Name of Unit	Web Technologies
Course/Subject Name	Computer Application in Pharmacy
Course/Subject Code	BP205T
Semester	II
Course coordinator	Ramanjit Kaur
Mobile no	8968729307
Email id	ramanjitsaini98@yahoo.com

Learning Outcome of module 02

LO	Learning Outcome	Course Outcome Code
LO1	To understand different types of databases, applications of computers and databases in pharmacy.	BP205.2
LO2	To illustrate the concept of Number system in computer.	BP205.2
LO3	To make use of web technologies such as HTML, XML, CSS, Programming languages, web servers and pharmacy drug database.	BP205.2
LO4	To appraise the applications of computers in pharmacy such as drug information services, pharmacokinetics, mathematical model in drug design, hospital and clinical pharmacy.	BP205.2
LO5	To explain about bioinformatics and its impact in vaccine discovery. To elaborate the applications of computers for data analysis in preclinical development.	BP205.2

Content Table

Topic
• HTML • XML • CSS • Web Server • Server products • MY SQL • MS ACCESS • Pharmacy Drug database

WEB TECHNOLOGIES

The mechanism of communication between various computers through different languages and multimedia packages is known as web technology.

Examples of web technologies are:

- Mark-up languages like HTML,XML and HTTP
- Programming Languages and Technologies like Java, visual basic and Dot Net.
- Web servers and server technologies that assist in sharing common network for worldwide communication.
- Database which are used to store information on a computer network

INTRODUCTION TO HTML

HTML stands for Hyper Text Markup Language. It is used to design web pages using markup language. **HTML** is the combination of Hypertext and Markup language. Hypertext defines the link between the web pages. Markup language is used to define the text document within tag which defines the structure of web pages. This language is used to annotate (make notes for the computer) text so that a machine can understand it and manipulate text accordingly. Most of markup (e.g. **HTML**) languages are human readable. Language uses tags to define what manipulation has to be done on the text.

HTML is a markup language which is used by the browser to manipulate text, images and other content to display it in required format. **HTML** was created by Tim Berners-Lee in 1991. The first ever version of **HTML** was **HTML** 1.0 but the first standard version was HTML 2.0 which was published in 1999.**HTML** is the standard markup language for creating Web pages.

HTML VERSION	YEAR
HTML 1.0	1991
HTML 2.0	1995
HTML 3.2	1997
HTML 4.01	1999

HTML VERSION	YEAR
XHTML	2000
HTML 5	2014

HTML page structure:

The Basic structure of HTML page is given below. It contains some elements like head, title, body etc. These elements are used to build the blocks of web pages.

<DOCTYPE! html>: This tag is used to tells the HTML version. This currently tells that the version is HTML 5.

<html>: This is called HTML root element and used to wrap all the code.

<head>: Head tag contains metadata, title, page CSS etc. All the HTML elements that can be used inside the <head> element are:

- <style>
- <title>
- <base>
- <noscript>
- <script>
- <meta>
- <title>

<body>: Body tag is used to enclosed all the data which a web page has from texts to links. All of the content that you see rendered in the browser is contained within this element.

Example HTML Document

```
<DOCTYPE html>          → Tells version of HTML
 <html>                 → HTML Root element
 <head>                 → used to contain page HTML metadata
<title>Page Title</tite> → Title of HTML page
 </head>                → hold content of HTML
<body>
<h1>My First Heading</h1>  → A HTML Heading Tag
<p>My First paragraph </p>
</body>
</html>
```

- **HTML** is not a programming language.
- **HTML** is a markup language that works on mark-up tags.
- **HTML** is not case sensitive language
- **HTML** tags are elements surrounded by angle brackets.
- The end tag is written like start tag but it contains forward slash.

  Example : start tag is and end tag is

Features of HTML:

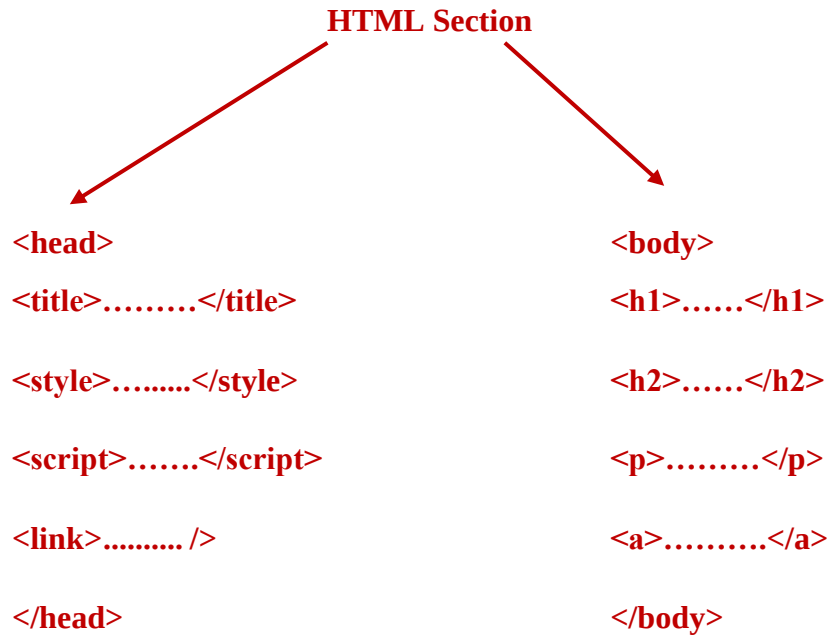
- It is easy to learn and easy to use.
- It is platform independent.
- Images, video and audio can be added to a web page.
- Hypertext can be added to text.
- It is a markup language.
- HTML is used to build a websites.
- It is supported by all browsers.
- It can be integrated with other languages like CSS, JavaScript etc.

Disadvantages of HTML

- HTML can create only static webpages so for dynamic web page other languageshave to be used.
- Large amount of code has to be written to create a simple web page.
- Security feature is not good.

HTML Headings

Heading are very important in HTML documents. They are defined with <h1> to<h6> tags.The most important heading is denoted as <h1> and least important is denoted as <h6



INTRODUCTION TO XML

XML refer to Extensible Markup language. It is another markup language like that HTML. The difference in the fact that in XML tags are not pre-defined and one has to define his own tags. This language is self-describing and user DTD (Document Type Definition) to describe its data.

What is XML

- **XML** stands for Extensible Markup Language
- **XML** is a markup language much like HTML
- **XML** was designed to store and transport data
- **XML** was designed to be self-descriptive
- Tags are added to the document to provide the extra information
- A markup language is used to provide information about a document

XML Simplifies Things

- It simplifies data sharing
- It simplifies data transport
- It simplifies platform changes
- It simplifies data availability

The Difference Between XML and HTML

XML and HTML were designed with different goals:

- XML was designed to describe data – with focus on what data is
- HTML was designed to display data – with focus on how data looks
- XML tags are not predefined like HTML tags are

The tags in the example above (like <to> and <from>) are not defined in anything XML standard. These tags are "invented" by the author of the XML document.

HTML works with predefined tags like <p>, <h1>, <table>, etc.

With XML, the author must define both the tags and the document structure.Therefore, we can say that the XML acts as a complement for HTML

Uses of XML

- It has become default format for many office productivity tools likeMicrosoft office.
- It is used to base language for communication protocols.
- It is also used to interchange data from one computer to another throughinternet.
- XML is used in web development
- XML stores data in plain text format. This provides a software- and hardware-independent way of storing, transporting, and sharing data.

Tags in XML

Tags in XML language can be expressed in three ways:

1. Start tag as <section>;
2. End tag as</section>;
3. Empty element tag as <line-break/>

Example of XML for a note containing simple reminder from Sam to Tom

```
<note>
<to>Tom</to>
<from>Sam</from>
<heading>Reminder</heading>
<body>Don't forget me this weekend</body>
</note>
```

Advantages of XML

1. XML is text based
    a. Takes up less space
    b. Can be transmitted efficiently
2. One XML document can be displayed differently in different media.
    a. HTML, Video, CD ,DVD
3. XML documents can modularized. Parts can be reused.

INTRODUCTION TO CSS

Cascading Style Sheets, fondly referred to as CSS, is a simply designed language intended to simplify the process of making web pages presentable. CSS allows you toapply styles to web pages. More importantly, CSS enables you to do this independent ofthe HTML that makes up each web page.

CSS is designed to enable the separation of presentation and content, including layout, colors, and fonts. This separation can improve content accessibility, provide more flexibility and control in the specification of presentation characteristics, enable multiple web pages to share formatting by specifying the relevant CSS in a separate. css file, and reduce complexity and repetition in the structural content.

Separation of formatting and content also makes it feasible to present the same markup page in different styles for different rendering methods, such as on-screen, in print, by voice (via speech-based browser or screen reader), and on Braille-based tactile devices. CSS also has rules for alternate formatting if the content is accessed on a mobile device.

CSS is easy to learn and understood but it provides powerfulcontrol over the presentation of an HTML document.

- **CSS saves time**: You can write CSS once and reuse same sheet in multiple HTMLpages.
- **Easy Maintainence:** To make a global change simply change the style, and allelements in all the webpages will be updated automatically.
- **Search Engines:** CSS is considered as clean coding technique, which means search engines won't have to struggle to "read" its content.

Superior styles to HTML : CSS has a much wider array of attributes than HTML, soyou can give a far better look to your HTML page in comparison to HTML attributes.

Offline Browsing : CSS can store web applications locally with the help of offlinecatche. Using of this we can view offline websites.

Uses of CSS: CSS is used to design various styles for different web pages. it canbe used to control the following elements:

1. Text color
2. Font style
3. Spacing between paragraphs
4. Layout and size of column
5. Background Images
6. Background colors
7. Layout design
8. Other effects

Example of CSS for center alignment and color change

```
<DOCTYPE html>
<html>
<head>
<style>Center{
    Text-align: center;
    Color: red;
}
</style>
</head>
<body>
<h1 class= “center”> Red and center aligned heading</h1>
<p class=”center”>Red and center-aligned paragraph</p>
</body>
</html>
```

Advantages of CSS

- These sheets save lot of time and work as they can control layout of multipleweb pages.
- CSS helps load web pages faster as you need not write HTML tag attributesevery time.
- CSS is easy to maintain. If you change the style, all other elements will beautomatically updated.
- CSS provides superior styles as compared to simple HTML.

INTRODUCTION TO PROGRAMMING LANGUAGES

Programming Language refer to set of instructions that are provided to the computer to describe computations and generate executable programs . A programming language is a notational system for describing computation in a machine-readable and human-readable form. A programming language is a tool for developing executable models for a class of problem domains. A programming language is a set of rules for communicating an algorithm A programming language is a set of rules that provides a way of telling acomputer what operations to perform.

Each programming language has a different set of syntax rules. The grammatical rules are called syntax. A programming language also has words, symbols and rules of grammar. English is a natural language. It has words, symbols and grammatical rules.

Programming languages have evolved over time as better ways have been developed to design them. First programming languages were developed in the 1950s. Since then thousands of languages have been developed. Different programming languages are designed for different types of programs.

Characteristics of Programming Language

- This Language is Independent of Computer system instead of being machineoriented it should be more oriented towards the given problem to be solved.
- Each Instructions of Programming language should get converted intomachine language instruction.
- This language should be easy to understand and should use words that areused in everyday communication.
- This language should be written using common words and mathematicalsymbols.

Generations of Programming Language

- First Generation Languages
- Second Generation Languages
- Third Generation Languages
- Fourth Generation Languages
- Fifth Generation Languages

FIRST GENERATION LANGUAGES

Machine language

Machine language is the lowest and most elementary level of programming language and was the first type of programming language to be developed. Machine language is basicallythe only language that a computer can understand.

Advantages of Machine language

- Machine language makes fast and efficient use of the computer.
- It requires no translator to translate the code. It is directly understood by thecomputer.

Disadvantages of Machine language

- All operation codes have to be remembered
- All memory addresses have to be remembered.
- It is hard to amend or find errors in a program written in the machine language.

SECOND GENERATION LANGUAGESASSEMBLY LANGUAGES

- Symbolic operation codes replaced binary operation codes.
- Assembly language programs needed to be “assembled” for execution by thecomputer.
- Each assembly language instruction is translated into one machine languageinstruction.
- Very efficient code and easier to write.

Advantages and Disadvantages of Assembly language

Advantages	Disadvantages
Assembly language is easier to understand and use as compared tomachine language.	Like machine language, it is also machine dependent/specific.
It is easy to locate and correct errors.	Since it is machine dependent, the programmer also needs to understand the hardware.
It is easily modified.	

THIRD GENERATION LANGUAGE OR HIGH-LEVEL LANGUAGE

High-level computer languages use formats that are similar to English. The purpose of developing high-level languages was to enable people to write programs easily, in theirown native language environment (English).

High-level languages are basically symbolic languages that use English words and/or mathematical symbols rather than mnemonic codes. Each instruction in the high-level language is translated into many machine language instructions that the computer canunderstand.

Advantages	Disadvantages
High-level languages are user-friendly	A high-level language has to be translated into the machine language by a translator, which takes up time
They are similar to English and use English vocabulary and well-known symbols	The object code generated by a translator might be inefficient compared to an equivalent assembly language program
They are easier to learn	
They are easier to maintain	

FOURTH GENERATION LANGUAGES

Fourth generations computer were much faster than the older **generations**. Graphics User Interface (GUI) technology was exploited to offer more comfort to users. PCs became more affordable and widespread during this period. Less repairement time and maintenance cost.

Advantages Fourth Generation of Computer

- They were developed for totally general purpose use (general-purpose computers).
- Smaller in size and much reliable than other generations of computer.
- The heat generation was negligible.
- No cooling system required in many cases of the fourth-generation computer.
- Portable and cheaper than the older versions.
- Fourth generations computer were much faster than the older generations.
- Graphics User Interface (GUI) technology was exploited to offer more comfort to users. PCs became more affordable and widespread during this period.
- Less repairement time and maintenance cost.
- They were developed for commercial production as well.
- All types of High-level languages can be used in this type of computers

Disadvantages of the Fourth Generation of Computer

- The very advanced technology was required to fabricate to the ICs (IntegratedCircuits).
- High quality and reliable system or technology can only make the ICs.
- Cooler is required (Fan)
- The latest technology is required for the manufacturing of Microprocessors.

FIFTH GENERATION LANGUAGES

The fifth generation is essentially about a new super-breed of computers. These computers will be able to think and take decisions. Artificial Intelligence is being built into the computer. The revolutionary parallel processing is being used in the new breed of computers in place of conventional Von Neumann architecture.

Advantages of Fifth Generation of Computer:

- These computers are much faster than other generation computers.
- It is easier to repair these computers.
- These computers are much smaller in size than other generation computers
- They are portable and easy to handle.
- Development of true artificial intelligence.
- Advancement in Parallel Processing.
- Advancement in Superconductor technology.

Disadvantages of Fifth Generatin of Computer:

- They tend to be sophisticated and complex tools.
- They can give more power to companies to watch what you are doing and even allow themto infect your computer.

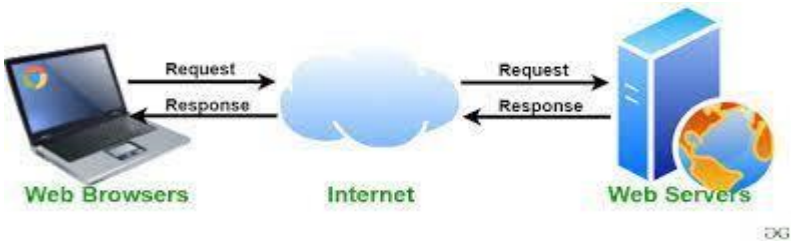
INTRODUCTION TO WEB SERVERS AND SERVER PRODUCTS

Web server is a computer where the web content is stored. Basically web server is used tohost the web sites but there exists other web servers also such as gaming, storage, FTP, email etc.

Web Server Working

Web server respond to the client request in either of the following two ways:

- Sending the file to the client associated with the requested URL.
- Generating response by invoking a script and communicating with database



Key Points

- When client sends request for a web page, the web server search for the requested page if requested page is found then it will send it to client with an HTTP response.
- If the requested web page is not found, web server will the send an HTTP response
- If client has requested for some other resources then the web server will contact to the application server and data store to construct the HTTP response.

INTRODUCTION TO DATABASES

Database refers to a collection of electronic records that could be processed to produce useful information. A database is an organized collection of data, generally stored and accessed electronically from a computer system. Where databases are more complex they are often developed using formal design and modeling techniques. The data can be accessed, modified, managed, controlled and organized to perform various data- processing operations.

Application of DBMS

Sector	Use of DBMS
Banking	For customer information, account activities, payments, deposits, loans,etc.
Airlines	For reservations and schedule information.
Universities	For student information, course registrations, colleges and grades.
Telecommunication	It helps to keep call records, monthly bills, maintaining balances, etc.
Finance	For storing information about stock, sales, and purchases of financial instruments like stocks and bonds.
Sales	Use for storing customer, product & sales information.
Manufacturing	It is used for the management of supply chain and for tracking production of items. Inventories status in warehouses.
HR Management	For information about employees, salaries, payroll, deduction, generation of paychecks, etc

Introduction to MYSQL

MySQL is a fast, easy-to-use RDBMS being used for many small and big businesses. MySQL is developed, marketed and supported by MySQL AB, which is a Swedish company. MySQL is becoming so popular because of many good reasons −

- MySQL is released under an open-source license. So you have nothing to pay touse it.
- MySQL is a very powerful program in its own right. It handles a large subset of the functionality of the most expensive and powerful database packages.
- MySQL uses a standard form of the well-known SQL data language.
- MySQL works on many operating systems and with many languages including PHP, PERL, C,

C++, JAVA, etc.

- MySQL works very quickly and works well even with large data sets.
- MySQL is very friendly to PHP, the most appreciated language for webdevelopment
- MySQL supports large databases, up to 50 million rows or more in a table. The default file size limit for a table is 4GB, but you can increase this (if your operatingsystem can handle it) to a theoretical limit of 8 million terabytes (TB).
- MySQL is customizable. The open-source GPL license allows programmers to modify the MySQL software to fit their own specific environments.

MS Access Database:

Microsoft Access is a database management system from Microsoft that combines the relational Microsoft Jet Database Engine with a graphical user interface and software- development tools. It is a member of the Microsoft Office suite of applications, included in the Professional and higher editions or sold separately.

Database objects are the main players in an Access database. Altogether, we have six different types of database objects. From these we'll use Table to create database Tables store information. Tables are the heart of any database, and you can create as many tables as you need to store different types of information. A fitness database could track your daily running log, your inventory of exercise equipment, and the number of high- protein whey milkshakes you down each day, as three separate tables.

Important point to remember

You can customize a table in two ways:

- Design view lets you precisely define all aspects of a table before you start using it.
- Datasheet view is where you enter data into a table. Datasheet view also lets youbuild a table on the fly as you insert new information.

Pharmacy Drug Databases

Drug databases and web resources play a very important role in the pharmaceutical field.

Check out this lesson to learn all about these databases and resources and how they canbenefit a pharmacist.

Drug databases are sites where information about drugs and medications are stored, andone of the largest (and most commonly used) drug databases is compiled by the Food & Drug

Administration (FDA). The FDA is a federal agency that oversees and controls all medications in the U.S., which includes:

- Over-the-counter (OTC) medications
- Prescription medications
- Dietary supplements
- Vaccines

The FDA drug database includes most of the drugs they have approved in the U.S. since1939. Best of all, this database is extremely easy to use. To search this database, you simply need to go to the FDA drug databases website. Once you get to this website, you are able to search the database by typing in the name of the drug or by typing in any activeingredient of a drug.

Additionally, the FDA drug database can be used to search drugs that are currently going through clinical trials and/or the approval process. The FDA must approve a drug before it is legally able to be sold and used in the U.S. Therefore, drug companies must formally submit an application to the FDA for the drug to be approved. The drugs that havenot been submitted to the FDA but not yet approved can be found in this database.

QUESTIONS(2MARKS) MULTIPLE CHOICE QUESTIONS

1. HTML is a……..
   a. Programming language
   b. Computer Language
   c. Markup language
   d. Database language

   Ans. c
2. HTML is a case sensitive language.
   a. True
   b. False
   c. None
   d. Depends

   Ans. b

3. End tag in HTML contains-
   a. Semi colon
   b. Back Slash
   c. Forward slash
   d. Hyphen

   Ans. c

4. XML was designed to .....data
   a. Describe
   b. Display
   c. Write
   d. Mention

   Ans. a

5. is used to deign various styles for different web pages.
   a. VB
   b. C++
   c. CSS
   d. C+

   Ans.c

6. A web server is a..... that uses HTTP to serve the required files to the user.
   a. Server
   b. Computer
   c. Program
   d. System

   Ans.c

7. Most popular web server in the world that can be installed on almost all operating system.
   a. IIS
   b. Apache
   c. NGINX
   d. Other

   Ans.b

8. MySQL is written in
   a. VB
   b. XML
   c. HTML
   d. C and C++

   Ans.d

SHORT ANSWER QUESTIONS (5 MARKS)

1. What are the advantages of using XML in computer?
2. What is CSS and what are its advantages?
3. What are the advantages and disadvantages of using high level languages?
4. What is the purpose of pharmacy drug database?
5. What are the advantages and disadvantages of machine language?

LONG ANSWER QUESTIONS (10 MARKS)

1. Differentiate between HTML and XML.
2. Briefly provide an introduction to different programming languages.
3. Describe web server and server products.