators and banks.

2.4.7 Choosing an E-Commerce Software Platform

- In the process of building an e-commerce website, selection of proper tool after proper evaluation is important.
- Following are few key factors to consider :
 - Features, which includes availability on an SaaS basis
 - Support for different models of business
 - Business process modeling tools
 - Visual site management tools and reporting
 - Scalability and performance

- Connectivity to existing business systems
- Compliance with standards
- Global and multicultural capability
- Shipping rules and local sales tax.
- For example, even if e-commerce platform provides all the required features, your company may need some specific features like streaming video and audio. You will require to have complete list of required business features. There might be possibility that you will have different models of business like B2B, retail and you may opt for running auction or do fixed price selling.
- Make sure the package selected supports different business models of your business. You may want to change your business processes, like order completion and taking order. A poorly designed e-commerce software will fall in terms of performance as visitors and transactions increasing into thousand per hour or minute. You will need e-commerce site version in foreign language also which is supporting foreign currency, as your e-commerce website might work globally. Your e-commerce website should support higher level of localization and globalization.

2.5 Choosing Hardware

- Regardless of whether you outsource hosting and operation or you host your own website, you should know some aspects of computing hardware platform.
- The hardware platform means that all the basic computing component which the system utilizes to accomplish its e-commerce features. Your aim is to have sufficient platform capacity to handle peak demand, but not in that much excess that you waste money. In case fails to match peak demand, then that means your website is actually crashing or is slow.
- It is required to have knowledge about the aspects which have effect on capacity, speed and scalability of an e-commerce website.

2.5.1 Right-Sizing Your Hardware Platform : The Demand Side

- The demands which customers put on your e-commerce website is major factor affecting your website's speed.
- Based on the kind of website you operate, demands on your website may become complex. The number of concurrent users in peak time, the type of customer requests, kind of content, required security, the number of products in inventory,

number of page requests and speed of legacy applications which may be required to provide data to web pages are all important factor in overall demand on a website application.

- One of the important factor to consider is the number of concurrent users who will likely to visit your website. In general, the load created by a single user on website server is limited and for short time. A session initiated by user on your website is stateless, which means that you server does not have to worry about maintaining an ongoing, dedicated communication with user. On web page request a web session is initiated, once the server responds to the request the session ends. Performance of system may decrease as increasing number of concurrent users request service.
- For serving static web page requests, I/O operations are required rather than heavy-duty processing power capability. Due to which Performance of website is majorly dependent on telecommunication connection and I/O limitation of server, rather than speed of server's processor.
- The nature of content and user profile are some other factors which needs to be considered while projecting the demand on the website. Demands on the server's processors will go up in case user requests registration forms, searches and accepting order through shopping cart.

2.5.2 Right-Sizing Your Hardware Platform : The Supply Side

- Once the demand on your website is projected, you will have to think about scaling up your website in order to meet the demand. One of the solution is that outsourcing the hosting part of your site to cloud based service. Service of Content Delivery Network (CDN) like Akamai, can also taken.
- However, in case you host your own website, scalability will remain an important consideration. Scalability mean the capability of a website to increase in size as demand increases. There are three steps by which you can meet the demands for service at your website : horizontal scaling of hardware, vertical scaling of hardware, and/ or enhance the processing architecture of the website.
- Increasing individual component's processing power is known as vertical scaling. Adding multiple computers to increase the footprint of installation and to share the workload is known as horizontal scaling.
- By upgrading the servers from single processor to multiple processor you will be able to scale your website vertically. Based on the operating system and for upgrading to faster chip speed, you can keep on adding processors to a computer.

- There are two disadvantages to vertical scaling. First, along with every growth cycle purchasing additional processors will become costly, and second, your complete website becomes dependent on a smaller number of powerful computers. In case you have two such computers and one goes down, then either half or complete website can become unavailable.
- Horizontal scaling contains adding multiple single processor server to your website and performing load balancing among those servers. You can then divide the load so some servers are assigned for handling database application, whereas some servers handle only HTML web page requests. To navigate incoming request to different server, you will require a special load balancing software.
- There are various advantages to horizontal scaling. It is cheap and can be achieved by using older computers which otherwise could have been disposed. Horizontal scaling also introduces concept of redundancy i.e. in case one computer fails, chances are that another computer can take up the load dynamically. However, when your website grows from single computer to 15 to 20 computer then the size of physical capacity needed to store also increases and this adds to management complexity.
- A third option, improving the processing architecture, is a combination of horizontal and vertical scaling, combined with artful design decisions. Below are few common techniques that can be taken to improve performance of your website:
 - Separate dynamic and static content : For every kind of workload make use of specialized server
 - Cache static content: RAM size to be increased to GB range and store static content in RAM
 - Cache database lookup tables : Use cache tables used to look up for records in database
 - Consolidate business logic on separate server : Put credit card processing, shopping cart and any other CPU intensive task on separate server
 - Optimize source code and database schema
- Many of these techniques include dividing the workload into CPU-intensive activities and I/O intensive tasks. Once you have divided the work, for every kind of workload you can fine tune the server. One of the less costly fine tuning technique is adding RAM to some servers and store all your HTML pages in RAM. This increases the processing speed by reducing load on your hard drives. RAM is cheap and it is thousand times faster than hard disks.

- The next course of action is to migrate all CPU intensive tasks like order taking, onto high-end, multiple processor server which is particularly assigned to handle order and accessing required databases.
- Taking these steps can allow you to reduce the number of server needed to responds to thousands of concurrent users from 100 down to 20, according to estimate.

2.6 Other E-Commerce Site Tool

- Since, now you are aware about the important factor which may affect the capacity, speed and scalability of your site, you can consider some other key requirements. You will require a well organized website design which makes business sense i.e. not exactly a website to excite visitor or wow them, but to sell something to them. You will also have to understand the way to develop active content and interactivity into your website. You should be able to track the customers who come, leave and return to your website so as to welcome return visitors.
- You may also want to track customer coming on your website throughout the session in order to make their experience customize and personalize. You will also want the capability for customers to generate feedback and content on your website to increase customer engagement with your brand. Lastly, you will want to create a set of information policies on your website such as accessibility, privacy and access to information policies.
- So to accomplish these business abilities, you will have to understand some design guidelines and additional software tools which can cost-effectively accomplish the required business features.

2.6.1 Website Design : Basic Business Considerations

- From business manager's point of view, there are few design goals you should tell to designers of your website to make them understand evaluation criteria for their work. At least, your customers will have to find what they require from your website, make a purchase and leave. A website which irritates customers have high risk of losing customer.
- Some of the complaint regarding websites are as below :
 - User needs to view ad or intro page before going to website content
 - Pop-up and pop-under windows and ads
 - To view actual content user needs to clicks too many times

- Links that don't work
 - No search function, Confusing navigation
 - Before viewing website content or ordering user needs to register and login
 - Slow loading pages
 - Out of date content
 - Unable to use back button of browser
 - Contact information not available (web form only)
 - Needless animations, flash screens, etc.
 - Music or other audio that plays automatically
 - Unprofessional design elements
 - Text not easily readable because of size, color, format
 - Typographical errors
 - Unclear or no returns policy.
- The worst e-commerce websites makes it hard to find information regarding their products and make it complex to buy goods, they have broken links and missing pages, a confusing structure of navigation, and irritating graphics or audio which you can't turn off.
 - The eight major factors in successful e-commerce website design are as below :
 - **Features :** Pages that load quickly, work, and point the customer toward your product offerings
 - **Informational :** Links that customers can easily locate to discover details about you and your products
 - **Ease of use :** Simple and clear navigation
 - **Redundant navigation :** Alternative navigation to the same content
 - **Ease of purchase :** One or two clicks to purchase
 - **Multi-browser functionality :** Site works well with the majority of popular browsers
 - **Simple graphics :** Avoids distracting, irritating graphics and audio which the user cannot control
 - **Legible text :** Avoids backgrounds that distort text or make it not readable.

2.6.2 Tools for Search Engine Optimization

- From business point of view a website is only as valuable as number of user who visit your website. For customers looking for a service or product first stop starts with a search engine, and follows the list on the page, generally starting with the top three to five listings, then looking at the sponsored ads to the right side. As high ranking your website have on search engine, the more traffic you will receive. It is always better to be listed on page 1 of search result than page 2.
- Every search engine work differently and they don't disclose their algorithms for ranking web pages, there are few basic techniques that work well which are as follow :
 - *Titles, page contents, metatags* : Search engine crawl your website and recognizes title pages as well as keywords and then for using in search parameter index them. Make use of such keywords which clearly describes what you do in keyword section of your source code and in metatag site description. For experiment purpose make use of different keywords and check which works well.
 - *Recognize market niches* : In place of marketing Jewellery, give specific information like "Antique Jewellery" or "1942s Jewellery" to attract specific, small group who are interested in period jewellery and closer to buy it.
 - *Offer expertise* : Industry analysis, white papers, FAQ pages, histories and guides are exceptional ways to develop confidence on the side of users and to encourage them to check your site as the place to go for guidance and help.
 - *Get linked up* : Motivate other websites to link to your site; write blogs which attracts people and those who will share your website URL with others and post links in the process. Create a Facebook page for your firm, also can create Instagram account for your firm to build fan base for your products.
 - *Local e-commerce* : It will take longer time to build a national market. In case your site is specifically attractive to local people, or involves product sold locally, use such type of keywords which can note your location so that nearby people can find you. Using keywords such as city, town and region name will be very helpful.
 - *Buy ads* : Add value to your natural search optimization efforts with paid ads and search engine keywords. Select your keywords and buy direct exposure on web pages. In order to prevent high losses, you can set your budget and keep an

upper limit on it. Observer what works best and keep eye on number of visits to your website generated by each keyword string.

2.6.3 Tools for Interactivity and Active Content

- The more interactive your website is, the more effective it will be in terms of generating sale and motivating return visitors. Even though features and ease of use are major objective for website design, you will also want to have interaction with the users visiting your website and present them with lively, active experience. You would also want to personalize visitor's experience by addressing their individual need and customize the website content of offering depending on visitor's expressed desires and behavior. In order to accomplish these business objective you should choose the tools carefully which are required to build these capabilities.
- A very simple interaction with visitor like visitor submitting their name, along with even more complex interaction which involve user preferences, credit card and user responses to prompts, all need special programs.
- In this section we will have a look at most commonly used software tools for achieving high level of website interactivity.

2.6.3.1 Common Gateway Interface (CGI)

- Common Gateway Interface is a set of standards for communication between browser and a program running on a server which permits for interaction between the server and the user. CGI allows an executable program to access all the information within incoming client's request. Then the program can produce all the required output to make up the return page and send it back to client through the web server. For example, in case a user clicks on shopping cart button, the server upon receiving this request executes a CGI program. This CGI program retrieve shopping cart content from database and returns it to the server. Server sends a HTML web page which shows the shopping cart contents on user's screen. Note that all computing related tasks are carried out at server side.

2.6.3.2 Active Server Pages (ASP) and ASP.NET

- Active Server Pages(ASP) is Microsoft's version of server-side programming language for Windows. In windows environment ASP has became popular choice for server-side programming. ASP allows developers to easily create and open records from a database and run programs inside a HTML web page, as well as handle all the different types of interactivity establish on e-commerce websites.

- Similar to CGI, ASP allows an interaction to take place between the server and the browser. As CGI, ASP make use of same standards for establishing communication with the browser. ASP programs are limited to use on Windows servers running of IIS web server software of Microsoft. ASP.NET, first released in January 2002, and segment of .NET framework of Microsoft, is the successor to ASP.

2.6.3.3 Java, Java Server Pages (JSP) and JavaScript

- Java is a programming language which permits software developers to develop active content and interactivity on client computer, thus saving significant load on the server. Java was initially developed as platform independent programming language by Sun Microsystem for electronics consumer. The purpose was to build a programming language whose program can be executed on any system irrespective of operating system. This can be possible in case every operating system at the time had a Java Virtual Machine installed which would interpret the programs written in Java for that environment.
- Java Server Pages (JSP), similar to CGI and ASP, is a web page programming standard which permits software developers to use mix of HTML, Java and JSP scripts to dynamically generate web pages in response to user requests. JSP uses Java servlets, a small program written in java which are specified in the web page and run on web server to modify the web page before sending it to client who has requested it. Majority of popular application servers supports JSP.
- Netscape has invented JavaScript programming language which is used to control the objects on HTML page and handle interaction with the browser. It is often used to handle validation and verification of user input, as well as implementing business logic on the client side. For example, in customer registration forms JavaScript can be used to verify that a valid pin code, mobile number or email id has been provided. JavaScript is acceptable to organizations since it is more stable and also it is restricted to the operation of HTML pages requested.

2.6.3.4 ColdFusion

- It is an integrated server side environment for building interactive mobile and web applications. Macromedia has originally developed ColdFusion which is now offered by Adobe. The cost of developing interactive features is reduced by the use of ColdFusion. It provides a powerful set of visual design, coding, debugging and deployment tools. The latest version of ColdFusion provides advanced feature for creating mobile app, as well as multiple new security features and programming language advancements, along with increased interoperability support.

2.6.3.5 ActiveX and VBScript

- In order to compete with Java and JavaScript Microsoft has invented ActiveX and VBScript. When a browser receives a HTML page containing ActiveX control, the browser directly executes the program. Unlike Java, ActiveX have full access to all the resources of client like hard drive, networks and printers. VBScript functions similar to JavaScript. ActiveX and VBScript only functions in case of using Internet Explorer, otherwise, that part of the screen is blank. Microsoft thinks that the demand of VBScript and ActiveX has been notably reduced provide the capabilities of HTML5, and that eliminating them will enhance security of browser.

2.6.3.6 PHP, Ruby on Rails (RoR) and Django

- PHP is general purpose, open source scripting language which is usually used in server side web application to generate dynamic content on web page, even though it can also be used in client side for graphical UI application. PHP is also part of various frameworks like CodeIgniter, CakePHP and others, and is also part of open source web development model named LAMPfor developing dynamic web applications and websites. According to Netcraft, almost all phishing kits are written in PHP making PHP popular among the hackers.
- Ruby on Rails (RoR) is an open source web development framework based on Ruby programming language. RoR is based on a concept of coding by convention, or convention over configuration, which means that the framework provides a layout in structured manner which reduces the number of choices that the developer needs to make, thus speeding and simplifying development. Ajax and JavaScript are highly integrated into RoR, that makes it simpler to handle Ajax requests for updating page.
- Django is also an open source web development framework which is based on Python programming language. Django is optimized for building database driven, complex websites. It permits for faster development, emphasizes the reusability of different components, focusing on automating as much as possible, and follows Don't Repeat Yourself programming principle. Some popular websites built in Django are Pinterest and Instagram.

2.6.4 Personalization Tools

- You would like to understand how to handle every customer on an individual basis and imitate a traditional face to face marketplace. Customization and personalization are two key elements of e-commerce which potentially can make it nearly as powerful as traditional marketplace, and might be more powerful than email marketing or shopping at an unknown suburban shopping mall. Talking directly to customer on one to one basis, and even adjusting the product as per customer is bit difficult in the normal type of mass marketing, one size fits all business transaction which characterizes much of modern commerce.
- There are various techniques available for achieving customization and personalization. For example, In case you know the visitor's background, you will be able to personalize content of website. You can also do analysis of pattern of clicks and websites visited for every customer who visits your website. The primary technique for achieving customization and personalization is done through the placement of cookies on client's computer. A cookie is small text file which is placed on the client's computer that can hold any type of information related to customer, like customer ID, purchases at the website, or campaign ID. Later, in case user returns to the website, or in fact goes further into your website, prior history of customer can be accessed from the database. This prior visit data can be then used to personalize the visit and customize the product accordingly.

2.7 Developing a Mobile Website and Mobile App

- Nowadays, developing a website is only one part of building an e-commerce presence. Provided that more than 90% users access the web at least a part of time from mobile devices, companies today want to build mobile websites, and native apps, mobile web apps, or hybrid apps, to do interaction with suppliers, employees and customers. First step is to select which extended web presence tools to use.
- There are various type of m-commerce platform offering to consider, each with special costs and advantages. A mobile website is a type of regular website which is scaled down in navigation and content so that users can locate what they need and navigate quickly to a conclusion or purchase. You can identify the difference between mobile website and regular website by visiting Amazon or Flipkart website from your mobile or tablet and from your computer. Amazon's mobile website is cleaner, more interactive website appropriate for navigation by fingers, and efficient customer decision making. Similar to conventional websites, mobile websites run on a company's servers and are developed using standard web tools like Linux,

PHP, server side HTML and SQL. Like any other website, the user must be connected to internet and performance of website will depend on the internet bandwidth.

- In general, mobile websites functions more slowly than conventional websites visited on a computer connected to a broadband office network. Majority of large companies today have mobile sites.
- A mobile web app is an application developed to execute on mobile web browser built into a tablet computer or smartphone. For Apple, the native browser is safari. Normally it is developed to mimic the qualities of native app using Java and HTML5. Mobile web apps are specifically designed for mobile platform in terms of finger navigation, screen size, and simplicity in graphical UI.
- Mobile web apps can support complex interactions used in rich media and games, carry out real-time, on the fly calculations, and can be geo sensitive using the GPS function of smartphone. Mobile web apps are generally functions faster than the mobile websites but not as fast as native apps.
- A native app is an application which is designed specially to function using the mobile device's operating system and hardware. These separate programs can connect to the web to upload and download data, and can function on this data even if not connected to the internet. Download a book to a reader app, disconnected internet and read the downloaded book. Since different type of smartphones have different operating system and hardware, mobile apps are not one size fits all and hence for different mobile platform different apps needs to be developed. The application running on iPhone cannot function on android phones. Based on the device for which application is being developed different programming languages are used for building native apps. Later the application source code is compiled into binary code and which executes faster on mobile devices, even faster than java-based mobile web apps or HTML. Because of this, native apps are suitable for complicated interactions, games, on the fly calculations, rich media advertising and graphical manipulations.
- After every passing time, programmers are combining elements of mobile web apps and native apps into hybrid apps. A hybrid app has many of the functionalities of both mobile web app and native app. Similar to native app, it executes inside a native container on mobile device and have access to device's APIs, allowing it take benefit of many of the features of device, like gyroscope, which are generally not accessible by a mobile web app. For distribution through an App store, it can also

be packaged as an app for distribution. Similar to mobile web app, it is based on HTML5, JavaScript, and CSS3, but make use of device's browser engine to provide the HTML5 and process the JavaScript locally.

2.7.1 Planning and Building a Mobile Presence

- The right mobile presence for your company is based on recognizing the business objectives and from these objectives, obtaining the information requirements of your mobile presence.
- The initial step is to recognize the business objectives that you want to achieve. Table 2.7.1 explains the thought process for the analysis phase of developing a mobile presence

Business Objective	Functionality	Requirements
Branding	Displaying how customers use your product	Rich media and video; product and customer demonstrations
Driving sales	Product database; digital brochure	Product photos, description and inventory
Advertising and promotion	Flash sales and coupons for slow selling products	Product description, inventory management and coupon management
Building community of customer	Games with multiplayer, interactive experience	Games, forums, contests, social sign-up to Facebook

Table 2.7.1 System Analysis for developing a mobile presence

- Once you have clarity regarding business objectives, you will be in position to explain the type of system functionality that you want to have and can provide information requirements for your mobile presence.
- After you recognized the business objectives, functionality of system and information requirement, you can consider designing and building the system. Now you can think of what you want to develop a mobile website or native app or mobile web app.
- For example, in case your aim is building community or branding, a native app will be the best selection since it allows you to deliver a interactive, rich and immersive experience which can build the emotional connection with the brand. Since native

apps are stored locally on the mobile device, such apps can be used even if the user is offline, allowing the user to engage more deeply. Additionally, native apps can take benefit of unique features of mobile device, like using the gyroscope to deliver 360 degree view.

- On the other hand, in case you aim is to build broad awareness, give some information on specific product or driving sales, then mobile web app or mobile website should be preferred, because it is comparatively less costly and easy to directly publish the content to the mobile web and users are more comfortable to complete the transaction on web.
- Increasingly, though the selection would not be and either-or selection. Mobile websites and mobile apps each of these provides unique benefits and in majority of cases, the best way will be to preparing plan for delivering engrossing content across all devices.

2.7.2 Mobile Presence : Design Considerations

- Designing a mobile presence is a bit different from conventional website design for desktop because of the different software, hardware and customer expectations.
- Designers have to consider the limitation of mobile platform while designing for mobile platform. The number of files sent to the user should be reduced and size of files need to be kept smaller. Focus on few, powerful graphics and reduce the amount of image file sent to the user. Simplify lists and choice boxes so that the user can simply scroll and touch select the options.
- Mobile presence has become so significant that it is filling a developing pattern to flip the conventional e-commerce development process and begin rather with development of a mobile presence as opposed to a desktop website . Mobile first design has several advantages. Rather than building a full-featured design for a desktop website that then needs to be scaled back, mobile first design focuses on developing the best possible experience given mobile platform limitations and then adding back elements for the desktop platform, increasingly advancing the features of the website. Supporters of mobile first design argue that it forces designers to focus on what is most important, and this helps in creating efficient mobile design that works much better than a design that begins with a conventional platform that must be stripped down to work on mobile. Mobile first design have their own set of challenges, however. It can be more challenging for designers who are more comfortable with the more conventional process.

- Another significant trend in mobile website development includes designing responsive website and adaptive web design.
- Responsive Website Design (RWD) tools and techniques for design make it feasible to design a website which automatically adjust the layout and display according to the resolution of device screen on which it is being viewed, whether a mobile, desktop or tablet.
- RWD tools comprises CSS3 and HTML5 and its three key design principles involve using flexible media and images, grid based layouts and media queries. RWD make use of the same HTML code and design for every device, but uses CSS to adapt the display and layout to the form factor of screen. However, using RWD can be expensive, often need to do complete redesigning of the interface of website. Another issue with RWD, specifically if not coupled with mobile first design, is that the responsive website still have the complexity and size of a conventional desktop website, which results in slow loading and functioning on mobile device. Adaptive Web Design (AWD) is other way which is developed to handle such type of issue.
- In Adaptive Web Design (AWD), the server which is hosting the website identifies the attributes of the device making the web page request and by using predefined layout depending on the size of screen along with JavaScript and CSS, loads a version of the website which is optimized for that device. AWD has various benefits which includes faster load time, the capability to remove or enhance features on the fly, and typically a better user experience, specifically for the companies where users purpose differs based on the platform being used.
- For instance, developing mobile website by using AWD enabled Lufthansa to focus on actions which the mobile user are likely to take, like check-in, getting information regarding status of flight, and looking up travel itineraries, and to give a differentiated experience from its conventional desktop website.

2.7.3 Cross-Platform Mobile App Development Tools

- Additionally to build native apps from scratch using a programming language like Java or objective C, There are number of cost effective or open source application development toolkits which makes it is comparatively easy to build cross platform mobile apps and less costly without required to use device depended programming language.
- Appery.io is one such cloud-based tool which allows you to drag and drop visual builder tool to build HTML5 apps using jQuery mobile. Appery.io supports iOS,

Android and windows phone application. Codiqa is one such app which provides drag and drop feature and develops an app with complete HTML5 components, without having to do any coding. For those who are not technically sound, Conduit is a free mobile app builder which permits you to include various functionality, including notification, e-commerce and social feed.

- PhoneGraph is a mobile development framework which make use of Apache Cordova to allow building hybrid mobile apps using HTML, JavaScript and CSS. MoSync is one more example of enhanced tool for building hybrid apps for Android, iOS, Windows mobile and Symbian mobile.

2.7.4 Mobile Presence : Performance and Cost Considerations

- In case you currently don't have any website, then recommended to design mobile site first by using mobile first design technique. On the other hand, you might opt to develop conventional website using RWD or AWD techniques. In case you already have a website that you don't want to redevelop completely, the cost effective way is to resize your website to develop a mobile friendly website. Doing this will not need effort of complete redesign. You will have to make the navigation simple, reduce the text and graphics and focus on enhancing the customer experience so the people does not get confused.
- Since your customers may still need to use comparatively slow internet connection at times, you will have to reduce the size of data you send. Also, provided the challenges of data entry by customer on mobile device, you should not expect that customer will enter long strings of character or numbers happily.
- For marketing clarity, ensure that the images of brand used for the mobile website should match with those on the conventional desktop website. The cost for building mobile website can range from ₹ 30 lakh for customized website for large firm to well under ₹ 50,000/- for smaller firms.
- Developing a mobile web app which uses browser of mobile device need more cost and efforts than building a mobile website and suffers from the same constraints as any browser based application. However, it does provide some benefit like more interactivity, better graphics and faster local calculations as, for example, in mobile geo-location applications such as Foursquare which need local calculation of position and the interaction with the web server of the website.
- Building a native app is one of the costly way to a mobile presence for your firm. More programming expertise are required for building native apps, even though

there are some new packages available which can build native app with minimum programming knowledge. Additionally, no elements used in your current website can be reused virtually, and you will have to redesign complete logic of the interface and carefully think out the customer experience.

- For example, there is reasonably stable HTML conventional website interface with graphics, buttons, ads and videos had built over last decade. This scenario is not correct for apps. Every app looks different from any other app. This means the user confronts large difference in design of app, so your interface should be kept simple.
- Native apps have their own advantages like you get a chance to develop a unique, stunning customer experience where user can interact with your brand. Native apps are best suited for the scenario in which if you want to have intense branding experience with customers of your product, where the interaction between your customer and brand is efficient and effortless.

2.8 Part A : Short Answered Questions (2 Marks Each)

Q.1 Describe following phases of System development life cycle

- i. System Analysis ii. System Design**

Ans. : i. System analysis

In this phase of SDLC, we will identify what we want this e-commerce website to do for our firm. The key point is to let the business choices drive the technology, not the reverse. This will guarantee that your technology platform is lined up with your business.

In system analysis, one approach to start is to recognize the particular business objectives for your website, and then build a list of system functionalities and information requirements.

ii. System design

The system design can be divided into two parts: physical design and logical design. A logical design contains a data flow diagram which explains the flow of data in your e-commerce website, the processing function which should be performed and the database which will be used.

The logical design is then translated in a physical design which contains physical components. The physical design provides details about the type of server to be used, the software needs to be purchased, required telecommunication link size, system backup and security policy, and so on.

Q.2 What is testing?**Ans. : Testing**

- Testing of the system needs to be done once the system is developed. Based on the system's size, this process can become lengthy and challenging. Testing is needed irrespective of whether it is built in-house or it is outsourced. A complex e-commerce website will have number of routes through the website, each of this should be documented and after that tested.
- In system testing, website is tested in a same way that a normal user would at the time of using system. In acceptance testing, company's key personnel and managers in production, marketing, sales and general management uses the system as deployed on testing server.
- Split testing is another type of testing in which two different versions of website is shown to different users to check which one performs better. This testing is also known as A/B testing.

Q.3 What is web performance optimization?**Ans. : Web performance optimization**

- Websites need to be optimized in order to fulfil customer need efficiently.
- Website performance optimization is more complex than it appears to be and it includes three elements which are page content, page generation and page delivery. Selection of Hardware and Software are also one of the major element in optimization of website.
- Usage of proper techniques and style for designing page and content can decrease the response time by up to five seconds. Reducing unnecessary white spaces and HTML comments, using efficient graphics and avoiding not so required links to other web pages in website, these are few steps needs to taken in order to optimize performance of your website.

Q.4 Draw two-tier and multi-tier e-commerce website architecture.

Ans. :

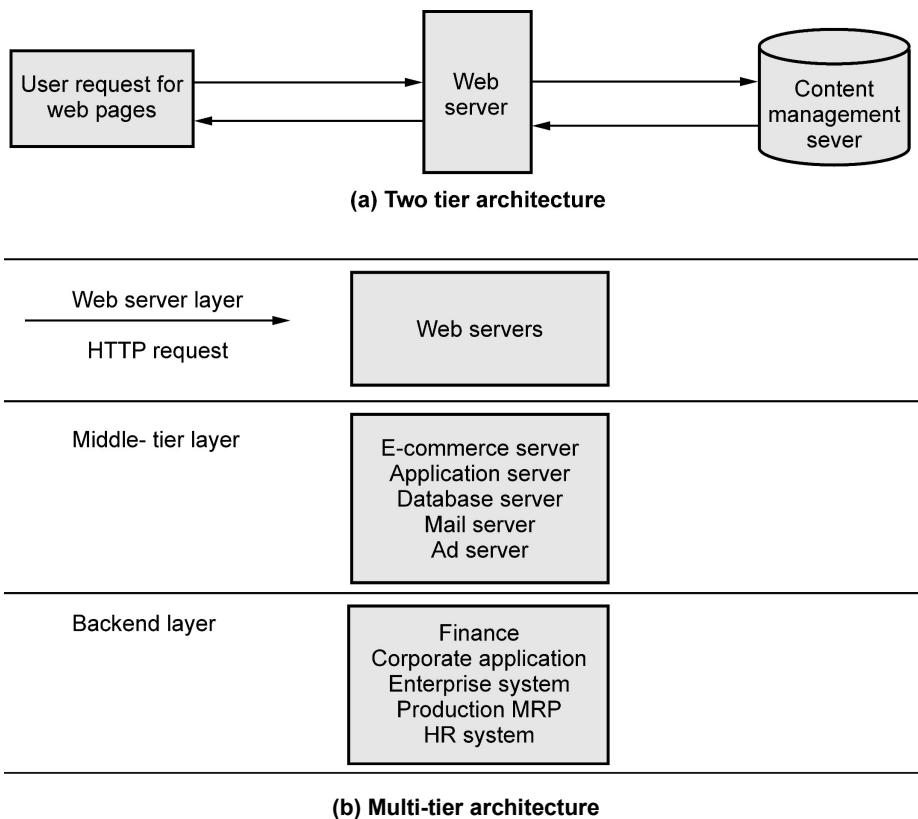


Fig. 2.8.1

Q.5 What are different functionalities offered by web server?

Ans. :

- Basic functionalities provided by all web servers:

HTTP request processing

Receive and respond to client requests for web pages

Security Service/Transport Layer Security

Verify username and password, process public/private key information and certificate needed for credit card transaction processing

File Transfer Protocol

Allows transfer of larger file from one server to another.

Search Engine

Keyword search capability, site content indexing

Data Capture

Log file of all website visits, duration, time of visit and referral source

E-mail

Ability to send, receive and store e-mail messages

Site management tools

Calculate and display website statistics like number of unique visitors, source of request and web page request

2.9 Part B : Long Answered Questions

1. Explain system design with proper diagram (**Refer section 2.2.2**)
2. Describe system analysis in detail. (**Refer section 2.2.1**)
3. What are different options available for building system ? (**Refer section 2.2.3**)
4. What are different options available for building system? (**Refer section 2.2.3**)



Notes

UNIT- III

3

E-Commerce Security and Payment Systems

Syllabus

E-Commerce Security Environment – Security threats in E-Commerce – Technology Solutions : Encryption, Securing Channels of Communication, Protecting Networks, Protecting Servers and Clients – Management Policies, Business Procedure and Public Laws - Payment Systems

Contents

- 3.1 *E-Commerce Security Environment*
- 3.2 *Security Threats in E-Commerce*
- 3.3 *Technology Solutions*
- 3.4 *Management Policies, Business Procedure and Public Laws*
- 3.5 *E-Commerce Payment Systems*
- 3.6 *Part A : Short Answered Questions (2 Marks Each)*
- 3.7 *Part B : Long Answered Questions*

3.1 E-Commerce Security Environment

- The Internet holds the guarantee of an enormous and helpful worldwide commercial center, giving admittance to individuals, merchandise, administrations, and organizations around the world, all at a deal cost for the legal residents. The Internet has created entirely new and high-income ways to steal for the criminals. It's all there for the taking on the Internet from products and services, to cash, to information. To steal online is less risky. For example, rob a bank in person is more risky than to rob people remotely and almost anonymously. Similarly to download the music for free and almost without risk from the internet is less risky actually without any risk compared to steal a CD at a local record store. Many criminals in lawful looking identities, permitting them to put in false requests with online vendors take data by blocking email, or basically shut down web based business locales by utilizing programming infection and multitude assaults is the forthcoming for obscurity on the web. The internet is unshielded-design and open network. For businesses and consumers the action of cybercriminals are costly. The costs of malicious cyber-activity are includes the cost of the actual time, the additional costs that are required to secure network and recover from cyber-attacks, the cost of opportunities lost due to service disruptions.
- Cybercrime becomes a more significant problem for both organizations and consumers. The security breaches are also there in the social networks. It is hard to precisely estimate the real measure of cybercrime. Since reluctant to report the cybercrimes because of dread of losing the trust of their clients. It very well might be hard to evaluate the real measure of misfortune, if wrongdoing is accounted for. A denial of service, malicious insiders, and malicious code are the most costly cybercrimes. Viruses, worms, and Trojans are most prevalent types of attacks. Other types of attacks are malware, web-based attacks, botnets, phishing and social engineering attacks, and malicious code.
- The source of the data is report issued by security product providers. The entry cost and skills required to enter the cybercrime business have greatly reduced due to advances in technology. The programmers to make malware without composing programming without any preparation empowers because of ease and promptly accessible web assault packs. The attackers to produce a special adaptation of the malware for every casualty empowers because of a flood in polymorphic malware. Making it is much more difficult for pattern-matching software used by security firms to detect. Online credit card fraud is one of the most high-profile forms of

e-commerce crime. Although the average amount of credit card fraud loss experienced by any one individual is typically relatively small, the overall amount is substantial. The nature of credit card fraud has changed greatly from the theft of a single credit card number and efforts to purchase goods at a few sites, to the simultaneous theft of millions of credit card numbers and their distributions to thousands of criminals operating as gangs of thieves. Criminals who steal information on the Internet derive value by selling the information to others on the so-called underground or shadow economy market. They do not always use this information. So we can say data is currency to cybercriminals and also it has a "street value" that can be monetized. Around the world several known underground economy marketplaces are there which sell stolen information along with malware like exploit kits, access to botnets and many more. The process takes place through Twitter, Tor, and VPN services, and sometimes e-mail exchanges of information. The general hierarchy of cybercriminals in the marketplace with low-level nontechnical criminals who frequent cards forums is aiming to make money, a political statement, or both, at the bottom, resellers in the middle acting as intermediaries and the technical masterminds who create malicious code at the top.

- There are six key dimensions to e-commerce security as listed below :

1. Integrity	2. Nonrepudiation	3. Authenticity
4. Confidentiality	5. Privacy	6. Availability.
- The ability to ensure the information being displayed on a website or transmitted or received over the internet refers to the **integrity**. It has not been altered in an unauthorized party. In somebody who is unapproved and attempts to captures and changes the substance of an online correspondence by diverting a bank wire move into an alternate record the respectability of the message has been undermined. This is on the grounds that what the first sender planned is does not speak to anymore.
- The capacity to guarantee that internet business members don't deny their online activity is alluding to nonrepudiation. The accessibility of free email accounts with pseudonym names makes it simple for an individual to post remarks or communicate something specific and maybe later deny doing as such. It is simple for that client to arrange stock on the web and afterward deny doing so when a client utilizes a genuine name and email address. Since vendors normally don't get an actual duplicate of a mark, the Mastercard backer will favor the client as the trader has no legitimately substantial confirmation that the client requested the product.

- The ability to identify the identity of a person or entity with whom you are dealing on the internet is referring **authenticity**. How does the customer know that the website operator is who it claims to be? How can the merchant be assured that the customer is really who she says she is ?
- The ability to ensure that message and data are available only to those who are authorized to view them is referring to **confidentiality**. Confidentiality is many times confused with privacy where the ability to control the use of information which provided by a customer about himself or herself to an e-commerce merchant.
- Web based business dealers have two concerns identified with protection. The first is to set up inner strategies that oversee their own utilization of client data and the subsequent one is to shield that data from ill-conceived or unapproved use. This abuses the secrecy of the information, yet additionally the security of the people who provided the data if programmers break into a web based business webpage and access Visa or other data.
- The ability to ensure that an e-commerce site continues to function as intended is referring to availability.
- Following table explains these dimensions with respect to customer's perspective as well as with respect to merchant's perspective.

Dimension	Merchant's Perspective	Customer's Perspective
Integrity	Has information on the site been modified without approval ? Is information being gotten from clients legitimate ?	Has data I sent or gotten been modified ?
Nonrepudiation	Could a client deny requesting items ?	Will involve with an activity with me later deny making the move ?
Authenticity	What is the genuine personality of the client ?	Who am I managing ? How might I be guaranteed that the individual or substance is who they guarantee to be ?
Confidentiality	Are messages or classified information open to anybody other than those approved to see them ?	Can somebody other than the expected beneficiary read my messages ?

Privacy	What use, assuming any, can be made of individual information gathered as a feature of an internet business exchange? Is the individual data of clients being utilized in an unapproved way ?	Would I be able to control the utilization of data about myself sent to a web based business vendor ?
Availability	Is the site operational ?	Can I get access to the site ?

Table 3.1.1 Customer and merchant perspectives on the different dimensions of e-commerce security

3.2 Security Threats in E-Commerce

- When dealing with e-commerce, there are three key points of vulnerability with respect to a technology. They are the client, the server and the communications pipeline. The following figure explains the typical e-commerce transaction for a customer who is using a credit card.

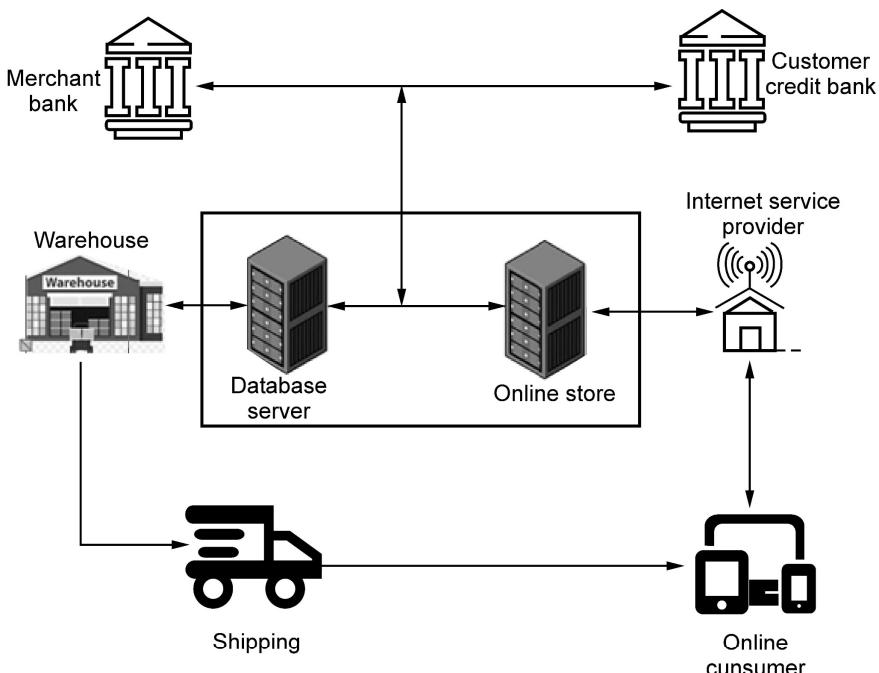


Fig. 3.2.1 E-commerce transaction for the customer credit card

- The below figure illustrates some of the things that can go wrong at each major vulnerability point in the transaction over internet communication channels at the server level and at the client level.

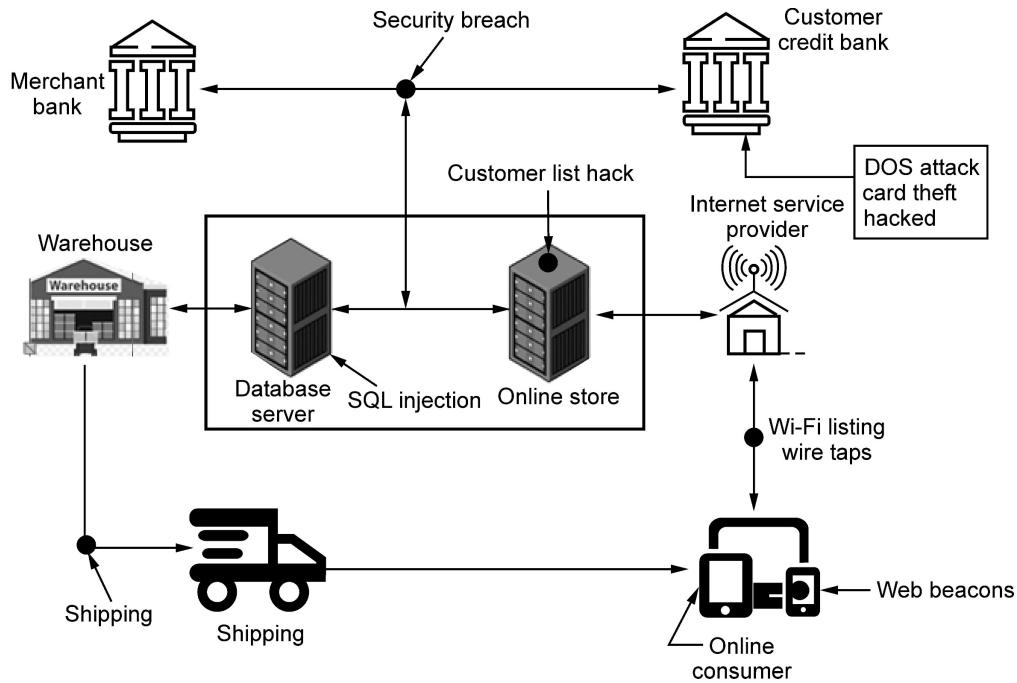


Fig. 3.2.2 Vulnerable points in an e-commerce transaction

- The most common as well as most damaging forms of security threats to e-commerce consumers and site operators are as listed here: malicious code, potentially unwanted programs, phishing, hacking and cyber-vandalism, credit card fraud/theft, spoofing, pharming, spam (junk) websites (link farms), identity fraud, Denial of Service (DoS) and DDoS attacks, sniffing, insider attacks, poorly designed server and client software, social network security issues, mobile platform security issues, and finally, cloud security issues.
- A variety of threats such as viruses, worms, Trojan horses, ransomware, and bots are included as a malicious code, sometimes referred as malware. To take advantage of software vulnerabilities in a computer's operating system, web browser, applications, or other software components some malicious codes are designed which are referred as exploit. The collections of exploits bundled together and rented or sold as commercial products with slick user interface and in-depth analytics functionality are called exploit kits. The technical skill, enabling novice to become cyber-criminal does not required by exploit kit. A drive-by download is a malware that come with a downloaded file that a user intentionally or unintentionally requests.

- A computer program that has the ability to replicate or make copies of it is called as a virus. The virus may spread to other files. In addition with that most computer viruses deliver a payload where the payload may be begin as the display of a message or image or it may destroy files or by reforming the computers' hard drive. It may also cause to run improperly. A worm is often combined with a virus. This combination is more harmful as a virus is spreading from file to file but a worm is designed to spread from computer to computer. It is not required that a worm need to be activated by a user or by a program in order to replicate itself.
- A malware or worm that locks your computer or files to stop you from accessing your computer or files is called ransomware or scareware. A notice will be displayed on your computer and demand you to pay a fine in order to unlock the computer and avoid prosecution.
- Any malware which misleads user of its true intent is called a Trojan horse. It appears to be benign but then it does something other than expected. As Trojan horse does not replicate but introduce bits or rootkits in a computer we can say Trojan horse is not itself a virus.
- A component of viruses, worms, and Trojans that permits an assailant to distantly get to an undermined PC is called as indirect access. An illustration of a worm with an indirect access is downadup. A Virus is an infection that contaminates different record types furthermore with that it likewise incorporates an indirect access that can be utilized to download and introduce extra dangers
- A malignant code that can be secretly introduced on your PC when joined to the web is considered Bots that is the short for robots. While the bot is introduced it reacts to outside orders sent by the aggressor. A zombie – for example your PC, can be constrained by an outer outsider that is bot-header. The assortments of caught PCs utilized for pernicious exercises, for example, sending spam, partaking in a DDoS assault, taking data from PCs and putting away organization traffic for later examination are called as Botnets.
- The e-commerce security environment is challenged by potentially unwanted programs (PUPs) such as adware, browser parasites, spyware and other applications that install themselves on a computer like rogue security software, toolbars and PC diagnostic tools without users' information consent.
- To call for pop-up ads to display when the user visits certain sites adware is used. For criminal activities adware are not used. A program that can monitor and change the settings of a users' browser, changing the browser's home page, and sending

information about the sites visited to a remote computer is called a browser parasite.

- On the other hand, to obtain information such as a user's keystrokes, copies of e-mail and instant messages, and even take screenshots spywares are used. Using spyware passwords and other confidential data can be capture.
- To fool individuals into making a move that will bring about the downloading of malware social designing depends on human interest, eagerness, and naïveté. To get private data for monetary benefit phishing is any misleading, online endeavor by an outsider. The phishing assault commonly doesn't include vindictive code however rather depend on direct deception and extortion. It is additionally called as social designing methods. The email trick letter is one of the instances of the phishing assaults.
- An individual who intends to gain unauthorized access to a computer system is called a hacker. The term cracker is typically used to denote a hacker with criminal intent. The terms hackers and crackers tend to be used interchangeably. Unauthorized access gained by hackers and crackers by finding weaknesses in the security procedures of website and computer system. Cybervandalism is an intentionally disrupting, defacing, or even destroying a site.
- The hacktivism adds a political twist. Hacktivists attack governments, organizations, and even individual for political purpose, employing the tactics of cybervandalism, distributed denial of service attacks, data thefts, and doxing. Here doxing means gathering and exposing personal information of public figures, from emails, social network posts and other documents.
- The unapproved utilization of someone else's very own information like federal retirement aide, driver's permit, and additionally MasterCard number, just as client names and secret word, for illicit monetary advantages are engaged with the Identity extortion. Such information is utilized by hoodlums to acquire advances, buy stock, or get different administrations, for example, cell phone or other utility administrations.
- Mocking includes endeavoring to conceal a genuine character by utilizing another person's email or IP address. Pharming consequently diverting a web connect to a location not the same as the planned one, with the website taking on the appearance of the proposed objective. Spam or garbage sites likewise alluded to as connection ranches. It guarantee to offer items or administrations, yet truth be told are only assortments of notices. An eavesdropping program that monitors information

traveling over a network is called sniffer. The assault in which the aggressor can capture interchanges between two gatherings who accept they are straightforwardly speaking with each other, when indeed the assailant is controlling the correspondences is called man-in-the-center (MitM) assault.

- The flooding a website with useless traffic to inundate and overwhelm the network is called Denial of Service (DoS) attack. DoS attacks involve the use of bot networks. The attack using numerous computers to attack the target network from numerous launch points are called Distributed Denial of Services (DDoS) attack. DoS and DDoS attacks are threats to a system's operation because they can shut it down indefinitely. Major Websites have experienced such attacks, making the companies aware of their vulnerability and the need to continually introduce new measures to prevent future attacks.
- It is required to think of security threats to a business as originating outside the organization. It is a fact that embezzlement by insider is the largest financial threats to business institutions but not same from the robberies. From the insiders-once trusted employees, the largest disruption to service, destruction to sites, and diversion of customer credit card data and personal information have come. It is obvious that the employees have access privileged information, and in the presence of sloppy internal security procedures, they are very frequently able to roam throughout an organization's system without leaving a trace.
- Any poorly designed software, it may be in the operating system, or in the application software including browsers is the mainly preyed by the many security threats. It is fact that the increasing in the complexity and size of the software program flaws or vulnerabilities that hackers can exploit. For example, in poorly coded web application software that fails to properly validate or filter data entered by a user on a web page to introduce malicious program code into a company's systems and networks, the advantages can be taken by the SQL injection attacks. An attacker can use this input validation error to send a rogue SQL query to the underlying database to access the database, plant malicious code, or access other systems on the network. Huge web applications have many spots for contributing client information, every one of which makes an open door for a SQL infusion assault.
- The zero-day is a weakness programming that has been already unreported and for which no fix yet exists. Heartbleed is a bug blemish in OpenSSL encryption framework that permitted programmers to unscramble a SSL meeting and find client names, passwords, and other client information.

- A rich and rewarding environment for hackers is provided by the social networks. Viruses, site takeovers, identity fraud, malware-loaded apps, click hijacking, phishing, and spam are all found on social networks. One of the common techniques is a fake offering that invite victims to join a fake event or group with incentives such as free gift cards and that required a user to share his or her information with the attacker. Similarly fake Like buttons when clicked, it install malware and post updates to the user's Newsfeed.
- The widened open doors for programmers are the blast in the portable. We as a whole are filling our versatile with individual and monetary data, and utilizing them to direct an expanding number of exchanges, from retail buys to portable banking. These make incredible focuses for programmers. The reality cell phones face in no way different danger as any web gadget just as some new danger related with remote organization security. For instance the public Wi-Fi networks that are not made sure about are entirely helpless to hack. Most wireless clients accept their PDA is as secure as a conventional landline telephone, while most PC clients know their PCs and sites might be hacked and contain malware. Versatile PDA malware was created as ahead of schedule as 2004 with Cabir, a Bluetooth worm influencing Symbian working frameworks and making the telephone consistently search out other Bluetooth-empowered gadgets, rapidly depleting the battery. The guileless phone clients assaults by vishing assault with verbal messages to call a specific number. For instance give cash to starving youngsters. Likewise smishing assaults misuse SMS/instant messages. An email and site tends to that can lead the blameless client to a malware site can be contained by undermined text.

3.3 Technology Solutions

- The major tools available to achieve site security are :
 1. Encryption
 2. Securing channels of communication
 3. Protecting networks
 4. Protecting servers and clients

1. Encryption

- The process of transforming plain text or data into cipher text that cannot be read by anyone other than the sender and receiver is called encryption. Basically there are two purpose of encryption, the first one is to secure stored information and the second is to secure information transmission. Encryption can provide four of the six

key dimensions for e-commerce security which we discussed at the beginning of this chapter and they are :

- Message integrity - provides assurance that the message has not been altered.
- Nonrepudiation - prevents the user from denying he or she sent the message.
- Authentication - provides verification of the identity of the person or computer sending the message.
- Confidentiality - gives assurance that the message was not read by others
- By using a key or cipher, this transformation of plain text to cipher text is accomplished. Any method for transforming plain text to cipher text is a key or cipher. A cipher text is a text that has been encrypted and thus cannot be read by anyone other than the sender and the receiver. Encryption has been polished since from the most punctual types of composing and business exchanges. Utilizing replacement and rendering figures, Ancient Egyptian and Phoenician business records were encoded.
- Each event of a given letter is supplanted methodically by another letter in replacement figure. For example, if we used the cipher "letter plus two"- meaning replace every letter in a word with a new letter two places forward - then the word "Hello" in plain text would be transformed into the following cipher text : "JGNQ."
- The requesting of the letters in each word is changed in some orderly path in an interpretation figure. "Hello" can be composed in reverse as "OLLEH". Leonardo Da Vinci recorded his shop notes backward request, making them comprehensible just with a mirror.
- A more complicated cipher would satisfies the two facts, that are (1) break all words into two words and (2) spell the first word with every other letter beginning with the first letter and then spell the second word with all the remaining letters. In this cipher, "HELLO" would be written as "HLO EL".
- In order to decrypt or decipher the message, the receiver would have to know the secret cipher that was used to encrypt the plain text is called **symmetric key cryptography or secret key cryptography**. Here both the sender and the receiver use the same key to encrypt and decrypt the message. They have to send the key over some communication media or exchange the key in person. Symmetric key was used extensively throughout World War II and it is still a part of internet cryptography.

- The opportunities for basic replacement and interpretation figure are perpetual yet they experience the ill effects of regular blemishes. PCs are so ground-breaking and quick in the advanced age. Right off the bat, these antiquated methods for encryption can be broken rapidly. At that point, Symmetric key cryptography necessitates that the two players share a similar key. They should send the key over a probably shaky medium where it very well may be taken and used to interpret message to have a similar key. From that point forward, in a business use, where you are not all piece of a similar group, you would require a mystery key for every one of the gatherings with whom you executed. That is one key for the bank, another for the retail establishment, and another for the public authority. In a population of millions of Internet users, thousands of millions of keys would be needed to accommodate all e-commerce customers.
- The modern encryption systems are digital where the cipher or keys used to transform plain text into cipher text are digital strings. The text and other data are in the form of binary strings composed of 0s and 1s in the computers. For example the binary representation of the capital letter "A" in ASCII computer code is accomplished as 01000001. By multiplying each letter by another binary number is one way in which digital strings can be transformed into cipher text. For example, an eight-bit key number 0101 0101, now if you multiplying each digit character in your text message by this eight-bit key and sent the encrypted message to a friend along with the secret eight-bit key, the friend could decode the message easily.
- The National Security Agency (NSA) and IBM built up the Data Encryption Standard (DES) during the 1950s. A 56-digit encryption key is utilized by DES. It has been improved to adapt to a lot quicker PCs by the Triple DES Encryption Algorithm that is TDEA where basically scrambling the message multiple times, each with a different key. The Advanced Encryption Standard (AES) is the broadly utilized symmetric key calculation which offers key size of 128, 192, and 256 pieces. AES had been viewed as generally secure. Yet, in the time of 2011, the analysts from a Belgain University and Microsoft reported that they had found an approach to break the calculation.
- A public key cryptography, another method of encoding was designed by Whitfield Diffie and Martin Hellman in 1976. It is additionally alluded to as asymmetric cryptography. It tackles the issue of trading keys. Here the proprietor kept the hidden key secretes, and the public key is generally dispersed. To scramble and unscramble a message both these keys are utilized. When the keys are utilized to scramble a message, a similar key can't be utilized to decode the message. To

deliver the keys the numerical calculations are utilized and the keys are single direction capacities, where once the calculation is applied, the information can't be therefore gotten from the yield. Most food plans resemble in this way (Hahaha!!!). For instance, it is anything but difficult to make fried eggs, however difficult to recover entire eggs from the fried eggs. Public key cryptography depends on the possibility of irreversible numerical capacities. The keys are adequately long (128, 256, and 512 pieces) that it would take tremendous figuring capacity to get one key from the other utilizing the biggest and quickest PCs accessible. Following figure outline a straightforward utilization of public key cryptography and makes you through the significant strides in utilizing general society and private keys.

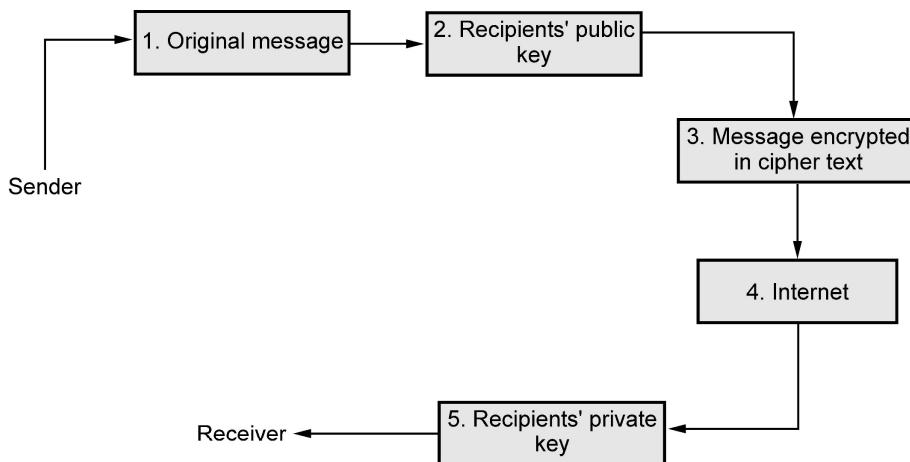


Fig. 3.3.1 Public key cryptography - a simple case

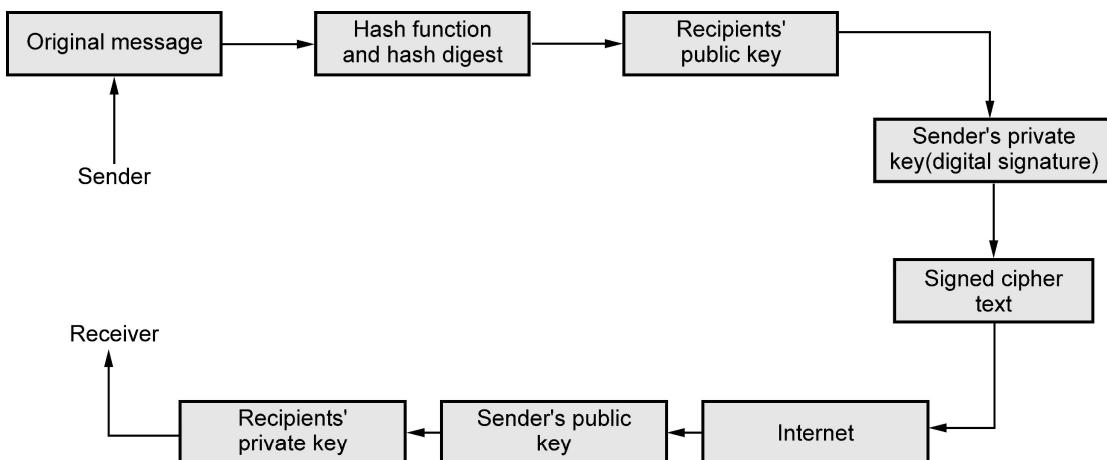
- The following table explains the description of each steps of the above figure.

Step	Description
The sender creates a digital message	The message could be a document, spreadsheet, or any digital object.
The sender obtains the recipient's public key from a public directory and applies it to the message.	Public keys are distributed widely and can be obtained from recipients directly.
Application of the recipient's key produces an encrypted cipher text message.	Once encrypted using the public key, the message cannot be reverse-engineered or unencrypted using the same public key. The process is irreversible.
The encrypted message is sent over the Internet.	The encrypted message is broken into packets and sent through several different pathways, making interception of the entire message difficult (but not impossible).

The recipient uses his/her private key to decrypt the message.	The only person who can decrypt the message is the person who has possession of the recipient's private key. Hopefully, this is the legitimate recipient.
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Table 3.3.1 Public key cryptography - a simple case

- Some elements of security are missing in public key cryptography. There is no authentication of the sender although we can be quite sure the message was not understood or read by any third party. This means the sender could deny ever sending the message. Also there is no assurance that the message was not altered somehow in transits. This suggests a potential lack of integrity in the system. A more sophisticated use of public key cryptography can achieve authentication, nonrepudiation, and integrity. A hash function is used to check the integrity of a message and ensure it has not been altered in transit. An algorithm that produces a fixed-length number called a hash or message digest is called a hash function. It can be simple or more complex. In case of simple it counts the number of digital 1s in a message and in case of complex it produces a 128-bit number that reflects the number of 0s and 1s, the number of 00s and 11s and so on. Standard hash functions MD4 and MD5 produce 128- and 160-bit hashes are available. These more complex hash functions produce hashes or hash results that are unique to every message. The results of applying the hash function are sent by the sender to the recipient. Upon receipt, the recipient applies the hash function to the received message and checks to verify the same result is produced. If so, the message has not been altered. The sender then encrypts both the hash result and the original message using the recipient's public key, producing a single block of cipher text. The following figure explains more powerful approach.



- The following table describes the steps of above figure.

Step	Description
The sender creates an original message.	The message can be any digital file.
The sender applies a hash function, producing a 128-bit hash result.	Hash functions create a unique digest of the message based on the message contents.
The sender encrypts the message and hash result using the recipient's public key.	This irreversible process creates a cipher text that can be read only by the recipient using his or her private key.
The sender encrypts the result, again using his or her private key.	The sender's private key is a digital signature. There is only one person who can create this digital mark.
The result of this double encryption is sent over the Internet.	The message traverses the Internet as a series of independent packets
The receiver uses the sender's public key to authenticate the message.	Only one person can send this message, namely, the sender
The receiver uses his or her private key to decrypt the hash function and the original message. The receiver checks to ensure the original message and the hash function results conform to one another.	The hash function is used here to check the original message. This ensures the message was not changed in transit.

Table 3.3.2 Public key cryptography with digital signatures

- Digital envelope** is a technique that uses symmetric encryption for large documents, but public key cryptography to encrypt and send the symmetric key. Digital certificate is a digital document issued by a certification authority that contains a variety of identifying information. **Certification authority (CA)** is a trusted third party that issues digital certificates. **Public key infrastructure (PKI)** refers to CAs and digital certificate procedures that are accepted by all parties. **Pretty Good Privacy (PGP)** is a widely used e-mail public key encryption software program.

2. Securing channel communication

- The concepts of public key cryptography are used routinely for securing channels of communication. The most common form of securing channels is through the **Secure**

Sockets Layer (SSL) and Transport Layer Security (TLS) protocols. When you receive a message from a server on the Web with which you will be communicating through a secure channel, this means you will be using SSL/TLS to establish a secure negotiated session. (Notice that the URL changes from HTTP to HTTPS.) A secure negotiated session is a client- server session in which the URL of the requested document, along with the contents, contents of forms, and the cookies exchanged, are encrypted. A **session key** is a unique symmetric encryption key chosen just for this single secure session. Once used, it is gone forever. Figure 5.10 shows how this works. Most private individuals do not have a digital certificate. In this case, the merchant server will not request a certificate, but the client browser will request the merchant certificate once a secure session is called for by the server. SSL/TLS gives information encryption, worker validation, discretionary customer confirmation, and message honesty for TCP/IP associations. SSL/TLS tends to the issue of realness by permitting clients to confirm another client's personality or the character of a worker. It likewise ensures the uprightness of the messages traded. Notwithstanding, when the dealer gets the encoded credit and request data, that data is regularly put away in decoded design on the vendor's workers. While SSL/TLS gives secure exchanges among vendor and shopper, it just ensures worker side validation. Customer validation is discretionary.

- A **Virtual Private Network (VPN)** allows remote users to securely access a corporation's local area network via the Internet, using a variety of VPN protocols. VPNs use both authentication and encryption to secure information from unauthorized persons (providing confidentiality and integrity). Authentication prevents spoofing and misrepresentation of identities. A distant client can associate with a far off private nearby organization utilizing a neighborhood ISP. The VPN conventions will build up the connection from the customer to the corporate organization as though the client had dialed into the corporate organization straightforwardly. The way toward associating one convention through another (IP) is called burrowing, in light of the fact that the VPN makes a private association by adding an imperceptible covering around a message to conceal its substance. As the message goes through the Internet between the ISP and the corporate organization, it is protected from prying eyes by an encrypted wrapper.
- A **wireless (Wi-Fi) network** has its own particular security issues. Early Wi-Fi networks used a security standard called Wired Equivalent Privacy (WEP) to encrypt information. WEP was very weak, and easy for hackers to crack. A new standard, Wi-Fi Protected Access (WPA), was developed that provided a higher

standard of protection, but this too soon became vulnerable to intrusion. Today, the current standard is WPA2, which uses the AES algorithm for encryption and CCMP, a more advanced authentication code protocol.

3. Protecting networks

- The following tools to consider are those that can secure your organizations just as the worker and customers on those organizations once an ensured correspondence is with you.
- A **firewall** refers to either hardware or software that filters communication packets and prevents some packets from entering the network based on a security policy. To build a wall around your network and the attached servers and clients, just like physical-world firewalls protect you from fires for a limited period of time, firewalls and proxy servers are. Firewalls and proxy server share some comparable capacities, however they are very extraordinary. The traffic to and from the workers and customers are constrained by the firewall. It likewise controls the disallowing correspondence from dishonest sources, and permitting different interchanges from confided in sources to continue. Firewall measures each message that will be sent or gotten from the organization, which decides whether the message meets security rules set up by the business. In the event that it does, it is allowed to be dispersed, and on the off chance that it doesn't, the message is obstructed. In view of bundle ascribes like source IP address, objective port or IP address, sort of administrations, for example, WWW or HTTP, the area name of the source, and different measurements firewall can channel the traffic. The equipment firewalls secure neighborhood associated with the web. Most equipment firewalls have default settings that require little chairman intercession and viable standards that deny approaching parcels from an association from workers that you mentioned administrations from. A typical default setting on equipment firewalls just disregards endeavors to speak with TCP port 445, the most regularly assaulted port. The expanding utilization of firewalls by home and business Internet clients has significantly diminished the adequacy of assaults, and constrained programmers to zero in additional on email connections to disperse worms and viruses.
- To validate traffic there are two major methods firewalls use : *packet filters* and *application gateways*. *Packet filters* examine data packets to determine whether they are destined for a prohibited port or originate from a prohibited IP address as specified by the security administrator. The filter specifically looks at the source and destination information, as well as the port and packet type, when determining

whether the information may be transmitted. One downside of the packet filtering method is that it is susceptible to spoofing, because authentication is not one of its roles. *Application gateways* are a type of firewall that filters communications based on the application being requested, rather than the source or destination of the message. Such firewalls also process requests at the application level, farther away from the client computer than packet filters. By providing a central filtering point, application gateways provide greater security than packet filters but can compromise system performance.

- The *proxy server (proxy)* is a software server that handles all communications originating from or being sent to the Internet, acting as a spokesperson or bodyguard for the organization. As proxy servers have two network interface, the proxy servers are sometimes called dual-home system. A proxy server is known as the gateway for internal computers, while to external computers it is known as a mail server or numeric address. When a user on an internal network requests a web page, the request is routed first to the proxy server. The proxy server validates the user and the nature of the request, and then sends the request onto the Internet. A web page sent by an external Internet server first passes to the proxy server. If acceptable, the web page passes onto the internal network web server and then to the client desktop. By forbidding clients from discussing straightforwardly with the Internet, organizations can confine admittance to particular kinds of locales, for example, obscene, sale, or stock-exchanging destinations. Intermediary workers likewise improve web execution by putting away as often as possible mentioned website pages locally, lessening transfer times, and concealing the interior organization's location, subsequently making it harder for programmers to screen.
- In addition to a firewall and proxy server, an intrusion detection and/or prevention system can be installed. An **intrusion detection system (IDS)** examines network traffic, watching to see if it matches certain patterns or preconfigured rules indicative of an attack. If it detects suspicious activity, the IDS will set off an alarm alerting administrators and log the event in a database. An IDS is useful for detecting malicious activity that a firewall might miss. An **intrusion prevention system (IPS)** has all the functionality of an IDS, with the additional ability to take steps to prevent and block suspicious activities. For instance, an IPS can terminate a session and reset a connection, block traffic from a suspicious IP address, or reconfigure firewall or router security controls.

4. Protecting servers and clients

- Operating system features and anti-virus software can help further protect servers and clients from certain types of attacks.
- To protect servers and clients the most evident route is to exploit programmed PC security updates. The Microsoft, Apple, and Linux/Unix working frameworks are constantly refreshed to fix weaknesses found by programmers. These patches are autonomic. You are incited and educated that working framework upgrades are accessible while utilizing these working frameworks on the Internet. Clients can without much of a stretch download these security fixes for nothing. By just keeping your worker and customer working frameworks and applications cutting-edge, the most widely recognized known worms and infections can be forestalled. Application weaknesses are fixed in a similar way. Most mainstream Internet programs are refreshed naturally with little client intercession.
- **Anti-virus software** is installed as it is the easiest and least-expensive way to prevent threats to system integrity. Inexpensive tools provided by Malwarebytes, McAfee, Symantec that is Norton Anti-virus and many others to identify and eradicate the most common types of malicious code as they enter a computer, as well as destroy those lurking on a hard drive. Anti-virus programs can be set up so that e-mail attachments are inspected before you click on them, and the attachments are eliminated if they contain a known virus or worm. It is not enough, however, to simply install the software once. Because new viruses are developed and released every day, daily routine updates are needed in order to prevent new threats from being loaded. Some premium-level anti-virus software is updated hourly.
- To eliminate intruders such as bot program, adware, and other security risks anti-virus suite packages and stand-alone programs are available. These programs are almost like anti-virus software where they look for recognized hacker tools or signature actions of known intruders.

3.4 Management Policies, Business Procedure and Public Laws

- Worldwide most CEOs and CIOs believe that technology is not the sole answer to managing the risk of e-commerce. A foundation is provided by the technology, but in the absence of intelligent management policies, though you are having the best technology it can be easily defeated. To rise the costs of illegal behavior on the internet and guard against corporate abuse of information public law and active enforcement of cybercrime statutes are required.

3.4.1 A Security Plan : Management Policies

- E-commerce firms must develop a coherent corporate policy to minimize security threats that takes into account the nature of the risk, the information assets that need protecting, and the procedures and technologies required to address the risk as well as implementation and auditing mechanisms. The following figure shows the key steps in developing a solid security plan.

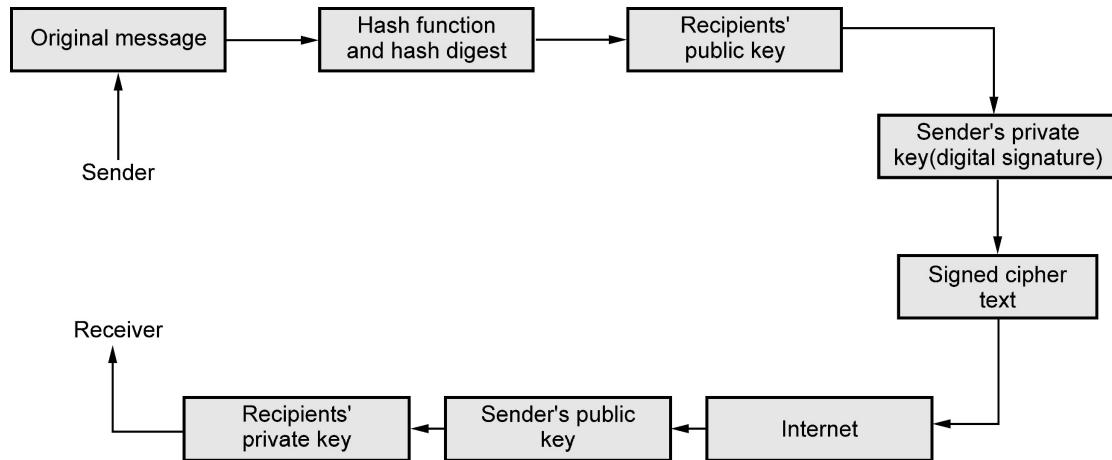


Fig. 3.4.1 Developing an e-commerce security plan

- With **risk assessment**, a security plan begins. Risk assessment is an assessment of the risk and points of vulnerability. The first step is to inventory the information and knowledge assets of the e-commerce site and company. For each type of information asset, try to estimate the dollar value to the firm if this information were compromised, and then multiply that amount by the probability of the loss occurring. Once you have done so, rank order the results. You now have a list of information assets prioritized by their value to the firm.
- Security policies** are a set of statements prioritizing the information risks, identifying acceptable risk targets and identifying the mechanisms for achieving these targets. Definitely you will want to start with the information assets that you determined to be the highest priority in your risk assessment. You will need to estimate how much it will cost to achieve this level of acceptable risk. Who generates and controls this information in the firm? What existing security policies are in place to protect the information? What enhancements can you recommend to improve security of these most valuable assets? What level of risk are you willing to accept for each of these assets? Are you willing, for instance, to lose customer credit card data once every 10 years? Or will you pursue a 100-year hurricane strategy by

building a security edifice for credit card data that can withstand the once-in-100-year disaster? The answers of these questions will have the beginning of security policies. It is important to know that, total and complete security may require extraordinary financial resources.

- An **implementation plan** is the steps you will take to achieve the security plan goals. How you will translate the level of acceptable risk into a set of tools, technology, policies, and procedure must be determined by you. What new technologies will you deploy to achieve the goals, and what new employee procedures will be needed? The answer of these questions will be helpful for the implementation plan.
- You will need an organizational unit in charge of security, and a security officer to implement your plan. A security officer is someone who is in charge of security on a daily basis. The security official for a little online business website or the webpage supervisor for the bigger firms is the individual accountable for internet providers. There might be a committed group with a supporting financial plan. The **security organization** teaches and prepares clients, keeps the executives mindful of security dangers and breakdowns, and keeps up the apparatuses picked to actualize security.
- We can say that administers access controls, verification strategies, and approval arrangements are the undertaking of security association. **Access controls** figure out which outcasts and insiders can acquire genuine admittance to your organizations. Outcast access controls incorporate firewalls and intermediary workers, while insider access controls regularly comprise of login systems like usernames, passwords, and access codes.
- **Authentication procedures** include the use of digital signatures, certificates of authority, and PKI. The e-signatures have been given the same legal weight as an original pen-and-ink version. The companies are in the process of devising ways to test and confirm a signer's identity. Companies frequently have signers type their full name and click on a button indicating their understanding that they have just signed a contract or document.
- One can also use **Biometric devices** to verify physical attributes associated with an individual like a fingerprint or eye retina scan or speech recognition system. **Biometrics** is the study of measurable biological, or physical, characteristics. An individual go through a unique mark is needed by an organization prior to being permitted admittance to a site, or prior to being permitted to pay for stock with a

Visa. It is more hard for programmers to break biometric gadgets into locales or offices. Fundamentally it lessening the open door for ridiculing. The Apple iPhones (5S and later) include a unique mark sensor called Touch ID incorporated into the iPhone's home catch that can open the telephone and approve buys from the iTunes, iBooks, and App Stores without expecting clients to enter a PIN or other security code. As per Apple, the framework doesn't store a genuine unique mark, yet rather biometric information, which will be scrambled and put away just on a chip inside the iPhone, and won't be made accessible to outsiders.

- **Security tokens** are physical devices or software that generates an identifier that can be used in addition to or in place of a password. Millions of corporations and government workers are using security tokens to log on to the corporate clients and servers. One example is RSA's SecurID token, which continuously generates six-digit passwords.
- The differing levels of access to information assets for differing levels of users are determined by **authorization policies**. Where and when a user is permitted to access certain parts of a website is established by the authorization management system. To restrict access to private information within a company's internet infrastructure is the primary function. Currently there are several authorization management products available and most operate in the same way. The system encrypts a user session to function like a passkey that follows the user from page to page, allowing access only to those areas that the user is permitted to enter, based on information set at the system database. By establishing entry rules up front for each user, the authorization management system knows who is permitted to go where at all times.
- The last step in developing an e-commerce security plan is performing a security audit. A **security audit** involves the routine review of access logs (identifying how outsiders are using the site as well as how insiders are accessing the site's assets). A monthly report should be produced that establishes the routine and non-routine accesses to the systems and identifies unusual patterns of activities.

3.4.2 The Role of Laws and Public Policy

- From the early days of e-commerce, the public policy environment today is very different. Because of this the internet is no longer an ungoverned, unsupervised, self-controlled technology judgment. In the last 70 years with the financial markets, there is a growing awareness that e-commerce markets work only when a powerful institutional set of laws and enforcement mechanisms are in place. These laws help ensure orderly, rational, and fair markets. This growing public policy environment

is becoming just as global as e-commerce itself. Despite some spectacular internationally based attacks on U.S. e-commerce sites, the sources and persons involved in major harmful attacks have almost always been uncovered and, where possible, prosecuted. A very large role is played by voluntary and private efforts in identifying criminal hackers and assisting law enforcement. As e-commerce has grown in significance, national and local law enforcement activities have expanded greatly. New laws have been passed that grant local and national authorities new tools and mechanisms for identifying, tracing, and prosecuting cybercriminals.

- E-commerce sites are not alone in their battle to achieve security on the internet. Several public and private organizations are devoted to tracking down criminal organizations and individual engaged in attacks against internet and e-commerce sites. US-CERT (United States Computer Emergency Readiness Team) is a division of the U.S. Branch of Homeland Security that facilitates digital episode alerts and reactions across government and private areas. CERT Coordination Center screens and tracks online crime answered to it by private enterprises and government offices that search out its assistance.

3.5 E-Commerce Payment Systems

- The existing payment mechanisms such as cash, credit cards, debit cards, checking accounts, and stored value accounts have been able to be adapted to the online environment. But there are some significant limitations that have led to efforts to develop alternatives. For the development of new payment system, a new type of purchasing relationship like individual online, and new technologies like development for the mobile platform have also created a need and an opportunity. The following table lists some of the major trends in e-commerce payment in last few years.

- | |
|---|
| • The dominant form of online payment is the payment by credit and/or debit card. |
| • UPI remains the most popular alternative payment method online |
| • Apple, Google, Samsung, and PayPal extend their reach in mobile payment apps. |
| • Large banks enter the mobile wallet and P2P payments market |
| • Square gains further traction with a smartphone app, credit card reader, and credit card processing service that permits anyone to accept credit card payments. |
| • Google refocuses Google Wallet, which had met with tepid response, solely on sending and receiving money |
| • Mobile P2P payment systems such as GPay, PayTM take off. |

Table 3.5.1 Major trends in e-commerce payments

- Depending on traditional and infrastructure, E-commerce payments can be very different. If you plan on operating an e-commerce site in Europe, Asia, or Latin America, you will need to develop different payment systems for each region. For example, in Denmark, Norway, and Finland payment is primarily with debit or credit cards, while in Sweden, payment after being tendered an invoice and by bank transfer are very popular in addition to credit/debit cards. In the Netherlands, the online payments service iDEAL is the most popular retail e-commerce payment method. In Italy, consumers rely heavily on both credit cards and PayPal. In Japan, although credit card is the primary payment method, many consumers still pick up and pay for goods using cash at local convenience stores. The following figure shows the block structure of the credit card transaction.

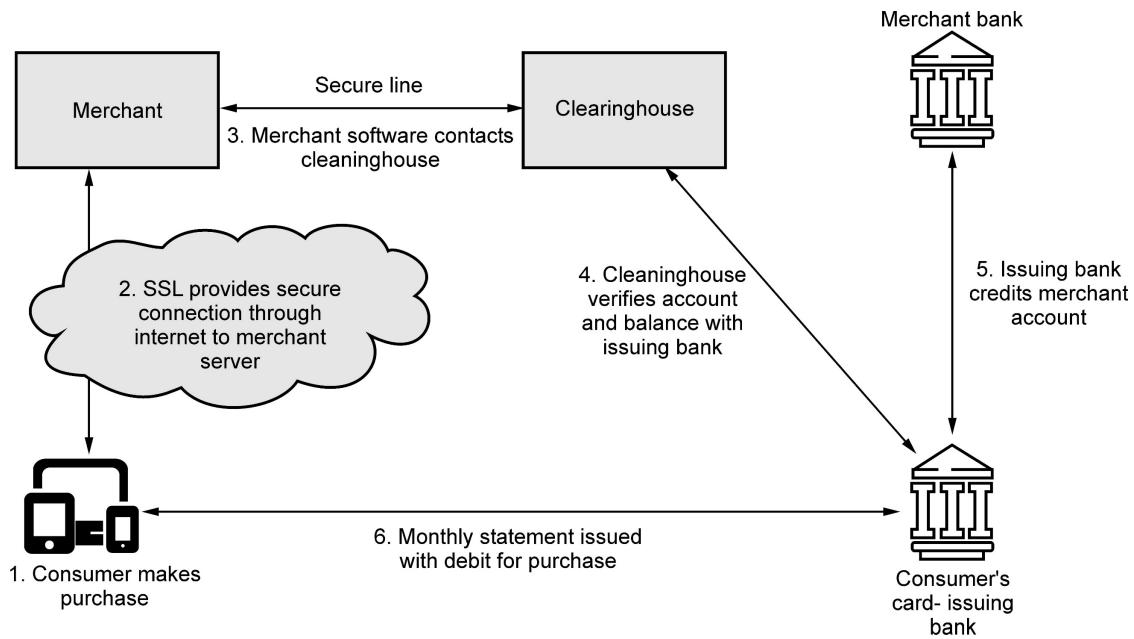


Fig. 3.5.2 How an online credit card transaction works

- A **merchant account** is simply a bank account that allows companies to process credit card payments and receive funds from those transactions.
- There are a number of limitations to the existing credit card payment system. The most important limitations involve security, merchant risk, administrative and transaction costs, and social equity. The existing system offers poor security. Neither the merchant nor the consumer can be fully authenticated. The merchant could be a criminal organization designed to collect credit card numbers, and the consumer could be a thief using stolen or fraudulent cards. The risk facing

merchants is high: consumers can repudiate charges even though the goods have been shipped or the product downloaded. The banking industry attempted to develop a secure electronic transaction (SET) protocol, but this effort failed because it was too complex for consumers and merchants alike. As banks switch to EMV cards with computer chips, offline credit card fraud becomes more difficult, encouraging criminals to focus on online fraud. The administrative costs of setting up an online credit card system and becoming authorized to accept credit cards are high. Transaction costs for merchants also are significant plus other setup fees. Credit cards are not very democratic, even though they seem ubiquitous. Millions of young adults do not have credit cards, which are considered poor risks because of low incomes.

3.6 Part A : Short Answered Questions (2 Marks Each)

Q.1 Define following terms.

- | | |
|------------------------------------|--------------------------------------|
| 1. Virus | 2. Worms |
| 3. Trojan horse | 4. Ransom ware |
| 5. Bots | 6. Hackers |
| 7. Encryption | 8. Symmetric key cryptography |
| 9. Digital certificate | 10. Public key cryptography |
| 11. Virtual private network | 12. Firewall |
| 13. Packet filters | 14. Application gateways |
| 15. Proxy Server | 16. Anti-virus software |

Ans. :

1. Virus

- A computer program that has the ability to replicate or make copies of it is called as a virus. The virus may spread to other files. In addition with that most computer viruses deliver a payload where the payload may begin as the display of a message or image or it may destroy files or by reforming the computers' hard drive. It may also cause to run improperly. A worm is often combined with a virus. This combination is more harmful as a virus is spreading from file to file but a worm is designed to spread from computer to computer. It is not required that a worm need to be activated by a user or by a program in order to replicate itself.
- A virus is an infection that contaminates different record types furthermore with that it likewise incorporates an indirect access that can be utilized to download and introduce extra dangers.

2. Worms

- A malware or worm that locks your computer or files to stop you from accessing your computer or files is called ransomware or scareware. A notice will be displayed on your computer and demand you to pay a fine in order to unlock the computer and avoid prosecution.

3. Trojan Horse

- Any malware which misleads user of its true intent is called a Trojan horse. It appears to be benign but then it does something other than expected. As Trojan horse does not replicate but introduce bits or rootkits in a computer we can say Trojan horse is not itself a virus.

4. Ransom Ware

- A malware or worm that locks your computer or files to stop you from accessing your computer or files is called ransomware or scareware. A notice will be displayed on your computer and demand you to pay a fine in order to unlock the computer and avoid prosecution.

5. Bots

- A malignant code that can be secretly introduced on your PC when joined to the web is considered Bots that is the short for robots. While the bot is introduced it reacts to outside orders sent by the aggressor. A zombie – for example your PC, can be constrained by an outer outsider that is bot-header. The assortments of caught PCs utilized for pernicious exercises, for example, sending spam, partaking in a DDoS assault, taking data from PCs and putting away organization traffic for later examination are called as Botnets.

6. Hackers

- An individual who intends to gain unauthorized access to a computer system is called a hacker. The term cracker is typically used to denote a hacker with criminal intent. The terms hackers and crackers tend to be used interchangeably. Unauthorized access gained by hackers and crackers by finding weaknesses in the security procedures of website and computer system. Cybervandalism is an intentionally disrupting, defacing, or even destroying a site.

7. Encryption

- The process of transforming plain text or data into cipher text that cannot be read by anyone other than the sender and receiver is called encryption. Basically there

are two purpose of encryption, the first one is to secure stored information and the second is to secure information transmission. Encryption can provide four of the six key dimensions for e-commerce security which we discussed at the beginning of this chapter and they are:

- Message integrity - provides assurance that the message has not been altered.
- Nonrepudiation - prevents the user from denying he or she sent the message.
- Authentication - provides verification of the identity of the person or computer sending the message.
- Confidentiality - gives assurance that the message was not read by others

8. Symmetric key cryptography

- In order to decrypt or decipher the message, the receiver would have to know the secret cipher that was used to encrypt the plain text is called symmetric key cryptography or secret key cryptography. Here both the sender and the receiver use the same key to encrypt and decrypt the message. They have to send the key over some communication media or exchange the key in person. Symmetric key was used extensively throughout World War II and it is still a part of internet cryptography.

9. Digital certificate

- Digital certificate is a digital document issued by a certification authority that contains a variety of identifying information. Digital envelope is a technique that uses symmetric encryption for large documents, but public key cryptography to encrypt and send the symmetric key. Certification authority (CA) is a trusted third party that issues digital certificates. Public key infrastructure (PKI) refers to CAs and digital certificate procedures that are accepted by all parties. Pretty Good Privacy (PGP) is a widely used e-mail public key encryption software program.

10. Public key cryptography

- A public key cryptography, a method of encoding was designed by Whitfield Diffie and Martin Hellman in 1976. It is additionally alluded to as asymmetric cryptography. It tackles the issue of trading keys. Here the proprietor kept the hidden key secretes, and the public key is generally dispersed. To scramble and unscramble a message both these keys are utilized. When the keys are utilized to scramble a message, a similar key can't be utilized to decode the message. To deliver the keys the numerical calculations are utilized and the keys are single direction capacities, where once the calculation is applied, the information can't be therefore gotten from the yield.

- For instance, it is anything but difficult to make fried eggs, however difficult to recover entire eggs from the fried eggs. Public key cryptography depends on the possibility of irreversible numerical capacities. The keys are adequately long (128, 256, and 512 pieces) that it would take tremendous figuring capacity to get one key from the other utilizing the biggest and quickest PCs accessible.

11. Virtual private network

- A Virtual Private Network (VPN) allows remote users to securely access a corporation's local area network via the Internet, using a variety of VPN protocols. VPNs use both authentication and encryption to secure information from unauthorized persons (providing confidentiality and integrity). Authentication prevents spoofing and misrepresentation of identities. A distant client can associate with a far off private nearby organization utilizing a neighborhood ISP. The VPN conventions will build up the connection from the customer to the corporate organization as though the client had dialed into the corporate organization straightforwardly. The way toward associating one convention through another (IP) is called burrowing, in light of the fact that the VPN makes a private association by adding an imperceptible covering around a message to conceal its substance. As the message goes through the Internet between the ISP and the corporate organization, it is protected from prying eyes by an encrypted wrapper.

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13. Packet filter

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16. Anti-virus software

- Anti-virus software is installed as it is the easiest and least-expensive way to prevent threats to system integrity. Inexpensive tools provided by Malwarebytes, McAfee, Symantec that is Norton anti-virus and many others to identify and eradicate the most common types of malicious code as they enter a computer, as well as destroy those lurking on a hard drive.
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Q.2 Explain the role of laws and public policy in e-commerce.

Ans. :

- From the early days of e-commerce, the public policy environment today is very different. Because of this the internet is no longer an ungoverned, unsupervised, self-controlled technology judgment. In the last 70 years with the financial markets, there is a growing awareness that e-commerce markets work only when a powerful institutional set of laws and enforcement mechanisms are in place. These laws help ensure orderly, rational, and fair markets. This growing public policy environment is becoming just as global as e-commerce itself. Despite some spectacular internationally based attacks on U.S. e-commerce sites, the sources and

persons involved in major harmful attacks have almost always been uncovered and, where possible, prosecuted. A very large role is played by voluntary and private efforts in identifying criminal hackers and assisting law enforcement. As e-commerce has grown in significance, national and local law enforcement activities have expanded greatly. New laws have been passed that grant local and national authorities new tools and mechanisms for identifying, tracing, and prosecuting cyber criminals.

- E-commerce sites are not alone in their battle to achieve security on the internet. Several public and private organizations are devoted to tracking down criminal organizations and individual engaged in attacks against internet and e-commerce sites. US-CERT (United States Computer Emergency Readiness Team) is a division of the U.S. Branch of Homeland Security that facilitates digital episode alerts and reactions across government and private areas. CERT Coordination Center screens and tracks online crime answered to it by private enterprises and government offices that search out its assistance.

3.7 Part B : Long Answered Questions

1. Explain the key dimensions to e-commerce security. (Refer section 3.1)
2. Explains the key dimensions with respect to customer's perspective as well as with respect to merchant's perspective. (Refer Table 3.1.1)
3. Explain the security threats in the e-commerce. (Refer section 3.2)
4. Explain the tools available to achieve site security. (Refer section 3.3)
5. Explain the steps for public key cryptography with proper diagram and description. (Refer Fig. 3.4.1 and Table 3.3.2)
6. Explain management policies for e-commerce. (Refer section 3.4)
7. Explain e-commerce payment system. (Refer section 3.5)



Notes

UNIT- IV

4

Business Concepts in E-Commerce

Syllabus

Digital Commerce Marketing and Advertising strategies and tools - Internet Marketing Technologies - Social Marketing - Mobile Marketing - Location based Marketing - Ethical, Social, Political Issues in E-Commerce.

Contents

- 4.1 *Digital Commerce Marketing and Advertising Strategies and Tools*
- 4.2 *Internet Marketing Technologies*
- 4.3 *Social Marketing*
- 4.4 *Mobile Marketing*
- 4.5 *Location based Marketing*
- 4.6 *Ethical, Social, Political Issues in E-Commerce*
- 4.7 *Part A : Short Answered Questions (2 Marks Each)*
- 4.8 *Part B : Long Answered Questions*

4.1 Digital Commerce Marketing and Advertising Strategies and Tools

- Ordinary marketing and online marketing both have many similarities as well as differences. The main aim of online marketing (as in all marketing) is to develop customer relationships so that above average returns can be achieved by firms. These relationships are a base for the brand of firm. But online marketing is very different from normal marketing since the type of medium and its abilities are so different from anything which has come before.
- As compared with conventional television and print marketing, online marketing or digital marketing can be more personalized, peer-to-peer, participatory and communal. These four features of online marketing differentiate it from conventional marketing mediums.
- Not all kind of online marketing have these four features. For example, there is not so much of difference between watching a television ad and watching marketing video that shown on your computer screen without taking your permission. However, that marketing video can be targeted to your community membership or your personal interest, and permits you to share it with others. The learning say that the most effective type of online marketing medium have all of these four features.

4.1.1 The Website as a Marketing Platform

- A website of company is a important tool for starting the initial relationship with customer. The website carry out four major functions: creating the brand recognition and costumer expectations, shaping customer experience, educating and informing customers, and anchoring the brand in an ocean of marketing messages coming from various sources.
- The website of company is the place where the customer can come to discover the complete story. This case is not true for email, apps or search engine ads.
- The first task of website is to create recognition of brand and to act as an anchor for company's different online marketing activities, thus driving sales revenue. This involve recognizing differentiating features of the service or product in terms of price, product support, quality and reliability for the customer. Recognizing teh differentiating features of the product on home page of website is planned to build expectations in the user of what it will be like to use the product.
- For example, website of RAW Pressery creates the expectation in the user that the product is fresh, delicious juice made from high quality, natural ingredients without any preservatives and sugar. Website of Ford focuses on high miles per litre and

automobile technology. The expectation that a website of Ford builds is, in case you purchase a Ford you will get to experience latest technology in automobile industry and the highest mileage.

- Websites also works to anchor the brands digitally, acting as a central point where all the branding messages which emerge from multiple online presence of firm, like Twitter, Facebook, mobile apps, or email, come together at a single online location. Alongside branding, websites also perform the typical functions of any commercial establishment by informing customers about services and product of company.
- Website, with their digital catalogs and associated shopping cart, are major elements in online customer experience. Customer experience refers to the overall experience that customer had with the company, including informing, search, purchase, use and after sales support for the service or product. The idea of customer experience is broader than the conventional idea of customer satisfaction. The overall customer experience will include various retail channels. This means that, in the mind of customer, the mobile site and apps, website, twitter feed, Facebook page, television ad and physical store are all connected as part of their experience with the company.

4.1.2 Traditional Online Marketing and Advertising Tools

- Below are the basic marketing and advertising tools available for attracting customers of e-commerce website :
 - Search engine marketing and advertising
 - Display ad marketing
 - Email marketing
 - Affiliate marketing
 - Lead generation marketing
- In recent time, advertisers have increased their spending on digital medium and reduced on conventional medium. In near future, it is expected that the amount spent on digital advertising will exceed the amount spent on television ads.
- In 2016, highest amount was spent on search, which is followed by banner ads, but the most popular types of ad on digital platform are video ads and rich media.
- Expenses on digital advertising among various companies is somewhat skewed. Highest percentage is of retail (22 %), which is followed by automotive (13 %), financial services (13 %), travel (9 %), telecommunications (9 %), computer and consumer electronics (7 %), packaged goods (6 %), healthcare & pharmaceuticals (5 %), media (5 %), and entertainment (4 %).

- Online advertising have advantages as well as disadvantages when compared with the conventional media advertisement, like radio, TV and print media. One big advantage for digital advertising is that nowadays internet has became that place where the audience has moved, specially of the age group of 18 - 34 years age which is very desirable age group. Another big advantage is that online advertising has capability to do targeted ads to small group or to individual and to track how these ads performs in real time.
- Ad targeting is one of the reason behind discrimination in price, it enable companies to offer different prices to different set of customers. With online advertising, it has become possible theoretically to charge different prices to every customer.
- Theoretically, it has become possible in online advertising to personalize each ad message to correctly fit the requirements, values, and interests of each customer. It also give opportunity to do two way interaction between customer and advertisers.
- The major disadvantage of online advertising is the concern about its benefit versus its cost, how to appropriately measure its outcomes, and the supply of good locations to display ads. For example, the publisher who sells advertising space on website do not have agreed upon routine or standard audits to check their claimed numbers as do conventional media outlets.

4.1.2.1 Search Engine Marketing and Advertising

- It is predicted that in near future companies will spend higher amount on search engine marketing. There are large chunk of users who uses the search engine at least once a month. So this is the place where advertising can be very effective by replying with ads which matches intentions and interests of the user. The click through rate for search engine is on an average around 2 % and it has been steady over past few years. The top three search engine providers i.e. Google Microsoft/Bing and Yahoo, provides more than 95 % of all online searches.
- Making use of search engine to develop and sustain brand is known as Search Engine Marketing (SEM). It refers to use of search engines to assist direct sales to online customers.
- Search engines are frequently considered as mostly direct sales medium focused on making sales in response to ads. While this is one of the major use of search engines, they are simply used to strengthen awareness of brand, driving traffic to other blogs or website to support customer engagement, to acquire deep insight into perception

of customer about the brand, to support other similar ads and to provide support to brand indirectly.

- Search engines helps marketers with insights into search pattern of customer, customer's point of view about their product, trending keywords used for search, and which keyword their competitors are using and the response of customer. For instance, PepsiCo, company having products like Doritos and Pepsi, does not make any sale on internet, but have various branding websites directed at investors, consumers and stakeholders. Their focus is on developing, updating and sustaining the Pepsi collection of branded consumer goods. A search on Pepsi will produce various search results which link to marketing material related to Pepsi.
- Search engine websites initially executed unbiased searches of the Internet's large collection of web pages and gets most of their revenue from banner ads. This type of search engine results are known as organic search since the ranking and inclusion of sites is based on more or less unbiased application of an algorithm imposed by search engine. After 1998, search engine websites have converted themselves into online yellow pages, where company pay for getting included in search engine index, pay for keyword to appear up in search result, or pay for keyword to appear in ads of other company.
- Search Engine Claim that the payment made by companies does not affect the organic ranking of their website in search result, just gets included in the search results. However, it is the example in which page inclusion ads gets more hits and the page rank gets appreciated, which causes the organic search algorithm to give up ranking in the organic results.
- Google claims that they do not allow companies to do payment for their rank in organic search results, even though it does assign two to three sponsored links at the top of their page, which are then labeled as "sponsored links". Companies who do not pay for the keyword or inclusion generally fall down on the search result list.
- *Pay-per-click (PPC) search ads* are the key type of search engine advertising. In keyword advertising, companies who buy keywords via a process of bidding at search websites, and whenever a customer searches for that particular word, their ad appears on the page, generally a small text based ad on the right side, but also as listing on top of the page.
- The more companies pay, the higher the rank and greater ad visibility on the web page.

- Usually, the search engines don't do editorial judgement regarding content or quality of ads even though search engines do monitor the use of language. Additionally, some search engines give ranking to the ads based on their popularity instead of the money paid by the advertiser so that the ranking of the ad is based on amount paid as well as the number of clicks per unit time. AdWords is keyword advertising program of Google.
- *Network keyword advertising*, established by Google as their AdSense product in 2002, differs from the normal keyword advertising. Websites which want to display ad (Publisher) join such network and permits the search engine to display relevant ads on their websites. Advertiser pay for such ads who want their ads to be displayed across the internet. The revenue generated from number of clicks on such ads is divided between the website publisher and the search engine.
- Search engine advertising is almost a perfect targeted marketing technique: at precisely the time when customer is searching for a product, an ad for that particular product is displayed.
- Search Engine Optimization (SEO) is the process of upgrading the ranking of web pages in search engine results by modifying the design and content of the website and web pages. By carefully choosing keywords used on the web pages, more often modifying content, and designing the website so that it can be easily read by programs of search engine, marketers can improve the impact and return on the investment they made in online marketing initiatives.
- Google and other search engine companies often do modification in their search algorithm so as to improve the search engine result and user experience. Google, for example, evidently makes more than 600 changes in search engine in a year. The websites having duplicate content, copied content from other websites on the internet and the content which did not attract high traffic from various sources were being pushed down in the search results.
- *Social Search Social search* is an effort to utilize your social contact in order to provide search results. Social search is different than search engine, it evaluates recommendation by your friends, internet visit history, and use of Like button. One issue with conventional search engine is that by entering a keyword say on Google, it provides list or results in which some will be helpful and remaining are suspect. Social search is an attempt to provide few but relevant and trustworthy results depending on the social graph.
- In 2014, Facebook has done number of changes to Graph Search, renewed their

product as Facebook Search, and providing keyword search feature which allows users to find people, pages, posts, photos, videos and links on Facebook by searching for keywords used in a post. Search results are ranked depending on personalization algorithm based in part on the relation of user with the poster.

- *Search Engine Issues*, while search engine have given significant advantage to customers and merchants, they also present costs and risks. For example, search engines have the capacity to crush smaller companies by positioning its ads on the back pages of search results. For accessing digital marketplace which is dominated by Google, merchants are at mercy of search engines. No one was aware of the algorithm or techniques used by Google to rank one company over other. No one had any idea about how rankings can be improved.
- Factors which degrade usefulness and search engine results includes :
- *Link farms* are set of websites which are link to each other, thus improving their ranking in search engines which uses Page Rank algorithm to evaluate usefulness of a website. For improving ranking in search result, some company hire search engine optimization firm to create number of websites which are linked to their company. JCPenney is one such company to do so, no matter what clothing item people are looking for JCPenney used to come on top in search results. It is believed by experts that this was one of the largest search engine fraud in history.
- *Content farms* are set of firms which produce large amount of text content for various websites which were designed to attract search engines and viewers. Content farms generate profit by attracting large traffic to their websites and then ads are exposed to them. The content usually is copied or summarized from valid content websites.
- *Click fraud* happens when a competitor clicks on ads and search engine results, forcing the advertiser to make payment even if the click is not valid. Competitors can hire third party company to carry out fraud clicks or hiring bots to automate this activity. Click fraud can result in high bills for merchants and does not provide any growth in sales.

4.1.2.2 Display Ad Marketing

- Display ads are the way of attracting customers of websites, social media platform or any other online medium to take particular action. These are frequently made up of text-based, video or image ads which motivate the user to click-through to a landing page and take some action like making a purchase.

- Cost for many display and digital ad campaigns is taken on per click basis. Each time a user clicks on your ad in search engine result, you will have to pay an amount depending on your bidding policy.
- Display ads can also be used for campaigns to retarget the user. This can be carried out where the ads are displayed to the user who have already seen a particular website. The objective is to retarget such users and motivate them to be back on your website and take some action.

4.1.2.3 Types of Display Ads

- Display ad campaigns have different type which are as follow :

Banner Ads :

- It is one of the oldest and conventional type of ad which generally displayed at the top of website in banner format. Banner ads are most familiar display marketing type. Banner ads are also low cost and less effective type of digital marketing.
- A banner ads portray a promotional message in rectangular box at the top of website on the screen of mobile or desktop. Banner ad is same as conventional print media ads but with some additional advantages. When clicked on these ads, it brings probable customers directly to the website of advertiser, and the website where the ad is being displayed can monitor the behavior of user on the website.
- The potential to recognize and track the user is an important feature of digital advertising. Banner ads frequently contains video and various animations. Even though the terms display ad and banner ad are frequently used interchangeably, banner ads are just one type of display ad. In spite of being less effective, advertisers still want to spend on banner ads.

Rich Media Ads :

- Ads which contains sound, animation, and interactivity, using HTML5, Flash, Java and JavaScript are known as rich media ads. Rich media ads are more effective as compared to banner ads. Research show that the discovery of rich media ads has boosted advertiser website visit very much as compared with normal banner ads. Audience of rich media ads which contains video are six times more likely to visit website of advertiser, by either typing URL of advertiser, directly clicking the ad or by searching about the advertiser.

Interstitial Ads :

- An interstitial ad is a way of positioning a full-page message in between the current page and destination pages of a user. Interstitial ads are generally placed within a single website, and shown as the user navigates from one page to the another. The interstitial is generally accommodated in its own browser window and moves automatically to the page requested by user after permitting sufficient time for the ad to be read. Interstitial ads can also be placed over an advertising network and emerge as users move among websites.
- Interstitial messages, such as TV ads, attempt to make the viewers a captive of the message. Duration of normal interstitial ads are 10 seconds or less and force the user to watch the ad for that duration. To entertain user, animated graphics and music is used in ads. A good interstitial ads will also contain a stop or skip option for the users having no interest to watch that message.

Video Ads

- Online video ads are like TV commercials which is shown as in-page video ads or during, before, or after a variety of content. The most widely used video ad format is pre-roll in which users are forced to watch a video ad either in start, in the middle or at the end of the video they have clicked on.
- Even though from total spending point of view, online video ads are still relatively small when compared with the money spent on search engine advertising, but video ads are one of the fastest growing online advertising format.
- The higher growth rate in video ads is because of the fact that video ads are more effective than any other form of display ad. For example, research has shown that the click-through rate of video ads are 12 times than that of rich media ads and 27 times than that of conventional banner ads.
- There are various advertising networks which are specialized in video ads, that run video advertising campaigns for national advertiser and position these videos on their respective website's networks. Companies can also initiate their own television and video sites to advertise their products. Retail websites are one of the largest users of ad videos.

Sponsorship

- A sponsorship is a paid attempt to tie name of an advertiser to an event, particular information or a place in a way that reinforces its brand in a positive yet not honestly commercial way. Sponsorships are generally more regarding

branding than immediate sales. An ordinary way of sponsorship is targeted content, in which editorial content is merged with an ad message to make this message more attractive and valuable to its intended users.

- Many of companies have moved towards social media influencers to do advertising of their product by providing sponsorship. There many youtubers or comedian available who record paid partnership video and share it on different social media platform. Instagram is one of the popular platform for such kind of advertisement.

4.1.2.4 Email Marketing

- Email marketing is when you send out commercial message via email to your contacts who have subscribed to your mailing list and provided permission to receive email communication from you.
- Email marketing technique is used to drive sales, to give information and to build a community around your brand. Current email marketing has improved from being one-size-fits-all bulk mailing and rather than focused on segmentation, consent and personalization.
- Email marketing is low cost and somewhat invariant to the number of emails sent. The cost for sending 1,000 mails are same as for sending 1 million. The primary cost of email marketing is for buying the list of names whom the email will be sent.
- Even though email be an effective advertising and marketing tool, it faces three major challenges: poorly targeted purchased email list, spam and software tools used to handle spam mails which remove many emails from users inbox.
- Spam is unsolicited type of commercial email which is also known as junk email, and spammers are those people who send such mails to bulk users who have not shown any interest in the product. Spammers are intended to do marketing of fraudulent deals & services, pornography, scams, and other products which are not accepted widely in majority of civilized societies.
- Legitimate direct subscribed email marketing is not growing at the rate other targeted display ads and search engine advertising because of the increase in spam mails. For even legitimate email marketing campaign consumers are giving more sophisticated response. Generally, email functions well for sustaining customer relationship but not works that well for gaining new customers.

- The different types of marketing emails are as follow :

Promotional emails

- Campaigns of email marketing are used for promotion of various things, like new product release, special offer, webinar or an ebook. Such promotional email campaigns could contain around 2 to 10 emails sent over few weeks or days.
- Promotional emails have a clear and short term call to action or CTA. The CTA focuses on particular action you want reader of the mail should take, like making a purchase or visiting website or web page.
- This kind of marketing emails are sent to the list of user whenever needed and in line with the flow of your business.

Informational emails

- *Newsletters* : As the name shows, it shares news related to your business or to highlight product use case. Newsletters are sent as per the specified schedule i.e. monthly, bi-weekly, weekly, it also helps in maintaining consistent connection with the subscriber of newsletter.
- Newsletters are not always have to be regarding news, the main focus should be on letter aspect of it. Newsletter can be thought of as a medium to share tips, thoughts, insights or anything else which interests your subscriber.
- *Announcements* : Email is the best way to communicate your customers regarding new releases, company announcements, modifications in the server etc.
- As a medium, email has the required formality for conveying important messages to the customers.
- This is why majority of companies have selected email as a channel for sending crisis communication during Covid-19.

4.1.2.5 Affiliate Marketing

- Affiliate marketing is strategy for online sales which lets a owner of the product to increase sales by permitting others targeting the same consumers i.e. affiliates, to earn a commission by suggesting the product to others. Simultaneously, it makes it feasible for affiliates to earn money on sales of product without need to create their own product.
- In simple terms, affiliate marketing includes referring a service or product by sharing it on social media, blog or website. An affiliate earns commission every time someone makes a purchase through the URL associated with their suggestion. If performed well, this performance based chance can become main part of your business by providing you good income.

- In order to become an affiliate in an affiliate marketing program, you will have to follow below steps :
 - Find and join an affiliate program
 - Select which offers to promote
 - Get a unique affiliate link for every offer
 - Share those links on your social media, blog, or website
 - Collect a commission whenever someone uses your links to make a purchase
- Rates of commission differ dramatically, based on the offer and the company. You can earn as low as 5% of the sale and in some scenarios can earn as much as 50% generally when promoting event or a class. There are some affiliate marketing program which offers a flat rate on every sale rather than a percentage.
- Advantages of affiliate marketing program :
 - The simplicity in this kind of marketing strategy is benefit to affiliates. You will only have to manage marketing part of educating the customers. You don't have to think much about the harder task, such as supporting, developing or offer fulfillment.
 - Affiliate marketing involves low risk, as you don't have to pay anything to join this program, you can immediately start earning with an esteemed affiliate service or product without any advance investment. In affiliate marketing program, initially after investing time for creating traffic sources, your affiliate links will continue to provide you stable paycheck.
 - At the end, successful affiliate marketing provides the potential to notably increase your earning without taking additional help. You can introduce new products to your existing users and build campaigns for other products while your current work continues to generate money in the background.

4.1.2.6 Lead Generation Marketing

- In the online marketing world, a lead means a potential customer in your target users who is interested in buying the service or product provided by you. So lead generation is the process of attracting such potential customers for your business.
- Various marketing companies make use of various marketing strategies for attracting potential customers which is referred as lead generation marketing. Lead generation strategy includes contacting business directly, drive user to register for something online by filling a form, or even walking into the shop.

- All businesses require customers to increase every passing day and to get such customers, businesses need to target potential customer first and get their attention. This is the scenario where lead generation marketing is very useful.
- These leads then pass to sales team in order to convert them into buying customer. This usually includes adding them in mailing list for further nurturing. And along with enhanced technologies, business intelligence tools can track demand of your product and customer trend from the data captured through lead generation marketing.
- *Steps for Marketing Lead Generation :*
 1. **Capture leads via website forms**
 - We can place a simple subscription form on your website and ask visitors who are interested to fill the form in trade of valuable contents like, eBook, infographics, white paper, checklist, case study, newsletter or how-to-do video. The big concept is to mix lead capture form with your website design.
 2. **Generate leads via Google Ads**
 - We can run targeted ads about main keywords on Google which capture attention of potential lead while searching online for your business related keywords. The user is later redirected to a landing page or your website, where additional strategy is in place to capture the lead and the best thing is you will only have to pay when user clicks on the ad. Google has helped many companies to start off with lead generation marketing on Google.
 3. **Capture leads using direct emails**
 - Direct emails sent to customer not only contains announcement regarding new product or service but it also provides user 20% promo code to use in order to buy the product. This technique is proven to be effective in most cases converting number of cases into potential leads for purchasing your product.
 4. **Capture leads using social media platform**
 - Lead generation marketing should not always need to be hard, even easy but effective techniques can lead to capture high quality, exciting lead prospects for your company. Social media is one such platform. Nowadays, users pass around five to six hours of their time on social media daily, by some or the other ways. Social media platforms, such as Instagram, Facebook and Twitter, are not only used for keeping in touch with our friends and family, but also share individual's point of view on different brands.

- This has provided business owner with the chance to hear out their existing customer and engage with potential customers. Business can engage in lead generation marketing in similar pages, groups or via direct messages. One similar and popular method to capture information about potential leads is through social media contests. Social media content contest can be organized in trade of some type of giveaway. Users are often asked to refer their friends, upload photos or give answer to few simple questions in order to enter into contest. Creating fun ways in order to engage with users of social media platform is very effective process for owners of businesses to capture potential leads.

4.2 Internet Marketing Technologies

- The Internet has four major impacts on marketing. First, the Internet, as a communication channel, has increased the range of marketing communication, in terms of the number of people that can be reached easily and the places where they can be reached, from desktop to mobile.
- Second, the Internet has increased the richness of marketing communication by integrating audio, video and text content into rich messages. Possible, the Internet is richer as a channel than video or TV because of the complexity of messages available, the vast content accessible on large number of subjects, and capability of users to control the experience interactively.
- Third, the Internet has enlarged the data intensity of the marketplace by giving marketers with unparalleled detailed, fine grained, real-time information regarding consumer as they do any transaction in marketplace.
- Fourth, the always attached, always on, environment created because of the mobile devices made customer available to receive messages related to marketing at any point in time.
- One of the major results of revolution of Internet is expansion of possibilities in online marketing for the companies.

4.2.1 Web Transaction Logs

- A main source of customer information on the Internet is the transaction log maintained by all web servers. User's activity on website is recorded in transaction log. The transaction log is built into web server software. The data captured in transaction log becomes more useful when merged with two other data trails generated by visitors: the shopping cart and sign up forms database.

- User are tempted via various means to fill sign up or registration forms. Registration forms collects personal data on name, contact number, address, pin code, email address which are generally mandatory fields and other optional data provided on users interests.
- When user purchases something, they provide some addition information into shopping cart database. The shopping cart database collects all the selected products, purchase and payment related data.
- For a website having millions of visitors every month, and where, on an average, a visitor requests for around 15 pages on every visit, there will be around 15 million entries in the log every month. These transaction logs combined with data from shopping cart database and registration forms, represent a treasure of marketing information for individual websites as well as online industry as a whole. Almost all Internet marketing capabilities are dependent on these data collection tools.
- For example, below are some interesting marketing questions which can be answered by analyzing web transaction logs of website, shopping cart database and registration forms :
 - What are the major patterns of purchase and interests for individuals and groups ?
 - After the home page, where do most users go first ?
 - What are the interests of particular individuals ?
 - How we can make it simpler for visitor to use our website so that they can find what they want ?
 - How can we change the design of the site to motivate visitors to purchase our high-margin items ?
 - Where are visitors coming from ?
 - How can we personalize our offering, messages, and products to individual users ?

4.2.2 Supplementing the Logs : Cookies and other Tracking Files

- While transaction logs builds the base for online data collection at a single website, marketers make use of tracking files to track users across the internet as they visit any other websites. There are three main type of tracking files: cookies, flash cookies and web beacons.

- A cookie is small text file websites place on visitor's computer each time they visit. Cookies permit a website to store the information on visitor's computer and then retrieve it later. The cookie generally includes name, unique ID for every visitor which is stored on visitor's computer, a path, the domain, security setting which provides information about whether the cookies can only transferred using secure server, and an expiry date which is optional.
- A cookie provides online marketers with a quick way of recognizing the customer and understanding user's history on the website. Website make use of cookie to find out number of user visiting the website, whether they are repeat visitors or new visitors, and how frequently they have visited the website, even though this data might be 100% accurate since people share computers, they many times use more than one computer, and cookies might be accidentally deleted. Cookies helps to make quick checkout and shopping cart options possible by permitting the website to keep track of the user as they add or remove products in shopping cart. Every time new item is added to the shopping cart is stored in databse of website along with unique ID of visitor.
- With increasing privacy concerns, over the time many user have started deleting cookies. The more cookies are getting delete, the web page and ad server benchmark becomes less accurate., and less likely marketer will be able to know visitors information or from where did that visitor came. As a result, advertiser have found other ways. One such way is using Adobe flash software, which creates its own cookie file, named as flash cookies. Flash cookies can be made in such a way it never expires, and can store the information up to 5 MB as compared to 1 MB data stored by normal cookies.
- On mobile devices use of cookies has found to be less effective. Normal cookies on mobile device are reset each time user closes browser and in-app cookies cannot be shared between applications, making both of limited utility. However, as the number of users increasing using mobile devices to access the Internet, it is of no wonder that telecommunication companies started using tracking files.

4.3 Social Marketing

- Social marketing or advertising includes using online social media platform and communities to create brands and drive sales revenues. There are various type of social media, from Facebook, Twitter, Instagram and Pinterest, to social apps, blogs, social games and forums.

- Marketers cannot overlook the large number of users that social media network like Facebook, Twitter, Instagram and Pinterest are gathering, which rival radio and TV in size. There are majority of population who visits social media sites on daily basis. It is found in a research that social media active user are more likely to discuss about and suggest a product or company they follow on social network. Many of the companies have started using social media platform for marketing purpose. Many companies have also started giving sponsorship to celebrities to promote their product on social media platform.
- Social media platform provides all major type of advertising formats to advertiser which includes banner ads, short pre-roll and post-roll ads related with videos, and sponsored content. Having Facebook page of company is like a marketing tool for brand just like web page. Many companies, like Coca-Cola, have shut down their product specific web pages and started using Facebook pages for marketing.
- Online games and blogs can also be used for social marketing. Blogs have been around since very long and are part of the conventional online culture. Around 80 million user read blogs while 29 million people write the blogs. In online marketing blogs have very important role to play. Even though many companies uses Facebook and Twitter, they have not replaced blogs, and in reality frequently they point to blogs for longer content. Advertising networks which are specialize in blogs offers efficiency in displaying ads on the blog. There are blog networks available which are collection of small number of famous blogs, that are coordinated by central management team, and from such network content can be delivered to larger number of users.
- The online gaming marketplace is expanding at high pace continuously as the number of users playing games on mobile, tablets, console and PC have increased. The aim of game advertising is branding as well as driving customers to buy moments at retail stores and restaurants.
- If social marketing is used properly then it can become a great asset for marketing industry. The favourable result of social marketing for any business can be enormous, but one must keep in mind that it should be used in most efficient way.
- Social marketing permits websites and businesses to acquire huge following over the Internet by using various kind of social midea platforms available, like blogs, photo and video sharing websites, social bookmarking websites and social networking websites.

4.4 Mobile Marketing

- Mobile marketing is multi channel, online marketing strategy whose objective is to reach target users on their mobile phones, tablets, and/or any other mobile device, through SMS, MMS, email, websites, social media, and applications. Since past few years, attention of customers have shifted towards mobile. Due to this, marketers have started to do similar thing so as to build true multi-channel engagement. In order to receive and sustain attention of potential customers, contents should be strategic and personalized.
- Mobile marketing is done by keeping mobile devices in mind and using SMS/MMS marketing and mobile applications. For creating any short-term or long term marketing strategy, mobile marketing has become an important piece of puzzle. From email, to pay per click, content marketing, search engine optimization and social media marketing, the mobile marketing is that one channel which helps you to cover larger part of users where they are comfortable. For making mobile marketing effective, you will have to create a unified experience which customer expects.
- Mobile marketing involves use of rich media ads, banner ad, video, games, SMS, email, QR code and in-store messaging. Mobile has now became essential part of marketing budget.
- Mobile marketing can be very helpful for driving demand and brand value for your services or products by strengthening mobile devices to reach to larger customer group in real time at any point in life cycle of customer. Mobile is also growing consistently. In order to use the growing potential of mobile marketing, your major focus should be on creating seamless experience for the users.
- Applications of mobile devices add up to a marketing platform which was not present few years back. Apps are non-browser medium for user to experience the Internet and do number of things like searching, shopping, reading articles and newspapers. Faster access to content is provided by mobile apps than multi-purpose browsers. Mobile apps have started impacting the way of operation and design of conventional websites as customers these days are attracted towards speed of operation and look and feel of apps. There are more than 5 million apps available for download on Google Play Store and Apple's App Store and there are millions of other apps available provided by Internet carriers and third party app stores.

4.5 Location based Marketing

- Location based marketing permits businesses to target users at a granular, person level by using offline or online messaging depending on physical location of user. By using location data, marketing team will be able to connect to customers depending on attributes such as events in their region, proximity to a store and many more.
- Location based marketing has proven to be effective across customer life cycle from searching and buying, to retaining and engaging. If user properly, location based marketing permits marketers to target particular group of customer with targeted offers, while enhancing customer experience for the kind of crowd which values instant satisfaction. For instance, location based marketing may notify a customer that a item they have been looking for is available in a store nearby, permitting them to pick up from there.

4.5.1 Types of Location-Based Marketing

- Location based marketing has majorly expanded in last few years because of the growth in connected devices. Today, we can say everything is connected to the web from mobile phones to watches, cars, AC and many more. These devices frequently track location of their owner, so there is plenty of spatial and location data available. Insights acquired from such data can be provided to marketing teams in order to plan ways to reach to customers and enhance overall customer experience.
- Below are few way to channel this location related data into marketing attempt :

4.5.1.1 Geotargeting

- Geotargeting is used to find out location of the user, so as to deliver personalized content depending on their current location. If customer have given permission to app for accessing their location data, they might get push notification or in-app messages depending on proximity to store or area.
- Geotargeting is based on IP addresses. IP address is assigned to every connected device to make them recognizable. IP address can later be matched with country, pin code etc, in order to identify the current location of user.
- The major benefit of geotargeting is to grow customer experience via personalization. For instance, marketers can target users depending on needs related to specific location, like local or weather news and events.

- A most popular example of geotargeting is Google search results. In case a user searches for medical shop, Google uses location data derived from assigned IP address to that device and displays search results of medical shop in user's nearby area.
- Another popular example is Uber. When user lands into new city, after opening app they will get alert regarding cars available in that city.

4.5.1.2 Geofencing

- Geofencing is building a border withing a particular region. When the targeted user enters into that boundary, they automatically become a target of marketing plan. This means that they will receive offers, content, or some other type of messaging from the businesses. One example of the boundary is an area covering a famous shopping mall in which company has a outlet.
- Geofencing uses GPS technology to develop a border. At any point a target user crosses that boundary, they receive a app notification or SMS.
- Geofencing permits marketers to cover large area, like event places or malls. Using this technique marketers can target all the users who are withing that particular range.
- Geofencing is dependent on real time location data, which permits marketers to motivate users to engage with their products, or deflect users from engaging with competitors product.
- Retailers can use geofencing to target users nearby their shops to motivate them to buy something from your shop. For instance, a user has been reviewing an item online, they may get a alert about availability of that item in nearby store.

4.5.1.3 Beaconing

- Beacons are connected devices which uses WiFi or Bluetooth to connect with predefined applications which are functioning withing range or the beacon. Within the range of smaller geographical area, beacons functions very well to target existing customers.
- Beacons send a sign to your device which alerts server to send content to your device. This can be an email, push notification etc. For instance, assume a sports stadium has encouraged the audience to download their app for concession, ticket booking, etc. The venue will setup a beacon to identify when a device having their app installed is in coverage area.

- User should subscribe and keep Bluetooth turned on so as to take advantage of this. However, this channel of location based targeting provides you more direct communication medium with customers.
- Businesses can monitor users indoors in more accurate way. This not only permits for more specific targeting, but also support marketers to get a more complete knowledge of customer behavior.
- Users don't have to be online to receive these notifications.
- Shops can place these beacons in passage around the shop to send offers as users browse. For instance, a grocery store might use beacon to check at what point customer is in the ice cream passage and then send offer to them on ice cream.

4.5.1.4 Mobile Targeting

- Mobile targeting happens when marketers targets consumers with advertisements on their mobile. Sometimes consumers want to be away from advertising, marketers aims to make their ads specific to the surrounding, which can be based on device, time or location.
- Create ground in your mobile advertisement platform which defines who you want to target and what the criteria for targeting the. This will permit marketers to target consumers directly on their device for establishing personalized connection.
- Marketers have frequently seen higher returns on money spent on ads using more targeted approach.
- Social media advertisements which target customers depending on location data can help to encourage visits to restaurant, store or nearby events.

4.6 Ethical, Social, Political Issues in E-Commerce

- Defining the rights of people to communicate their ideas and copyright owner's property rights are two among various ethical, social and political issues raised as a result of rapid growth in e-commerce.
- The ethical, social and political issues raised in e-commerce, give a structure for organizing issues and make suggestions for managers who are assigned the task of operating e-commerce companies within accepted standards of usefulness.
- We live in an information era, where wealth and strength are majorly depend on knowledge and information as major assets. Disagreement over information are majorly over wealth, power, influence and other valuable things. Similar to any other technology like electricity, steam, telephones and TV, the e-commerce and

Internet can be used to accomplish social growth, and for the major part, this has occurred. However, same technologies can be used to commit crimes, destroy the environment, and threaten esteemed social values. Before the invention of automobiles, interstate crime rate was less and very less federal jurisdiction over crime. Same goes with Internet, before the Internet, cyber crime rate was very less.

- Many companies and individuals are taking advantage from the commercial development of Internet, but this development also demands a price from companies, individuals and societies. These benefits and cost should be carefully taken into consideration by those who want to make social and ethically responsible decisions in new environment.

4.6.1 Public Policy Issues in E commerce

- The main ethical, social and political issues which have built around e-commerce since last few years can be classified into four dimensions: property rights, information rights, governance and public safety and welfare.
- Some ethical, social and political issues raised in these dimensions include the following :
- Property rights : How can conventional intellectual property rights be imposed in Internet world where making various copies of protected work is possible and can be distributed worldwide so quickly.
- Information rights : In public marketplace, or in their private home, what are the rights individuals have to their own information, when Internet technology is making collection of information so penetrating and efficient? What rights do individuals have to access business firms and other organization's information ?
- Governance : Should the e-commerce and Internet be subject to public laws ? And if yes, then what legislative body should have jurisdiction ?
- Public safety and welfare : What efforts should be made to make sure fair access to the e-commerce and Internet mediums ? Should govt be made responsible for making sure that schools and colleges have Internet access? Is some kind of content and acts like gambling and pornography, a threat to public safety and welfare ? Should mobile commerce be permitted from moving vehicles ?

4.6.2 Basic Ethical Concepts : Responsibility Accountability & Liability

- Ethics is at the center of political and social arguments regarding Internet. Ethics is study of principles which companies and individuals can use to find out right and

wrong courses of action. It is presume in ethics that individuals are free moral agents who are in such place to make selections.

- Extending ethics from individuals to business organizations and even complete society can be challenging, but it is not impossible. Considering there is decision making body or individual in place, then their decisions can be judged against various ethical principles. If you know some basic principles of ethics, your capability to reason regarding large political and social arguments will be improved. In western countries, there are liability and ability principles which all ethical schools of thoughts share: responsibility, accountability, liability.
- Responsibility means as free moral agents, organizations, individuals and societies are accountable for the actions they take. Accountability means that organizations, individuals and societies must be help responsible to others for results of their actions.
- Liability extends principle of accountability and responsibility to the area of law. Liability is a attribute of political systems in which a body of law is in place which allows individuals to recover the harm done to them by other player, organization or systems. Due process is a attribute of law governed societies and refers to a process in which laws are understood and known. There is provision to appeal to higher authorities to make sure that the laws have been implemented correctly

4.6.3 Privacy and Information Rights

- The Internet provides a perfect environment for occupying the personal privacy of large number of users on a scale unmatched in history. Possibly no other current issue has raised as much widespread political and social worry as safeguarding privacy of over millions of users on Internet.
- The main ethical issues about privacy and e-commerce includes :
- Under which circumstances should we occupy the privacy of others ?
- What valid invading into others lives through market research, surveillance and other mediums ?
- The main social issues about privacy and e-commerce concern the evolution of privacy norms or privacy exception and public attitudes. In what areas of should we as a society motivate people to think that they are in private area as opposed to public view ?

4.7 Part A : Short Answered Questions (2 Marks Each)

Q.1 Define online marketing. List out marketing and advertising tools available.

Ans. : Online marketing :

Online marketing is the practice of using various online mediums available to promote brand, service or product of company.

Marketing and Advertising tools :

- Search engine marketing and advertising
- Display ad marketing
- Email marketing
- Affiliate marketing
- Lead generation marketing

Q.2 Describe different factors responsible for degrading search engine result.

Ans. : Factors responsible for degrading search engine result:

- *Link farms* are set of websites which are link to each other, thus improving their ranking in search engines which uses Page Rank algorithm to evaluate usefulness of a website. For improving ranking in search result, some company hire search engine optimization firm to create number of websites which are linked to their company.
- *Content farms* are set of firms which produce large amount of text content for various websites which were designed to attract search engines and viewers. Content farms generate profit by attracting large traffic to their websites and then ads are exposed to them.
- *Click fraud* happens when a competitor clicks on ads and search engine results, forcing the advertiser to make payment even if the click is not valid. Competitors can hire third party company to carry out fraud clicks or hiring bots to automate this activity.

Q.3 What is banner ad ?

Ans. : Banner Ad :

- It is one of the oldest and conventional type of ad which generally displayed at the top of website in banner format. Banner ads are most familiar display marketing type. Banner ads are also low cost and less effective type of digital marketing.
- A banner ads portray a promotional message in rectangular box at the top of website on the screen of mobile or desktop. Banner ad is same as conventional print media ads but with some additional advantages. When clicked on these ads,

it bring probable customers directly to the website of advertiser, and the website where the ad is being displayed can monitor the behavior of user on the website.

Q.4 What is display ad marketing? List various types of display ad marketing.

Ans. : Display ad marketing

- Display ads are the way of attracting customers of websites, social media platform or any other online medium to take particular action. These are frequently made up of text-based, video or image ads which motivate the user to click-through to a landing page and take some action like making a purchase.
- Cost for many display and digital ad campaigns is taken on per click basis. Each time a user clicks on your ad in search engine result, you will have to pay an amount depending on your bidding policy.

Types of display ads :

- Banner ads
- Rich media ads
- Interstitial ads
- Video ads
- Sponsorship

Q.5 What is email marketing?

Ans. : Email Marketing

- Email marketing is when you send out commercial message via email to your contacts who have subscribed to your mailing list and provided permission to receive email communication from you.
- Email marketing technique is used to drive sales, to give information and to build a community around your brand. Current email marketing has improved from being one-size-fits-all bulk mailing and rather than focused on segmentation, consent and personalization.
- Email marketing is low cost and somewhat invariant to the number of emails sent. The cost for sending 1,000 mails are same as for sending 1 million. The primary cost of email marketing is for buying the list of names whom the email will be sent.

Q.6 Describe affiliate marketing in short?

Ans. : Affiliate Marketing

- Affiliate marketing is strategy for online sales which lets a owner of the product to increase sales by permitting others targeting the same consumers i.e. affiliates, to earn a commission by suggesting the product to others. Simultaneously, it makes it

feasible for affiliates to earn money on sales of product without need to create their own product.

- Affiliate marketing includes referring a service or product by sharing it on social media, blog or website. An affiliate earns commission every time someone makes a purchase through the URL associated with their suggestion.

Q.7 Describe lead generation marketing in short.

Ans. : Lead generation marketing

- In the online marketing world, a lead means a potential customer in your target users who is interested in buying the service or product provided by you. So lead generation is the process of attracting such potential customers for your business.
- Various marketing companies makes use of various marketing strategy for attracting potential customer which is referred as lead generation marketing. Lead generation strategy includes contacting business directly, drive user to register for something online by filling a form, or even walking into the shop.
- All businesses requires customers to increase every passing day and to get such customers, businesses need to target potential customer first and get their attention. This is the scenario where lead generation marketing is very useful.

Q.8 Define cookies with its use.

Ans. : Cookies

- A cookie is small text file websites place on visitor's computer each time they visit. Cookies permit a website to store the information on visitor's computer and then retrieve it later. The cookie generally includes name, unique ID for every visitor which is stored on visitor's computer, a path, the domain, security setting which provides information about whether the cookies can only transferred using secure server, and an expiry date which is optional.
- A cookie provides online marketers with a quick way of recognizing the customer and understanding user's history on the website. Website make use of cookie to find out number of user visiting the website, whether they are repeat visitors or new visitors, and how frequently they have visited the website, even though this data might be 100% accurate since people share computers, they many times use more than one computer, and cookies might be accidentally deleted. Cookies helps to make quick checkout and shopping cart options possible by permitting the website to keep track of the user as they add or remove products in shopping cart. Every time new item is added to the shopping cart is stored in database of website along with unique ID of visitor.

Q.9 Define social marketing and mobile marketing.**Ans. : Social marketing**

- Social marketing or advertising includes using online social media platform and communities to create brands and drive sales revenues. There are various type of social media, from Facebook, Twitter, Instagram and Pinterest, to social apps, blogs, social games and forums.

Mobile marketing

- Mobile marketing is multi channel, online marketing strategy whose objective is to reach target users on their mobile phones, tablets, and/or any other mobile device, through SMS, MMS, email, websites, social media, and applications. Since past few years, attention of customers have shifted towards mobile. Due to this, marketers have started to do similar thing so as to build true multi-channel engagement.

Q.10 What is location based marketing.**Ans. : Location based Marketing**

- Location based marketing permits businesses to target users at a granular, person level by using offline or online messaging depending on physical location of user. By using location data, marketing team will be able to connect to customers depending on attributes such as events in their region, proximity to a store and many more.
- Location based marketing has proven to be effective across customer life cycle from searching and buying, to retaining and engaging. If user properly, location based marketing permits marketers to target particular group of customer with targeted offers, while enhancing customer experience for the kind of crowd which values instant satisfaction.

4.8 Part B : Long Answered Questions

1. Explain different types of Location based Marketing **(Refer section 4.5.1)**
2. Write a note on ethical, social and political issues in e-commerce. **(Refer section 4.6)**
3. Explain search engine marketing in detail. **(Refer section 4.1.2.1)**
4. Explain different types of display ad marketing. **(Refer section 4.1.4.1)**
5. Explain different steps for lead generation marketing. **(Refer section 4.1.2.5)**



Notes

UNIT- V

5

Project Case Study

Syllabus

Case Study : Identify Key Components, Strategy, B2B, B2C Models of E-commerce Business Model of any e-commerce website - Mini Project : Develop E-Commerce project in any one of Platforms like Woo-Commerce, Magento or Opencart

Contents

- 5.1 Identify Key Components*
- 5.2 Major Business-To-Consumer (B2C) Business Models*
- 5.3 Major Business-To-Business (B2B) Business Models*
- 5.4 Part A : Short Answered Questions (2 Marks Each)*
- 5.5 Part B : Long Answered Questions*

5.1 Identify Key Components

- A business model is a bunch of arranged exercises (now and then alluded to as business measures) intended to bring about a benefit in a commercial center. A business model is not always equivalent to a business methodology, albeit at times they are close to the extent that the business model unequivocally considers the serious climate.
- The business model is at the focal point of the strategy. A field-tested strategy is a record that depicts a company's business model. A marketable strategy consistently considers the serious climate. A web based business, a business model expects to utilize and use the one of a kind of characteristics of the Internet, the Web, and the versatile stage.
- There are eight key element of a business model
 1. Value proposition
 2. Revenue model
 3. Market opportunity
 4. Competitive environment
 5. Competitive advantage
 6. Market strategy
 7. Organizational department
 8. Market opportunity

1. Value proposition

- A company's value proposition is at the very heart of its business model. A value proposition defines how a company's product or service fulfills the needs of customers. To build and/or analyze value proposition of a company, you need to know why customers will opt to do business with your company instead of another company and what your company provides that other firms do not and cannot.
- From the consumer point of view, successful e-commerce value propositions include personalization and customization of product offerings, reduction of product search costs, reduction of price discovery costs, and facilitation of transactions by managing product delivery.
- For example, before Amazon existed, most clients by and by ventured out to book retailers to submit a request. At times, the ideal book probably won't be accessible, and the client would need to stand by a few days or weeks, and afterward

re-visitation of the book shop to get it. Amazon makes it workable for book sweethearts to look for essentially any book on paper from the solace of their home or office, 24 hours every day, and to know promptly whether a book is available. Amazon's Kindle makes this one stride further by making digital books right away accessible with no transportation pause. Amazon's essential value propositions are unmatched determination and comfort.

2. Revenue model

- A revenue model of company describes how the company will generate money, generate a superior return on the capital invested and generate profits. We use the terms financial model and revenue model interchangeably.
- The function of business organizations is to generate profits as well as to produce returns on invested capital that exceed alternative investments. Profits alone are not enough to make a company successful. A company should generate higher returns than alternative investments, so as to consider themselves successful. Companies which fails this test go out of existence.
- There are many different e-commerce revenue models that have been developed, most companies rely on one, or some combination, of the following major revenue models: the advertising model, the subscription model, the transaction fee model, the sales model, and the affiliate model.
- In the **advertising revenue model**, a company which provide services, content, and/or products also provides a forum for advertisements by which generating revenue from advertisers. Companies that are able to attract the greatest viewership or that have a highly specialized, differentiated viewership and are able to retain user attention are able to charge higher advertising rates. Yahoo, for example, obtain a significant amount of revenue from video and display advertising.
- In the **subscription revenue model**, a company that provides services or content takes a subscription fee in order to provide access to some or all of their content or services. For example, the digital version of Consumer Reports offers mobile and online access to premium content.
- Involvement in the subscription revenue model demonstrates that to effectively defeat the hesitation of clients to pay for content, the substance offered should be seen as a high-esteem added, premium contribution that isn't promptly accessible somewhere else nor handily imitated. Organizations effectively offering substance or administrations online on a membership premise incorporate Match.com and eHarmony, Ancestry.com and Genealogy.com, Microsoft's Xboxlive.com, Rhapsody.com and Hulu.com.

- In the **transaction fee revenue model**, a company receives a fee for executing or enabling a transaction. For instance, eBay provides an auction marketplace and gets a small transaction fee from a seller in case the seller has successfully sold the item.
- In the sales revenue model, companies obtain revenue by selling content, services or goods to customers. For example, Amazon, which sells grocery, cloths, electronic, books, music, and other products follow sales revenue models.
- In the affiliate revenue model, companies which directs business to an affiliate gets percentage of revenue from any resulting sales or referral fee. For example, MyPoints generates revenue by connecting companies with potential customers by offering special deals to its members.

3. Market opportunity

- The term market opportunity refers to the company's intended marketspace (i.e., an area of potential or actual commercial value) and in that marketspace the overall potential financial opportunities available to the firm.
- The market opportunity is typically separated into more modest market specialties. The reasonable market opportunity is characterized by the income potential in every one of the market specialties where you desire to contend.
- For example, we should accept you are investigating a product preparing organization that makes online programming learning frameworks available to be purchased to organizations. The general size of the product preparing market for all market sections is around \$70 billion. The general market can be separated, notwithstanding, into two significant market portions: teacher drove preparing items, which include about 70 % of the market , and PC based preparing, which represents 30 %.
- There are further market specialties inside every one of those significant market fragments, for example, the Fortune 500 PC based preparing market and the independent company PC based preparing market. Since the firm is a beginning up firm, it can't contend successfully in the huge business, PC based preparing market. Enormous brandname preparing firms overwhelm this specialty. The beginning up company's genuine market opportunity is to offer to the great many independent venture firms that spend about \$6 billion on PC based programming preparing. This is the size of the association's practical market opportunity.

4. Competitive environment

- An association's competitive environment refers to different organizations selling comparable items and working in the equivalent marketspace. It likewise alludes to the presence of substitute items and expected new contestants to the market, just as the force of clients and providers over your business.
- The competitive environment for an organization is impacted by a few variables: the numbers of contenders are dynamic, how huge their tasks are, what the piece of the overall industry of every contender is, the way beneficial these organizations are, and how they value their items.
- The presence of countless rivals in any one portion might be an indication that the market is soaked and that it very well might be hard to get productive. Then again, an absence of contenders could either flag an undiscovered market specialty ready to go, or a market that has just been attempted without progress on the grounds that there is no cash to be made. Investigation of the competitive environment can assist you with choosing which it is.

5. Competitive advantage

- Firms achieve a competitive advantage when they can produce a superior product and/or bring the product to market at a lower price than most, or all, of their competitors.
- Firms additionally contend on extension. A few firms can create worldwide business sectors, while different firms can grow just a public or provincial market. Firms that can give prevalent items at the most reduced expense on a worldwide premise are really advantaged.
- Firms accomplish upper hands since they have some way or another had the option to get differential admittance to the elements of creation that are denied to their rivals-at any rate for the time being (Barney, 1991). Maybe the firm has had the option to get truly ideal terms from providers, transporters, or wellsprings of work. Or on the other hand maybe the firm has more experienced, learned, and steadfast workers than any contenders. Perhaps the firm has a patent on an item that others can't mirror, or admittance to speculation capital through an organization of previous business partners or a brand name and famous picture that different firms can't copy.
- A lopsidedness exists at whatever point one member in a market has more assets - monetary sponsorship, information, data, or potentially power - than different members. Imbalances lead to certain organizations having an edge over others,

allowing them to come to showcase with better items, quicker than contenders, and now and again at lower cost.

- A first-mover advantage is a competitive market advantage for a company that results from being the first into a marketplace with a service or serviceable product. In case first movers build a loyal following or a unique interface which is difficult to copy, they can sustain their first-mover advantage for long duration.
- Amazon gives a genuine model. In any case, throughout the entire existence of innovation driven business development, most first movers frequently do not have the correlative assets expected to support their favorable circumstances, and regularly devotee firms receive the biggest benefits. Undoubtedly, large numbers of the examples of overcoming adversity we examine in this book are those of organizations that were moderate devotees-organizations that acquired information from disappointment of spearheading firms and went into the market late.
- Some competitive advantages are called "unfair." An unfair competitive advantage occurs when one company builds an advantage depending on a factor that other company cannot purchase. For example, a brand name can't be bought and is in that sense an "unfair" advantage. Brands are based upon dedication, trust, dependability, and quality. Once got, they are hard to duplicate or mirror, and they grant firms to charge premium costs for their items.
- In amazing business sectors, there are no competitive advantages or asymmetries since all organizations approach all the variables of creation (counting data and information) similarly. Nonetheless, genuine business sectors are flawed, and deviations prompting upper hands do exist, at any rate for the time being. Most upper hands are present moment, albeit some can be supported for extremely significant stretches. Be that as it may, not for eternity. Indeed, many regarded brands bomb each year.

6. Market strategy

- Regardless of how enormous an association's characteristics, its showcasing procedure and execution are frequently similarly as significant. The best business idea, or thought, will come up short in the event that it isn't appropriately showcased to expected clients.
- Everything you do to promote your company's products and services to potential customers is known as marketing. Market strategy is the plan you put together that details exactly how you intend to enter a new market and attract new customers.

- For example, Twitter, YouTube, and Pinterest have an informal organization advertising procedure that urges clients to post their substance on the destinations for nothing, assemble individual profile pages, contact their companions, and construct a local area. In these cases, the client turns out to be important for the advertising staff!

7. Organizational development

- Although numerous innovative endeavors are begun by one visionary individual, it is uncommon that one individual alone can grow a thought into a multi-million dollar organization. By and large, quick development organizations-particularly online business organizations-need representatives and a bunch of business methods. So, all organizations-new ones specifically-need an association to effectively execute their marketable strategies and procedures. Numerous internet business firms and numerous customary firms that endeavor an online business technique have fizzled in light of the fact that they did not have the hierarchical designs and strong social qualities needed to help new types of trade
- Companies that hope to grow and thrive need to have a plan for organizational development that describes how the company will organize the work that needs to be accomplished. Typically, work is divided into functional departments, such as production, marketing, shipping, finance and customer support. Jobs within these functional areas are defined, and then for particular job titles and responsibilities recruitment starts.
- Commonly, to start with, generalists who can play out different errands are recruited. As the organization develops, selecting turns out to be more particular. For example, at the start, a business may make them market administrator. In any case, following a few years of consistent development, that one advertising position might be separated into seven separate positions done by seven people.
- For example, eBay author Pierre Omidyar began an online closeout webpage, as indicated by certain sources, to help his sweetheart exchange Pez containers with different gatherers, however inside a couple of months the volume of business had far surpassed what he alone could deal with. So he started recruiting individuals with more business experience to assist. Before long the organization had numerous workers, divisions, and directors who were answerable for managing the different parts of the association.

8. Management team

- Arguably, the single most important element of a business model is the management team responsible for making the model work. A strong management team gives a model instant reliability to immediate market-specific knowledge, outside investors, and experience in implementing business plans. A strong management team may not be able to recover a weak business model, but the team should be able to change the model and redefine the business as it becomes necessary.
- Eventually, most companies get to the point of having several senior executives or managers. How skilled managers are, however, can be a source of competitive advantage or disadvantage. The challenge is to find people who have both the experience and the ability to apply that experience to new situations.
- To be able to identify good managers for a business start-up, first consider the kinds of experiences that would be helpful to a manager joining your company. What kind of technical background is desirable? What kind of supervisory experience is necessary? How many years in a particular function should be required? What job functions should be fulfilled first: marketing, production, finance, or operations? Especially in situations where financing will be needed to get a company off the ground, do prospective senior managers have experience and contacts for raising financing from outside investors ?

5.2 Major Business-To-Consumer (B2C) Business Models

- Business-to-consumer (B2C) e-commerce, in which online businesses seek to reach individual consumers, is the most well-known and familiar type of e-commerce. Table 5.2.1 illustrates the major business models utilized in the B2C arena.

Business Model	Variation	Examples	Description	Revenue Model
E-tailer	Virtual Merchant	Amazon iTunes Bluefly	Online version of retail store, where customers can shop at any hour of the day or night without leaving their home or office	Sales of goods
	Bricks-and-Clicks	Walmart.com Sears.com	Online distribution channel for a company that also has physical stores	Sales of goods

	Catalog Merchant	LLBean.com LillianVernon.com	Online version of direct mail catalog	Sales of goods
	Manufacturer Direct	Dell.com Mattel.com SonyStyle.com	Manufacturer uses online channel to sell direct to customer	Sales of goods
Community Provider		Facebook LinkedIn Twitter Pinteres	Sites where individuals with particular interests, hobbies, common experiences, or social networks can come together and "meet" online	Advertising, subscription, affiliate referral fees
Content Provider		WSJ.com CBSSports.com CNN.com ESPN.com Rhapsody.com	Information and entertainment providers such as newspapers, sports sites, and other online sources that offer customers up-to-date news and special interest how-to guidance and tips and/or information sales	Advertising, subscription fees, affiliate referral fees
Portal	Horizontal/ General	Yahoo AOL MSN Facebook	Offers an integrated package of content, content-search, and social network services: news, email, chat, music downloads, video streaming, calendars, etc. Seeks to be a user's home base	Advertising, subscription fees, transaction fees
	Vertical/ Specialized (Vortal)	Sailnet	Offers services and products to specialized marketplace	Advertising, subscription fees, transaction fees
	Search	Google Bing Ask.com	Focuses primarily on offering search services	Advertising, affiliate referral
Transaction Broker		E*Trade Expedia	Processors of online sales transactions, such as	Transaction fees

		Monster Travelocity Hotels.com Orbitz	stockbrokers and travel agents, that increase customers' productivity by helping them get things done faster and more cheaply
Market Creator		eBay Etsy Amazon Priceline	Businesses that use Internet technology to create markets that bring buyers and sellers together
Service Provider		VisaNow.com Carbonite RocketLawyer	Companies that make money by selling users a service, rather than a product

Table 5.2.1 : Major Business-To-Consumer (B2C) Business Models

5.3 Major Business-To-Business (B2B) Business Models

- The business-to-business (B2B) e-commerce, in which businesses sell to other businesses, is more than 10 times the size of B2C e-commerce, even though most of the public attention has focused on B2C.
- B2B e-commerce relies overwhelmingly on a technology called electronic data interchange (EDI) (U.S. Census Bureau, 2013). EDI is useful for one-to-one relationships between a single supplier and a single purchaser, and originally was designed for proprietary networks, although it is migrating rapidly to the Internet. Many firms have supplemented their EDI systems, however, with more powerful Internet technologies that can enable many-to-one and many-to-many market relationships where there are many suppliers selling to a single or small group of very large purchasers, or, in the case of independent exchanges, where there are many sellers and many buyers simultaneously in the marketplace. EDI is not designed for these types of relationships.

Business Model	Examples	Description	Revenue Model
1. NET MARKETPLACE			
E-distributor	Grainger.com Partstore.com	Single-firm online version of retail and wholesale store; supply maintenance, repair, operation goods; indirect inputs	Sales of goods

E-procurement	Ariba PerfectCommerce	Single firm creating digital markets where sellers and buyers transact for indirect inputs	Fees for market-making services, supply chain management, and fulfillment services
Exchange	OceanConnect	Independently owned vertical digital marketplace for direct inputs	Fees and commissions on transactions
Industry Consortium	Exostar Elemica	Industry-owned vertical digital market open to select suppliers	Fees and commissions on transactions
2. PRIVATE INDUSTRIAL NETWORK			
	Walmart Procter & Gamble	Company-owned network that coordinates supply chains with a limited set of partners	Cost absorbed by network owner and recovered through production and distribution efficiencies

Table 5.3.1 : Major business-to-business (B2B) business models

5.4 Part A : Short Answered Questions (2 Marks Each)

Q.1 List key elements of business model.

Ans. : Key element of a business model

1. Value proposition
2. Revenue model
3. Market opportunity
4. Competitive environment
5. Competitive advantage
6. Market strategy
7. Organizational department
8. Market opportunity

Q.2 Define : Advertising revenue model and subscription revenue model**Ans. : Advertising revenue model :**

In the advertising revenue model, a company which provide services, content, and/or products also provides a forum for advertisements by which generating revenue from advertisers.

Subscription revenue model :

In the subscription revenue model, a company that provides services or content takes a subscription fee in order to provide access to some or all of their content or services.

5.5 Part B : Long Answered Questions

1. *Explain any four key elements of business model in detail. (Refer section 5.1)*
2. *Explain B2C business model. (Refer section 5.2)*
3. *Explain B2B business model. (Refer section 5.3)*



SOLVED MODEL QUESTION PAPER

(As Per New Syllabus)

Electronic Commerce

Semester - VIII (IT) Professional Elective - V

Time : Three Hours]

[Maximum Marks : 100

Answer ALL Questions

PART - A

(10 × 2 = 20 Marks)

Q.1 *What is e-commerce ? (Refer section 1.1)*

Q.2 *Write a short note of line breakup HTML tag. (Refer section 1.3.2)*

Q.3 *What is the difference between an absolute links and a relative links ?
(Refer section 1.5.2)*

Q.4 *Describe following phases of system development life cycle
i. System analysis ii. System design*
(Refer sections 2.2.1 and 2.2.2)

Q.5 *What is testing ? (Refer section 2.2.4)*

Q.6 *What are different functionalities offered by web server ? (Refer section 2.4.2)*

Q.7 *Explain the role of laws and public policy in e-commerce. (Refer section 3.4.2)*

Q.8 *Define following terms.*

i. Virus (Refer section 3.2) ii. Encryption (Refer section 3.3)

Q.9 *Describe lead generation marketing in short. (Refer section 4.1.2.6)*

Q.10 *Define cookies with its use. (Refer section 4.2.2)*

PART - B

(5 × 13 = 65 Marks)

Q.11 a) *i. Give the difference between HTML element and the HTML attributes. Explain with an example. (Refer sections 1.3.3 and 1.3.4)* **[6]**

*ii. Explain the structure of the HTML document with an example.
(Refer section 1.3.1)* **[7]**

OR

b) *How we can use images, email address and buttons as a link in the HTML ? Write an HTML script for the same. (Refer section 1.6.3)* **[13]**

Q.12 a) *i. Explain HTML formatting elements with an example. (Refer section 1.5) [6]
ii. Explain how the web works. (Refer section 1.2) [7]*

OR

- b) Explain system design with proper diagram. What are different options available for building system ? (Refer sections 2.2.2 and 2.2.3) [13]

- Q.13 a)** i. Describe system analysis in detail.(Refer section 2.2.1) [6]
ii. Explain any four key elements of business model in detail. (Refer section 5.1) [7]

OR

- b) Explain B2C business model and B2B business model.
(Refer sections 5.2 and 5.3) [13]

- Q.14 a)** i. Explain management policies for e-commerce. (Refer section 3.4) [6]
ii. Explains the key dimensions with respect to customer's perspective as well as with respect to merchant's perspective. (Refer Table 3.1.1) [7]

OR

- b) Explain the key dimensions to e-commerce security. (Refer section 3.1) [13]

- Q.15 a)** i. Explain different types of location based marketing. (Refer section 4.5.1) [6]
ii. Explain search engine marketing in detail. (Refer section 4.1.2.1) [7]

OR

- b) Explain different types of display ad marketing. Also explain different steps for lead generation marketing. (Refer sections 4.1.4.1 and 4.1.2.5) [13]

PART - C

(1 × 15 = 15 Marks)

- Q.16 a)** Write an HTML script file which will use various form elements of HTML forms. Also use the links in that form. (Refer sections 1.6 and 1.9) [15]

OR

- b) i. Explain various traditional online marketing and advertising tools.
(Refer section 4.1.2) [8]
ii. Write down steps for creating the first HTML page. (Refer section 1.4) [7]



Notes

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