SRINIVAS UNIVERSITY

CITY CAMPUS PANDESHWAR
MANGALURU- 575001.

INSTITUTE OF COMPUTER SCIENCE & INFORMATION SCIENCE

BACKGROUND STUDY MATERIAL

LAMP TECHNOLOGY

V SEMESTER B.C.A

Compiled by
Faculty

Paper : 20BCASD51/	**LAMP Technology/ LAMP SERVER**	**Hours:** 40 **IA :** 50

20BCAAI51, 20BCANT51 **Theory/Week:**4 Hours **Credits:**4		**Exam:** 50
Unit - I		**8hrs**
Linux Operating System: Linux Operating System Concepts and Architecture; Overview of the Linux Kernel, User Space, Kernel Space; Processes and Daemons, Process Control; **Overview of Linux Administration**; Linux File system, User, Group and Resource Management; File system Permissions, Access Permissions and Security, **Apache web Server:** Introduction, MIME types and CGI Files, Global Environment, Authentication and log files, PHP and the web server Architecture model, Overview of PHP capabilities, CGI vs. Shared Object Model.		
Unit – II		**8hrs**
MYSQL: Introduction**,** MySQL Administration; Commands – Show database, create database, Use command, describe command, Insert command, Select command, Update command, delete command, Creating databases; Defining tables and column ; Entering Data; Understanding the datatype, Using Auto increment. **PHP:** Introduction**,** PHP syntax overview, Commenting in PHP code, Benefits of PHP, Combining HTML and PHP, PHP – Variables; Variables naming, Local variables, Function parameters, Global variables, Static variables, Constants.		
Unit – III		**8hrs**
Fundamentals of PHP: Data types, and Operators; Decision making: if, else, elseif, switch statements, Flow control and loops types: while, do while, for, foreach, breaking out of loop, the continue statement. creating **PHP Date function, Arrays and Strings** Date functions, Arrays and variable handling functions, arrays, Numerically indexed array, Associative array, and multidimensional arrays, array functions, Strings and strings operations and functions,.		
Unit – IV		**8hrs**
Working with form: Using HTML Forms, PHP – GET and POST methods, The $_Request variable, Creating a dynamic HTML Form with PHP, PHP file Inclusion Include(), require(). **PHP Function:** Creating PHP function, PHP function with parameters, Sessions- Starting php session, destroying session, Cookies- Setting cookies, accessing cookies, Sending emails, File Upload.		
Unit – V		**8hrs**
PHP and MySQL: Areas where PHP and MySQL are used together, Connecting to a		

MySQL Database, Closing Database connection, Create MySQL Database Using PHP, Selecting a Database, Creating Database Tables, Delete MySQL Database Using PHP. **Accessing MySQL database from web with PHP :** Querying the database, Retrieving

the query results, Insert Data to MySQL Database, Retrieving Data from MySQL Database, Updating Data to MySQL Database, Deleting Data from MySQL Database, Disconnecting from the database.
Text Books
Lee , **Open Source Development with LAMP : Using Linux, Apache, MySQL, Perl and PHP**, Pearson Education, 2006
Timothy Boronczyk, et al, **Beginning PHP6, Apache, MySQL Web Development**, Wiley India Pvt Ltd,2009
Julie C Meloni, **Teach Yourself PHP, MySQL and Apache All-in-One**, SAMS, 2008
Reference Books
W. Jason Gilmore, **Beginning PHP and MySQL: From Novice to Professional**, 4th Edition, Apress, 2010
Aleksa Vukotic, James Goodwill, **Apache Tomcat 7**, Apress, 2011
Richard Petersen, **Linux Complete Reference, 6th Edition,** Tata McGraw Hill Education Private Limited

TEACHING PLAN

UNIT- 1 8 hrs. Session 1 Linux Operating System Concepts and Architecture

Session 2. Overview of the Linux Kernel; User Space, Kernel Space; Processes and Daemons, Process Control

Session 3 Linux File system

Session 4 File system Permissions, Access Permissions and Security

Session 5 MIME types and CGI Files,

Session 6 Global Environment, Authentication and log files

Session 7 PHP and the web server Architecture model

Session 8 CGI vs. Shared Object Model.

UNIT-2 8 hrs. Session 9 Introduction

Session 10 MySQL Administration; Commands

Session 11 Creating databases; Defining tables and column ; Entering Data;

Session 12 Understanding the datatype, Using Auto Increment

Session 13 PHP syntax overview

Session 14 Benefits of PHP, commenting in php.

Session 15 Combining HTML and PHP

Session 16 Variables, scope of variables, constants.

UNIT-3 8 hrs. Session 17 Datatypes in PHP

Session 18 Operators- Assignment, logical, Arithmetic.

Session 19 Decision making : if, else, elseif, switch statements

Session 20 Flow control and loops types: while, do while, for, foreach, breaking out of loop, the continue statement.

Session 21 Date function

Session 22 Arrays and variable handling functions

Session 23 Numerical, Associative and multidimensional arrays

Session 24 Strings and String functions

UNIT-4 8 hrs. Session 25 Using HTML Forms

Session 26 PHP – GET and POST methods, The $_Request

variable Session 27 Creating a dynamic HTML Form with PHP

Session 28 PHP file Inclusion- Include(), require().

Session 29 Creating PHP function, PHP function with parameters

Session 30 Sessions- Starting php session, destroying session

Session 31 Cookies- Setting cookies, accessing cookies

Session 32 Sending emails, File Upload.

UNIT-5 8hrs Session 33 Areas where PHP and MySQL are used together

Session 34 Connecting to a MySQL Database, Closing Database connection

Session 35 Create MySQL Database Using PHP, Selecting a Database

Session 36 Creating Database Tables, Delete MySQL Database Using PHP

Session 37 Querying the database, Retrieving the query results

Session 38 Insert Data to MySQL Database, Retrieving Data from MySQL Database

Session 39 Updating Data to MySQL Database

Session 40 Deleting Data from MySQL Database, Disconnecting from the database.

CONTENT

UNIT I

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Linux Operating System Concepts and Architecture
Overview of the Linux Kernel
User Space, Kernel Space
Processes and Daemons
Process Control
Overview of Linux Administration
Linux File system
User, Group and Resource Management

File system Permissions
Access Permissions and Security

2.Apache web Server:

Introduction
MIME types and CGI Files
Global Environment
Authentication and log files
PHP and the web server Architecture model
Overview of PHP capabilities
CGI vs. Shared Object Model.

UNIT II

3.MYSQL:

Introduction
MySQL Administration
Commands – Show database, create database, Use command, describe command. Insert command, Select command, Update command, delete command. Creating databases.
Defining tables and column
Entering Data.
Understanding the datatype.
Using Auto Increment.

4. PHP:

Introduction.
PHP syntax overview.
Commenting in PHP code.
Benefits of PHP.
Combining HTML and PHP.
PHP – Variables; Variables naming.
Local variables, Function parameters, Global variables, Static variables.
Constants

UNIT III

5.Fundamentals of PHP:

Data Types, and Operators.
Decision making: if, else, elseif, switch
statements. Flow control and loops types
while, do while, for, foreach.
breaking out of the loop, the continue statement.

6.PHP Date function, Arrays and Strings

Date functions
Arrays and variable handling functions
arrays Numerically indexed array
Associative array.
Multidimensional arrays
Array functions.
Strings and strings operations and functions,.

UNIT IV

7.Working with form:

Using HTML Forms
PHP – GET and POST methods
The $_Request variable
Creating a dynamic HTML Form with PHP
PHP file Inclusion- Include(), require().

8.PHP Function:

Creating PHP function
PHP function with parameters
Sessions- Starting php session, destroying session. Cookies- Setting cookies, accessing cookies. Sending email.
File Upload.

UNIT V

9.PHP and MySQL:

Areas where PHP and MySQL are used together Connecting to a MySQL Database.
Closing Database connection.
Create MySQL Database Using PHP
Selecting a Database
Creating Database Tables
Delete MySQL Database Using PHP.

10. Accessing MySQL database from web with PHP :

Querying the database
Retrieving the query results
Insert Data to MySQL Database,
Retrieving Data from MySQL Database,
Updating Data to MySQL Database
Deleting Data from MySQL Database
Disconnecting from the database.

UNIT I
CHAPTER 1
LINUX OPERATING SYSTEM

1.1 Linux Operating System Concepts and Architecture

The Linux kernel is composed of five main subsystems that communicate using procedure calls. The architecture of the kernel is one of the reasons that Linux has been successfully adopted by many users. In particular, the Linux kernel architecture was designed to support a large number of volunteer developers. Further, the subsystems that are most likely to need enhancements were architected to easily support extensibility.

Figure 1.1: *Decomposition of Linux System into Major Subsystems*

The Linux operating system is composed of four major subsystems:

1. User Applications -- the set of applications in use on a particular Linux system will be different depending on what the computer system is used for, but typical examples include a word-processing application and a web-browser.

2. O/S Services -- these are services that are typically considered part of the operating system (a windowing system, command shell, etc.); also, the programming interface to the kernel (compiler tool and library) is included in this subsystem.

3. Linux Kernel -- this is the main area of interest in this paper; the kernel abstracts and mediates access to the hardware resources, including the CPU.

4. Hardware Controllers -- this subsystem is comprised of all the possible physical devices in a Linux installation; for example, the CPU, memory hardware, hard disks, and network hardware are all members of this subsystem

1.2 **Overview of the Linux Kernel**

The Linux kernel is composed of five main subsystems:

1. The Process Scheduler (SCHED) is responsible for controlling process access to the CPU. The scheduler enforces a policy that ensures that processes will have fair access to the CPU, while ensuring that necessary hardware actions are performed by the kernel on time. 2. The Memory Manager (MM) permits multiple processes to securely share the machine's main memory system. In addition, the memory manager supports virtual memory that allows Linux to support processes that use more memory than is available in the system. Unused

memory is swapped out to persistent storage using the file system then swapped back in when it is needed.

3. The Virtual File System (VFS) abstracts the details of the variety of hardware devices by presenting a common file interface to all devices. In addition, the VFS supports several file system formats that are compatible with other operating systems.

4. The Network Interface (NET) provides access to several networking standards and a variety of network hardware.

5. The Inter-Process Communication (IPC) subsystem supports several mechanisms for process-to-process communication on a single Linux system.

1.3 **User space and Kernel space**

System memory in Linux can be divided into two distinct regions: *kernel space* and *user space*. Kernel space is where the *kernel* (i.e., the core of the operating system) *executes* (i.e., runs) and provides its *services*. User space is that set of memory locations in which *user processes* (i.e., everything other than the kernel) run.

Memory consists of *RAM* (random access memory) cells, whose contents can be *accessed* (i.e.,

read and written to) at extremely high speeds but are retained only temporarily (i.e., while in use or, at most, while the power supply remains on). Its purpose is to hold programs and data that are currently in use and thereby serve as a high speed intermediary between the CPU (central processing unit) and the much slower *storage*, which most commonly consists of one or more hard disk drives (HDDs).

A *process* is an executing instance of a program. One of the roles of the kernel is to manage individual user processes within this space and to prevent them from interfering with each other.

Kernel space can be accessed by user processes only through the use of *system calls*. System calls are requests in a Unix-like operating system by an *active process* for a service performed by the kernel, such as *input/output* (I/O) or process creation. An active process is a process that is currently progressing in the CPU, as contrasted with a process that is waiting for its next turn in the CPU. I/O is any program, operation or device that transfers data to or from a CPU and to or from a peripheral device (such as disk drives, keyboards, mice and printers).

1.4 **Processes and Demons**

A ***process*** is an *executing* (i.e., running) instance of a *program*. Processes are also frequently referred to as *tasks*.

A program is an *executable file* that is held in *storage*. Storage refers to devices or media that can retain data for relatively long periods of time (e.g., years or even decades), such as hard disk drives (HDDs), optical disks and magnetic tape. This contrasts with *memory*, whose contents can be accessed (i.e., read and written to) at extremely high speeds but which are retained only temporarily (i.e., while in use or only as long as the power supply remains on).

A program is a passive entity until it is launched, and a process can be thought of as a program in action. Processes are dynamic entities in that they are constantly changing as their machine code instructions are executed by the CPU. Each process consists of (1) *system resources* that are allocated to it, (2) a section of memory, (3) security attributes (such as its *owner* and its set of *permissions*) and (4) the processor *state*.

An alternative definition of a process is the execution *context* of a running program, i.e., all of the activity in the current *time slot* in the CPU. A time slot, also called a *time slice* or a *quantum*, is the length of time that each process is permitted to run in the CPU until it is *preempted* (i.e., replaced) by another process in a *time sharing* operating system.

A ***daemon*** is a type of program on Unix-like operating systems that runs unobtrusively in the background, rather than under the direct control of a user, waiting to be activated by the occurrence of a specific event or condition.

Unix-like systems typically run numerous daemons, mainly to accommodate requests for services from other computers on a network, but also to respond to other programs and to hardware activity. Examples of actions or conditions that can trigger daemons into activity are a specific time or date, passage of a specified time interval, a file landing in a particular directory, receipt of an e-mail or a Web request made through a particular communication line. It is not necessary that the perpetrator of the action or condition be aware that a daemon is *listening*, although programs frequently will perform an action only because they are aware that they will implicitly arouse a daemon.

Daemons are usually instantiated as *processes*. A process is an *executing* (i.e., running) instance of a program. Processes are managed by the *kernel* (i.e., the core of the operating system), which assigns each a unique *process identification number* (PID). There are three basic types of processes in Linux: interactive, batch and daemon. Interactive processes are run interactively by a user at the *command line* (i.e., all-text mode). Batch processes are submitted from a queue of processes and are not associated with the command line; they are well suited for performing recurring tasks when system usage is otherwise low. Daemons are recognized by the system as any processes whose *parent process* has a PID of one, which always represents the process *init*. init is always the first process that is started when a Linux

computer is *booted up* (i.e., started), and it remains on the system until the computer is turned off. init *adopts* any process whose *parent* process *dies* (i.e., terminates) without waiting for the *child* process's status. Thus, the common method for launching a daemon involves *forking* (i.e., dividing) once or twice, and making the parent (and grandparent) processes die while the child (or grandchild) process begins performing its normal function.

Some daemons are launched via *System V init scripts*, which are *scripts* (i.e., short programs) that are run automatically when the system is booting up. They may either survive for the duration of the session or be regenerated at intervals. Many daemons are now started only as required and by a single daemon, *xinetd* (which has replaced *inetd* in newer systems), rather than running continuously. xinetd, which is referred to as a *TCP/IP super server*, itself is started at boot time, and it listens to the *ports* assigned to the processes listed in the */etc/inetd.conf* or in */etc/xinetd.conf* configuration file. Examples of daemons that it starts include *crond* (which runs scheduled tasks), *ftpd* (file transfer), *lpd* (laser printing), *rlogind* (remote login), *rshd* (remote command execution) and *telnetd* (telnet). In addition to being launched by the operating system and by application programs, some daemons can also be started manually. Examples of commands that launch daemons include *binlogd* (which logs binary events to specified files), *mysqld* (the MySQL databse server) and *apache* (the Apache web server). In many Unix-like operating systems, including Linux, each daemon has a single *script* (i.e., short program) with which it can be terminated, restarted or have its status checked. The handling of these scripts is based on *runlevels*. A runlevel is a configuration or operating state of the system that only allows certain selected processes to exist. Booting into a different runlevel can help solve certain problems, including repairing system errors. The term *daemon* is derived from the daemons of Greek mythology, which were supernatural beings that ranked between gods and mortals and which possessed special knowledge and power[1]. For example, Socrates claimed to have a daemon that gave him warnings and advice but never coerced him into following it. He also claimed that his daemon exhibited greater accuracy than any of the forms of divination practiced at the time.

The word *daemon* was first used in a computer context at the pioneering Project MAC (which later became the MIT Laboratory for Computer Science) using the IBM 7094 in 1963. This

usage was inspired by Maxwell's daemon of physics and thermodynamics, which was an imaginary agent that helped sort molecules of different speeds and worked tirelessly in the background. The term was then used to describe background processes which worked tirelessly to perform system chores. The first computer daemon was a program that automatically made tape backups. After the term was adopted for computer use, it was rationalized as an acronym for *Disk And Execution MONitor*.

1.5 **Process Control**

Under Linux, the *ptrace* system call is supported for process control, and it works as in 4.3BSD. To obtain process and system information, Linux also provides a */proc* filesystem, but with very different semantics. Under Linux, */proc* consists of a number of files providing general system information, such as memory usage, load average, loaded module statistics, and network statistics. These files are generally accessed using *read* and *write* and their contents can be parsed using *scanf*. The */proc* filesystem under Linux also provides a directory entry for each running process, named by process ID, which contains file entries for information such as the command line, links to the current working directory and executable file, open file descriptors, and so forth. The kernel provides all of this information on the fly in response to *read* requests. This implementation is not unlike the */proc* filesystem found in Plan 9, but it does have its drawbacks--for example, for a tool such as *ps* to list a table of information on all running processes, many directories must be traversed and many files opened and read. By comparison, the *kvm* routines used on other UNIX systems read kernel data structures directly with only a few system calls. Obviously, each implementation is so

vastly different that porting applications which use them can prove to be a real task. It should be pointed out that the SVR4 */proc* filesystem is a very different beast than that found in Linux, and they may not be used in the same context. Arguably, any program which uses the *kvm* routines or SVR4 */proc* filesystem is not really portable, and those sections of code should be rewritten for each operating system.

Overview of Linux Administration

2.1 **Linux File system**

General A simple description of the UNIX system, also applicable to Linux, is this: "On a UNIX system, everything is a file; if something is not a file, it is a process." This statement is true because there are special files that are more than just files (named pipes and sockets, for instance), but to keep things simple, saying that everything is a file is an acceptable generalization. A Linux system, just like UNIX, makes no difference between a file and a directory, since a directory is just a file containing names of other files. Programs, services, texts, images, and so forth, are all files. Input and output devices, and generally all devices, are considered to be files, according to the system. In order to manage all those files in an orderly fashion, man likes to think of them in an ordered tree-like structure on the hard disk, as we know from MS-DOS (Disk Operating System) for instance. The large branches contain more branches, and the branches at the end contain the tree's leaves or normal files. For now we will use this image of the tree, but we will find out later why this is not a fully accurate image. Sorts of files Most files are just files, called *regular* files; they contain normal data, for example text files, executable files or programs, input for or output from a program and so on. While it is reasonably safe to suppose that everything you encounter on a Linux system is a file, there are some exceptions.

- *Directories*: files that are lists of other files.

- *Special files*: the mechanism used for input and output. Most special files are in /dev. • *Links*: a system to make a file or directory visible in multiple parts of the system's file tree.

• *(Domain) sockets*: a special file type, similar to TCP/IP sockets, providing inter process networking protected by the file system's access control.

• *Named pipes*: act more or less like sockets and form a way for processes to communicate with each other, without using network socket semantics.

As a user, you only need to deal directly with plain files, executable files, directories and links. The special file types are there for making your system do what you demand from it and are dealt with by system administrators and programmers.

For convenience, the Linux file system

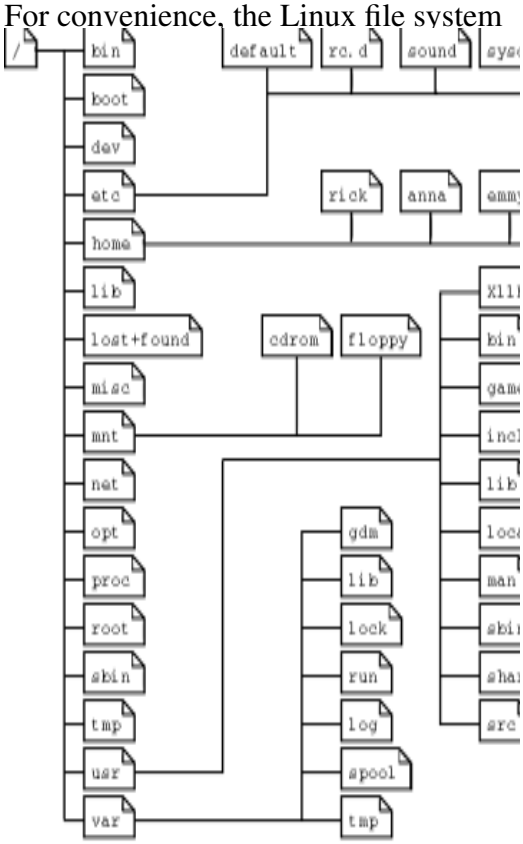


Figure 2-1. Linux file system layout

This is a layout from a RedHat system. Depending on the system admin, the operating system and the mission of the UNIX machine, the structure may vary, and directories may be left out or added at will. The names are not even required; they are only a convention. The tree of the file system starts at the trunk or *slash*, indicated by a forward slash (/). This directory, containing all underlying directories and files, is also called the *root directory* or "the root" of the file system. Directories that are only one level below the root directory are often preceded by a slash, to indicate their position and prevent confusion with other directories that could have the same name. When starting with a new system, it is always a good idea to take a look in the root directory. Let's see what you could run into:

DIRECTORY	C
/bin	Common programs, shared by the users.
/boot	The startup files and the kernel, grub data. Grub is the GRand U rid of the many different boot-loa

DIRECTORY	CONTENT
/dev	Contains references to all the CPU peripheral hardware, which are represented as files with special properties.
/etc	Most important system configuration files are in /etc, this directory contains data similar to those in the Control Panel in Windows
/home	Home directories of the common users.

/initrd	(on some distributions) Information for booting. Do not remove!
/lib	Library files, includes files for all kinds of programs needed by the system and the users.
/lost+found	Every partition has a lost+found in its upper directory. Files that were saved during failures are here.
/misc	For miscellaneous purposes.
/mnt	Standard mount point for external file systems, e.g. a CD-ROM or a digital camera.
/net	Standard mount point for entire remote file systems
/opt	Typically contains extra and third party software.
/proc	A virtual file system containing information about system resources. More information about the meaning of the files in proc is obtained by entering the command **man proc** in a terminal window. The file proc.txt discusses the virtual file system in detail.
/root	The administrative user's home directory. Mind the difference between /, the root directory and /root, the home directory of the *root* user.
/sbin	Programs for use by the system and the system administrator.
/tmp	Temporary space for use by the system, cleaned upon reboot, so don't use this for saving any work!
/usr	Programs, libraries, documentation etc. for all user-related programs.
/var	Storage for all variable files and temporary files created by users, such as log files, the mail queue, the print spooler area, space for temporary storage of files downloaded from the Internet, or to keep an image of a CD before burning it.

Table 2-1. Subdirectories of the root directory

User Group and Resource Management

A *user* is anyone who uses a computer. In this case, we are describing the names which represent those users. It may be Mary or Bill, and they may use the names Dragonlady or Pirate in place of their real name. All that matters is that the computer has a name for each account it creates, and it is this name by which a person gains access to use the computer. Some system services also run using restricted or privileged user accounts.

Managing users is done for the purpose of security by limiting access in certain specific ways. The superuser (root) has complete access to the operating system and its configuration; it is intended for administrative use only. Unprivileged users can use the su and sudo programs for controlled privilege escalation. Any individual may have more than one account, as long as they use a different name for each account they create. Further, there are some reserved names which may not be used such as "root". Users may be grouped together into a "group", and users may be added to an existing group to utilize the privileged access it grants. Linux/Unix

operating systems have the ability to multitask in a manner similar to other operating systems. However, Linux's major difference from other operating systems is its ability to have multiple users. Linux was designed to allow more than one user access to the system at the same time. In order for this multiuser design to work properly, there needs to be a method to protect users from each other. This is where permissions come in to play.

File system Permissions

Read, Write & Execute Permissions

Permissions are the "rights" to act on a file or directory. The basic rights are read, write, and execute. Read - A readable permission allows the contents of the file to be viewed. A read permission on a directory allows you to list the contents of a directory. Write - A write permission on a file allows you to modify the contents of that file. For a directory, the write permission allows you to edit the contents of a directory (e.g. add/delete files). Execute - For a file the executable permission allows you to run the file and execute a program or script. For a directory, the execute permission allows you to change to a different directory and make it your current working directory. Users usually have a default group, but they may belong to

several additional groups.

Viewing File Permissions
To view the permissions on a file or directory, issue the command ls -l <directory/file>. Remember to replace the information in the **< >** with the actual file or directory name. Below is sample output for the ls command: -rw-r--r-- 1 root root 1031 Nov 18 09:22 /etc/passwd

The first ten characters show the access permissions. The first dash (-) indicates the type of file (d for directory, s for special file, and - for a regular file). The next three characters (**rw-**) define the owner's permission to the file. In this example, the file owner has read and write permissions only. The next three characters (**r--**) are the permissions for the members of the same group as the file owner (which in this example is read only). The last three characters (**r--**) show the permissions for all other users and in this example it is read only.

Access permissions and security
The Unix operating system (and likewise, Linux) differs from other computing environments in that it is not only a *multitasking* system but it is also a *multi-user* system as well. The computer would support many users at the same time. In order to make this practical, a method had to be devised to protect the users from each other. After all, you could not allow the actions of one user to crash the computer, nor could you allow one user to interfere with the files belonging to another user. Linux uses the same permissions scheme as Unix. Each file and directory on your system is assigned access rights for the owner of the file, the members of a group of related users, and everybody else. Rights can be assigned to read a file, to write a file, and to execute a file (i.e., run the file as a program). To see the permission settings for a file, we can use the ls command as follows:

[me@linuxbox me]$ ls -l some_file

-rw-rw-r-- 1 me me 1097374 Sep 26 18:48 some_file
We can determine a lot from examining the results of this command:

- The file "some_file" is owned by user "me"
- User "me" has the right to read and write this file
- The file is owned by the group "me"
- Members of the group "me" can also read and write this file

- Everybody else can read this file

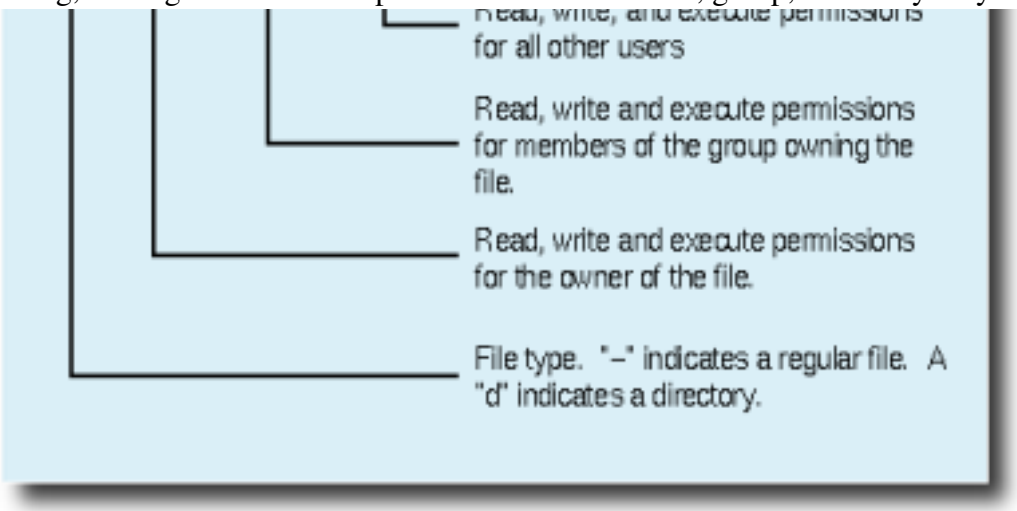
Let's try another example. We will look at the bash program which is located in the /bin directory:
[me@linuxbox me]$ ls -l /bin/bash

-rwxr-xr-x 1 root root 316848 Feb 27 2000 /bin/bash
Here we can see:

- The file "/bin/bash" is owned by user "root"
- The superuser has the right to read, write, and execute this file
- The file is owned by the group "root"
- Members of the group "root" can also read and execute this file

- Everybody else can read and execute this file

In the diagram below, we see how the first portion of the listing is interpreted. It consists of a character indicating the file type, followed by three sets of three characters that convey the reading, writing and execution permission for the owner, group, and everybody else.



chmod

The chmod command is used to change the permissions of a file or directory. To use it, you specify the desired permission settings and the file or files that you wish to modify. It is easy to think of the permission settings as a series of bits (which is how the computer thinks about them). Here's how it works:

rwx rwx rwx = 111 111 111
rw- rw- rw- = 110 110 110
rwx --- --- = 111 000 000

and so on...

rwx = 111 in binary = 7
rw- = 110 in binary = 6
r-x = 101 in binary = 5

r-- = 100 in binary = 4

Now, if you represent each of the three sets of permissions (owner, group, and other) as a single digit, you have a pretty convenient way of expressing the possible permissions settings. For example, if we wanted to set some_file to have read and write permission for the owner, but wanted to keep the file private from others, we would:

[me@linuxbox me]$ chmod 600 some_file

Here is a table of numbers that covers all the common settings. The ones beginning with "7" are used with programs (since they enable execution) and the rest are for other kinds of files.

Value Meaning

777 (rwxrwxrwx) No restrictions on permissions. Anybody may do anything. Generally not a desirable setting.

(rwxr-xr-x) The file's owner may read, write, and execute the file. All others may

read and execute the file. This setting is common for programs that are used by all
755
users.

(rwx------) The file's owner may read, write, and execute the file. Nobody else has any rights. This setting is useful for programs that only the owner may use and must
700
be kept private from others.

666 (rw-rw-rw-) All users may read and write the file.

(rw-r--r--) The owner may read and write a file, while all others may only read the file. A common setting for data files that everybody may read, but only the owner
644
may change.

600 (rw-------) The owner may read and write a file. All others have no rights. A common setting for data files that the owner wants to keep private.

Directory permissions

The chmod command can also be used to control the access permissions for directories. In most ways, the permissions scheme for directories works the same way as they do with files. However, the execution permission is used in a different way. It provides control for access to file listing and other things. Here are some useful settings for directories:

Value Meaning

777 (rwxrwxrwx) No restrictions on permissions. Anybody may list files, create new files in the directory and delete files in the directory. Generally not a good setting.

(rwxr-xr-x) The directory owner has full access. All others may list the directory, but cannot create files nor delete them. This setting is common for directories that you
755
wish to share with other users.

(rwx------) The directory owner has full access. Nobody else has any rights. This setting is useful for directories that only the owner may use and must be kept private
700
from others.

Common file system commands

Command Meaning
cat file(s) Send content of file(s) to standard output. **chmod *mode* file(s)** Change access permissions on file(s) **cp sourcefile targetfile** Copy sourcefile to targetfile.
echo *string* Display a line of text
file filename Determine file type of filename.
locate *searchstring* Print all accessible files matching the search pattern. **ls file(s)** Prints directory content.
mkdir newdir Make a new empty directory.
mv oldfile newfile Rename or move oldfile.
Pwd Print the present or current working directory. **rm file** Removes files and directories.
rmdir file Removes directories.
wc file Counts lines, words and characters in file.

Chapter 2
APACHE

What is apache?

Apache is a remarkable piece of application software. It is the most widely used Web Server application in the world with more than 50% share in the commercial web server market. Apache is the most widely used Web Server application in Unix-like operating systems but can be used on almost all platforms such as Windows, OS X, OS/2, etc. The word, Apache, has been taken from the name of the Native American tribe *'Apache'*, famous for its skills in warfare and strategy making.

It is a modular, process-based web server application that creates a new thread with each simultaneous connection. It supports a number of features; many of them are compiled as separate modules and extend its core functionality, and can provide everything from server side programming language support to authentication mechanism. Virtual hosting is one such feature that allows a single Apache Web Server to serve a number of different websites

What is Virtual Host?

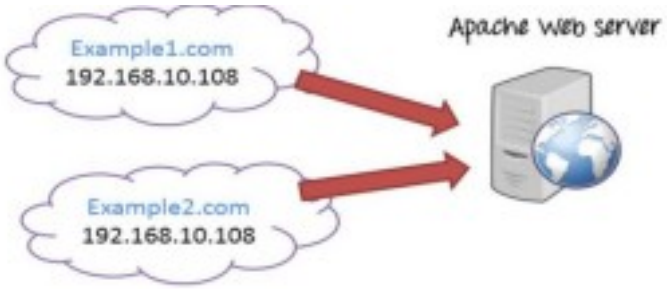
An Apache web server can host multiple websites on the **SAME** server. You do not need separate server machine and apache software for each website. This can achieved using the concept of **Virtual Host** or **VHost.** Any domain that you want to host on your web server will have a separate entry in apache configuration file.

Types of Apache Virtualhost

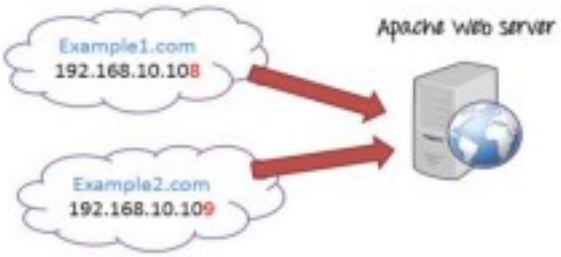
1. Name-based Virtual host
2. Address-based or IP based virtual host and.

Name-based Virtual Host

Name based virtual hosting is used to host multiple virtual sites on a single IP address.



In order to configure name based virtual hosting, you have to set the IP address on which you are going to receive the Apache requests for all the desired websites. You can do this by NameVirutalHost directive within the apache configuration i.e. **httpd.conf/apache2.conf file.** IP-based Virtual host In order to setup IP based virtual hosting, you need more than one IP address configured on your server. So, the number of vhost apache will depend on number of IP address configured on your server. If your server has 10 IP addresses, you can create 10 IP based virtual hosts.



3.3 MIME types and CGI Files

Manipulating the Apache2 HTTPD service

Starting the Apache2 HTTPD service:
#/usr/local/apache2/bin/apachectl start
Stopping the Apache2 HTTPD service:
/usr/local/apache2/bin/apachectl stop

The main configuration file for configuring Apache is httpd.conf, which contains directives

written in plain text. The location of this file is set at compile-time. When required this may be overridden with the -f command line flag. The srm.conf and access.conf files can also be used to configure Apache. Other configuration files may be added and their instructions passed to Apache by using the Include directive followed the path that points to where the additional configuration files are. Any directive may be placed in any of these configuration files. Apache is pretty flexible like that. Changes made to the main configuration files are only recognized by Apache when it is Started or restarted. If any configuration file is actually a directory, Apache will enter that directory and parse any files (and sub-directories) found there as configuration files. Apache works best if there is only one configuration file used and all its directives are placed in that file (i:e. httpd.conf). Apache also reads a file containing document mime types. This filename is set by the Types Config directive, and is mime.types by default. Apache configuration files contain one directive per line. If a directive must continue onto the next line use back-slash '\' as the last character on the previous line. Directives in configuration files are case-insensitive, but arguments to directives are often case-sensitive. Any line beginning with a hash (#) character is ignored. Blank lines and white spaces before a directive are ignored. Configuration files can be checked for syntax errors without starting the server by using apachectl configest or the -t command line option. Some important entries in httpd.conf file.

Global Environment

Server Type standalone The two server types are standalone and inetd. Usually it is always standalone. Setting it to inetd causes a new server to be started to handle every incoming HTTP request, which will die as soon as the request is served. This makes things slower because of re-reading the configuration file and the overhead of server startup with every request.

Server Root /etc/httpd

This sets the absolute path to the server directory. Generally, the argument 'of Server Root should be the path to where Apache is installed.

3.4 Authentication and log files

ErrorLog /logs/error_log

Custom Log /logs/access_log common

The various directives that end in Log control indicate whether log files exist at all. Directives also indicate exactly where the log files exist in the Linux file system.

LockFile /var/run/httpd.lock

The LockFile directive sets the path to the lockfile used when Apache is compiled. This directive should normally be left at its default value.

PidFile /var/run/httpd.pid

It is a file in which the server should record its process identification number when it starts.

ScoreBoard File /logs/apache_runtime_status

It is a file used to store internal server process information. Not air architectures require this But if local architecture does (This will be known because this file will be created when Apache run) then ensure that no two invocations of Apache share the same Scoreboardfile.

Timeout 300

Indicates the number of seconds before Apach.ereceives and senqs a time out. KeepAlive On

Indicates whether or not to allow persistent connections (more than one request per connection

Set it to Off to deactivate.

MaxKeepAliveRequests 100

Indicates the maximum number of requests to allow during a persistent connection. Set it to allow an unlimited amount. It is recommended that this number is set high, for maximum

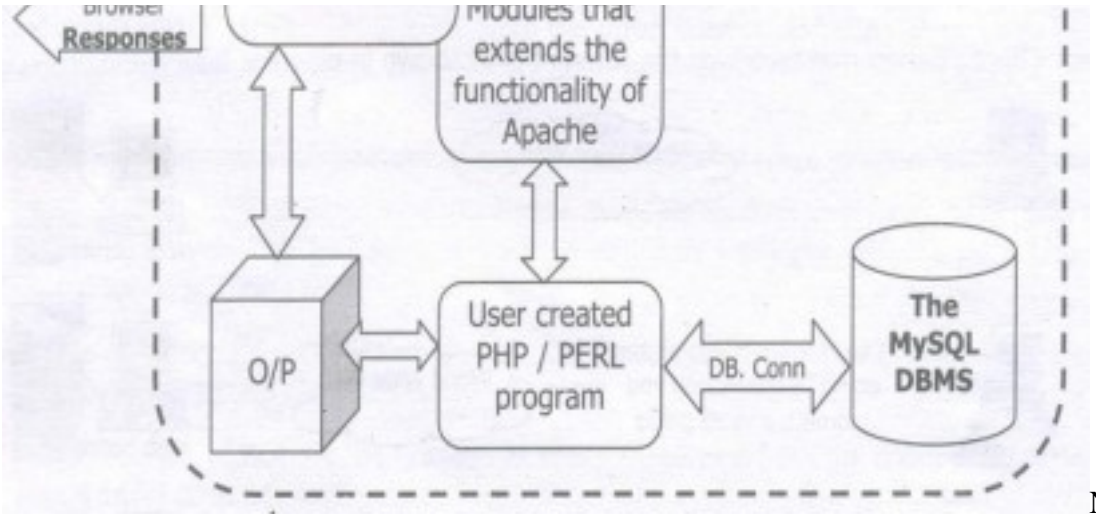
performance.
KeepAliveTimeout 15
Indicates the number of seconds to wait for the next request from the same client on the same connection.
MinSpareServers 5
MaxSpareServers 20
Indicates the Server-pool size regulation. Rather than making a user guess how many server processes are required, Apache dynamically adapts to the load it sees - that is, it tries to maintain enough server processes to handle the current load, plus a few spare servers to handle transient load spikes (e.g., multiple simultaneous requests from a single Netscape browser).
It doesthis by periodically checking how many servers are waiting for a request If there are fewer than MinSpareServers, it creates a new spare. If there are more than MaxSpareServers, some of the spares die off. The default values are probably OK for most sites. Number of servers to start initially should be a reasonable ballpark figure. StartServers 8
Port 80
This indicates the port on which the server should run on.
User and Group
The Web server's user and group values are denoted by the User and Group settings. This should be set to User ID and Group ID that the server will use to process requests. If the server runs as root, some hacker could exploit the privilege. Normally, people want to run Apache as an underprivileged user for security reasons. On Linux, this can be done, by setting both to nobody.
ServerAdmin root@localhost
Accepts the Email address, where problems with the server should be e-mailed. This address appears on some server-generated pages, such as error documents.

ServerName localhost
This sets the hostname the server will return. Set the name of the server using the ServerName directive. This is especially useful when the computer has multiple names or IP addresses.
DocumentRoot /var/www/html
This indicates the absolute path of the document tree, which is the top directory from which Apache will serve files. The DocumentRoot is the root of the Web tree and it defaults to /usr/local/apache2/htdocs. Assuming that Apache is installed in/usr/local/apche2/, this can be changed if required.

5.2 **PHP and the web server architecture model**

The most commonly used framework on the Internet, for building interactive, database driven websites is L.A.M.P.P. as mentioned earlier this is an acronym for Linux, Apache, MySQL, PHP and PERL. Here the operating system of the framework is Linux. Common flavors being RedHat, Mandrake, SuSE, Debian and so on. The Web server is Apache. MySQL is a production quality, Linux based, RDBMS in which user information is stored and finally, PHP and PERL are the programming
Environment of choice that acts as a go between Apache Web server and the MySQL database engine, which protects user information.

Apache is the Web server responsible for responding to requests received from cIient browsers for information. MySQL is the database in which such information is stored. PHP and PERL are the middleware, programming environment of choice that can: 1. Respond to such information requests being processed by the Web server Apache 2. Access the MySQL database tables where the information requested is stored 3. Convert this to HTML
4. Return this HTML to the client browser via Apache Web server
Decomposing the server side architecture.



Now that the request/response paradigm of the Internet and the framework on which this paradigm can be implemented is known, it is necessary to actually create such a framework on a Linux box to work on.

5.3 **Over view of PHP capabilities**

This will involve the installation (and configuration, where applicable) of:
Linux as an O/S. (RedHat Linux 9 is the 0/5 of choice)

- ApacheWeb Server
- MySQL
- PHP
- PERL

Thus servicing the client's request for information. All this is because a Web server (Apache2) cannot communicate directly with a database management system (MySQL) hence PHP and PERL program codes plays the role of mediator.

5.4 **CGI vs Shared object Model**

Common Gateway Interface (CGI) is a basic way to create dynamic web pages. CGI is a standard for communication between a client and the server. CGI scripts can be written in almost any language. Perl is well suited to the types of text processing common for many tasks, such as search engines and forms interfaces. Other benefits of Perl include portability, ease of programming and overall computational power and performance. And to top it off, the Perl module CGI.pm is a useful way to make Perl CGI script writing quick and easy.

CGI scripts can do simple things that require no input from the client, such as displaying the current time or a random banner when a web page is accessed. Or they can do more complicated tasks involving posted form data from the client, such as entering a credit card number, searching a database and returning the information, and filling out a form.

Figure shown below depicts what happens during the request and execution of a CGI program. The web server recognizes a CGI request by the location of the thing requested (or by the file name extension). For instance, if we load the URL *www.example.com/cgi-bin/a.cgi* into the browser, the web server contacted, www.example.com. receives a request such as the following:

GET /cgi-bin/a.cgi HTTP/1.0

The server notices that the directory that contains the thing requested is cgi -bin. It is configured to take the object requested, here a. cgi, which is a program located on the server, and execute it as a stand-alone program. The program generates standard output (in Perl, we would use print()). This output is in an important format: a header, a blank line, and the body.

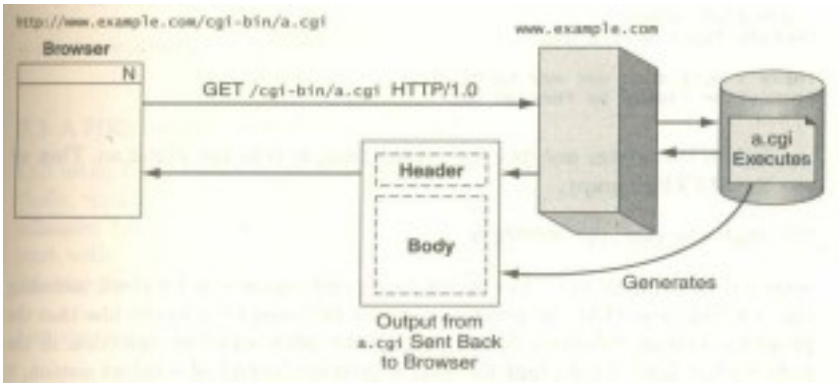


Figure: CGI model

The header is a very important piece of information that is sent back to the browser because it tells the browser how to render the data that follows. The primary piece of information that is sent in the header is the Content- l2e. If the header contains content-type: text/plain, the browser displays the data that follows as plain text. If the header contains Content type:

text/html, the browser treats the data that follows as HTML and renders it appropriately. And this is what is really important: Programs must output the header, then a blank line, and then the content to be displayed. The blank line is essential-it tells the browser that the header is complete and the body is about to begin. It is easy to see the header, blank line, and body output from a CGI program by using a shell and telnetting to a server. The following code is an example of connecting to a CGI program named test. cgi, which simply prints the content type, the blank line, and some important text:

```
$ telnet www.not_a_real_web_server.com 80
Trying 1.299.299.1
Connected to www.not_a_real_web_server.com (1.299.299.1)
Escape character is '-'.
GET /cgi-bin/test.cgi HTTP/l.0

HTTP/I.1 200 OK
Date: Thu, 17 Jan 2002 19:57:05 GMT
Server: Acme Web Server Version 0.001b

Connection: close
Content-Type: text/plain
There's more than one way to do it.
Connection closed by foreign host.
```

When the server accepts the connection, it tells the client so. Then we see the HTTP request: followed by a blank line. The webserver prints some header stuff, including the content type that the program prints, followed by a blank line that the program prints, followed by an important philosophical assertion in the next-to-last line. Then, had we used a browser instead of a telnet session ,it would have taken the information in the header and the body and rendered it appropriately based on the content type in the header. Again, that blank line that separates the header and the body is important. If it is not present, a server error will result.

Multiple Choice Questions

1. The programming interface to the kernel is included in which subsystem of operating system.
a) User Applications
b) O/S Services
c) Linux Kernel
d) Hardware Controllers
2. Memory hardware is an example of which subsystem of operating system a) User Applications
b) O/S Services
c) Linux Kernel
d) Hardware Controllers
3. Give the fullform of VFS
a) **Virtual File System**
b) Visual File System
c) Virus File System
d) Valid File System
4. Full form of IPC
a) **Inter-Process Communication**
b) Intra -Process Communication
c) Inter-Process Command
d) Intra- Process Command
5. Which of the following is responsible for controlling process access to the CPU a) Memory Manager
b) Inter-Process Communication
c) Virtual File System
d) **Process Scheduler**
6. Give the fullform of PID
a) **Process identification number**
b) Page identification number
c) Process identical number
d) Program identical name
7. Special files are in which folder
a) /dev
b) /bin
c) /lib
d) /tmp
8. Which of the following value represent —No restrictions on permissions‖ on **files a)** ***777***
b) *755*
c) *700*
d) *666*
9. Which of the following value represent —The file's owner may read, write, and execute the **file‖**.
a) *777*
b) *755*
c) *700*
d) *666*
10. Which of the following value represent —The directory owner has full access. Nobody else has any rights.‖

a) *777*
b) *755*
c) *700*
d) *666*
11. Which of the following command is used to —Prints directory content‖.
a) Cat
b) chmod
c) ls
d) mkdir
12. Which of the following command is used Removes directories.
a) Cat
b) chmod
c) rmdir
d) rm
13. Which of the following has extra and third party software.
a) /opt
b) /root
c) /sbin
d) /tmp
14. Which directory is used for miscellaneous purposes.
a) /misc
b) /root
c) /sbin
d) /tmp
15. How is rwx --- --- represented in binary form
a) 111 111 111
b) 110 110 110
c) **111 000 000**
d) 000 000 000
16. The main configuration file for configuring Apache is The main configuration file for configuring Apache is
a) httpd.conf
b) srm.conf
c) access.conf
d) apache.conf
17. . If a directive must continue onto the next line which of the following must be used as the last character on the previous line
a) back-slash '\'
b) colon (:)
c) semicolon (;)
d) underscore (_)
18. Any line beginning with a _____ character is ignored
a) hash (#)
b) colon (:)
c) semicolon (;)
d) underscore (_)
19. Maximum number of requests to allow during a persistent connection is indicated via **a) MaxKeepAliveRequests**
b) KeepAliveTimeout
c) MinSpareServers

d) MaxSpareServers

20. Full form of CGI
a) Correct Gateway Interface
b) Common Gateway Interface
c) Common Gateway Interconnect
d) Correct Gateway Interconnect
21. IP based Virtual host is also called as
a) Name based Virtual host
b) Address-based Virtual host
c) File based virtual host
d) Time based virtual host
22. If your server has 10 IP addresses, how many IP based virtual hosts can be created? **a) 10**
b) 20
c) 30
d) 40
23. Which of the following indicates whether or not to allow persistent connections **a) KeepAlive**
b) MinSpareServers
c) MaxSpareServers
d) MaxKeepAliveRequests
24. In which of the following file the server should record its process identification number
a) LockFile
b) PidFile
c) ScoreBoard File
d) StartServers
25. Which of the following file is used to store internal server process information a) LockFile
b) PidFile
c) ScoreBoard File
d) StartServers

Long Answer Questions

1. Explain the architecture of linux operating system
2. Briefly explain different subsystem of linux kernel
3. Describe the 2 distinct region of system memory
4. What are different file system permission
5. What is the different setting for directory permissions?
6. List and explain 8 common filesystem commands
7. Write a note on Manipulating the Apache2 HTTPD service
8. What is virtual host, Differentiate IP based Virtual Hosts and Name based Virtual Hosts
9. Write a note on PHP and the web server architecture model
10. Describe the different authentication and log files
11. Explain how the Web server's user and group values are denoted.
12. Write a note on CGI Model.

UNIT II
CHAPTER 3

MYSQL

Introduction

WHAT IS A DATABASE?

Databases have terminology all their own. Several terms are also used interchangeably: ‰ Database: A database is an organized collection of data. In MySQL you often create separate databases for each of your projects. ‰ Table: A table is a collection of similar information. In MySQL you might have a Customers table that contains data about your customers, a Products table that has data about your products, an Order Headers table that contains header and totals about your orders, and an Order Details table that contains the line items on the orders. ‰ Row: Inside a table, you have rows. Each row is a related set of data. In the Customers table, each customer is in a row.

‰ Record: A record is another word for a row.

‰ Column: Inside your table you also have columns. Columns are the types of information you are storing in your table. For instance in the Customers table, name, street, and city would all be columns.

‰ Field: A field is another word for a column. Sometimes used to refer to a specific row‘s column.

‰ Value: A value is what is in a given cell. In the Customers table, for instance, you would have a row for George Smith where the value of the cell in the name column is —George Smith.‖

Relationship: A relationship is a link between two tables.

%For instance, an Order Details table would link to the Order Headers so that you can associate the line items with the correct order. ‰ Key: A key is a field, or fields, that link the tables. In the Order Details table you have an order number field that matches an order number field in the Order Headers table. The order number field is a key or key field.

‰ Index: An index is an internal system that a database system uses to locate information more quickly. In MySQL you can specify that certain columns, usually keys, are indexes.

6.3 **MYSQL administration Commands-**

$mysql –u root

This is a command used to connect to the MYSQL as a root user. This root user is different from linux root user. Using this connection the administrator has all the privileges in the MYSQL. He can create or modify the databases, users, various privileges to the users etc. In order to connect to MYSQL first of all the service should be started. The command to start the MYSQL service is

chkconfig mysqld on
/etc/init.d/mysqld start

Once the root user is connected the prompt is shown as follows

Mysql>

THE SHOW DATABASE AND CREATE DATABASE COMMAND

To show the database created inside MYSQL the show command is used.
Syntax of the same is as follows
Mysql> SHOW DATABASES;
This query will show all the databases present inside.

To create a databse the following command is used
Mysql> CREATE DATABASE *name of the database*

SQL commands and sub commands (in the previous example, CREATE is a command; DATABASE is its subcommand) are case-insensitive. The name of the database (and table and field) are case sensitive. It's a matter of style whether one uses uppercase or lowercase, but traditionally the SQL commands are distinguished by uppercase.

One way to think of a database is as a container for related tables. A table is a collection of rows, each row holding data for one record. Each record containing chunks of information called fields.

USE Command

Before anything can be done with the newly created database, MySQL has to connect to it. That‘s done with the USE command.

Mysql>USE name of the database;

CREATE TABLE and SHOW TABLE Command

Each table within the database must be defined and created. This is done with the CREATE TABLE command.

Create a table named age_information to contain an individual is first name, last name, and age. MySQL needs to know what kind of data can be stored in these fields. In this case, the first name and the last name are character strings of up to 20 characters each, and the age is an integer:

The Syntax of the same is :

mysql> CREATE TABLE age_information (
-> lastname CHAR(20),
-> firstname CHAR(20),
-> age INT
->);
Query OK, 0 rows affected (0.00 see)

It appears that the table was created properly (it says OK after all), but this can be checked by executing the SHOWTABLES command. If an error is made, the table can be removed with DROP TABLE.

When a database in MySQL is created, a directory is created with the same name as the database (people, in this example):

SHOW TABLES is used to show all the tables present in the database.

The syntax of the same is

Mysql> SHOW TABLES;

The DESCRIBE Command

The DESCRIBE command gives information about the fields in a table. The fields created earlier-lastname, firstname, and age-appear to have been created correctly.

```
| lastname  | char(20) | YES  |     | NULL    |       |
| firstname | char(20) | YES  |     | NULL    |       |
| age       | int(11)  | YES  |     | NULL    |       |
+-----------+----------+------+-----+---------+-------+
3 rows in set (0.00 sec)
```

The command SHOW COLUMNS FROM age_information· gives the same information as DESCRIBE age_ information; but DESCRIBE involves less typing.

INSERT Command

This command is used to insert the records into the table created using CREATE command. The syntax of the same is

Mysql> INSERT INTO name of the table VALUES (the necessary values);

mysql> INSERT INTO age_information

-> (1astname , firstname, age)

-> VALUES ('Wall', 'Larry', 46);

Query OK, 1 row affected (0.00 sec)

The syntax of the command is INSERT INTO, followed by the table in which to insert, a list within parentheses of the fields into which information is to be inserted, and the qualifier VALUES followed by the list of values in parentheses in the same order as the respective fields.

SELECT command

SELECT selects records from the database. When this command is executed from the command line, MySQL prints all the records that match the query.

The simplest use of SELECT is shown in this example

```
mysql> SELECT * FROM age_information;
+----------+-----------+------+
| lastname | firstname | age  |
+----------+-----------+------+
| Wall     | Larry     |   46 |
+----------+-----------+------+
1 row in set (0.00 sec)
```

The * means "show values for all fields in the table"; FROM specifies the table from which to extract the information.

The previous output shows that the record for Larry Wall was added successfully.

There are many ways to use the SELECT command-it's very flexible.

First, the table based on 1astname:

```
+----------+-----------+------+
| lastname | firstname | age  |
+----------+-----------+------+
| Raymond  | Eric      |   40 |
| Torvalds | Linus     |   31 |
| Wall     | Larry     |   46 |
+----------+-----------+------+
3 rows in set (0.00 sec)
```

```
    ->         ORDER BY lastname;
+-----------+
| lastname  |
+-----------+
| Raymond   |
| Torvalds  |
| Wall      |
+-----------+
3 rows in set (0.00 sec)
```

Show the ages in descending order:

```
mysql> SELECT age FROM age_information ORDER BY age DESC;
+-------+
| age   |
+-------+
|    46 |
|    40 |
|    31 |
+-------+
3 rows in set (0.00 sec)
```

Show all the last names for those who are older than 35:

```
mysql> SELECT lastname FROM age_information WHERE age > 35;
+-----------+
| lastname  |
+-----------+
| Wall      |
| Raymond   |
+-----------+
2 rows in set (0.00 sec)
```

The UPDATE Command

Since the database is about people, information in it can change (people are unpredictable like that). For instance, although a person's birthday is static, their age changes. To change the value in an existing record, we can UPDATE the table. Let's say the fictional Larry Wall has turned 47:

Be sure to use that WHERE clause; otherwise if we had only entered UPDATE age_information SET age = 47, all the records in the database would have been given the age of 47!

Although this might be good news for some people in these records (how often have the old timers said "Oh, to be 47 years old again"-OK, probably not), it might be shocking news to others.

This method works, but it requires the database to know that Larry is 46, turning 47. Instead of keeping track of this, for Larry's next birthday we simply increment his age:

The DELETE Command

Sometimes we need to delete a record from the table (don't assume the worst-perhaps the person just asked to be removed from a mailing list, which was opt-in in the first place, of course). This is done with the DELETE command:

```
mysql> DELETE FROM age_information WHERE lastname = Raymond';
Query OK, 1 row affected (0.00 sec)
```

Cr

eating Database

Follow these steps as illustrated in Figure 19-5 to create a database called test

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1.Type test in the input box labeled Create New Database. (If you do not see that input box, click the house icon to return to the Home page first.)

2. Click the down arrow in Collation and select utf8_general_ci.

3. Click the Create button.

Next comes a list of the tables in this database. There are no tables yet, so you need to create one now:

1. Enter table1 as the name.

2. Enter 2 for the number of fields (columns) to create.

3. Click the Go button and a window similar to Figure 19-7 is presented. 4. Fill in the field ID by giving it the name id, selecting PRIMARY from the Index drop down, and clicking the AUTO_INCREMENT checkbox. Selecting Primary for the index tells MySQL that this is a main field that is used to identify records in the table. MySQL creates an index for the field in order to retrieve the data more quickly. Flagging the field as auto_ increment means that MySQL automatically creates a unique sequential number in this field when a record is added.

5. Fill in the field description by giving it the name description, changing the Type drop-down to TEXT, and clicking the Null checkbox to allow nulls to exist. Allowing nulls to exist means that the field is not required. Your window looks like Figure 19-8. 6. Click the Save button to add these two columns to table1 as shown in Figure 19-9.

The table table1 is now listed in the left column. To work with a specifi c table, click that table on the left. If there are records in the table, the Browse tab is activated; otherwise, as in this case, the Structure tab is active as it was in Figure 19-7. You add or change columns (not the data in the columns) in the Structure tab. You can add a column either at the end of the table, at the beginning of the table, or after a given column as shown in Figure 19-10.

After you click the Go button, the window where you create your new column displays as shown in Figure 19-11. This example creates an integer column called code, where any new rows default to 42 if not set to a different number.

Clicking the Save button adds the column to table1 as shown in Figure 19-12.

Entering Data

You now have a database called test, which contains a single table called table1, which has three fields: id, description, and code. At this point you can enter data into your database. To do so, be sure that the table is selected either by clicking the table name on the left or checking the breadcrumb at the top of the window. Clicking the Insert tab opens a window with forms to enter two records. Figure 19-13 shows the forms filled in and ready to be saved. The first field is id, which is the primary key that is flagged as an auto_increment field. When left blank, MySQL automatically assigns the next number in sequence. The next field is description, which is a text field where text can be entered. The code field displays the default of 42 to start, but can that can be changed to a different number. To save both the records, click the Go button in either form. The program jumps to the SQL tab where it displays a

status message and the SQL command used to add the records as shown in Figure 19-14. Now that you have records in the table, clicking the Browse tab displays those records as shown in Figure 19-15. To delete the records in a table, but leave the structure intact, click the Empty tab. You are asked if you want to TRUNCATE TABLE. Click the OK button to continue with the deletion of the records. To delete the entire table, including the structure, click the Drop tab. You are asked if you want to DROP TABLE. Click the OK button to continue to delete the table completely.

UNDERSTANDING DATA TYPES

Just as in PHP, MySQL has different data types for the fields. The data types in MySQL are stricter than in PHP and there is not a one-to-one correlation.

Strings

There are two types of strings in MySQL. The first is text strings, which have character sets and collations. This is the type of string that you use most often. Text strings are further defined as follows:

‰ CHAR: This is the character data type. You define exactly how many characters are stored. For example, if you want a field to be exactly six characters long, you define it as CHAR(6). If you pass it data that is less than that, it pads with spaces at the end. If you pass it more, the extra characters are truncated. Whether you are truncating blanks or non-blank characters and what error reporting you have set determines what, if any, errors you see. You can go all the

way up to 255 characters. Note that some character sets require more than 1 byte to store some characters. The size limits for the text strings are based on the number of characters, not the number of bytes. Trailing spaces are removed when you retrieve the data.

‰ VARCHAR: This data type has a variable number of characters. You specify the maximum number of characters, up to 65,535. If you have a fi eld that could contain up to 50 characters but would likely contain less, you defi ne it as VARCHAR(50). There is a little overhead when using VARCHAR rather than CHAR because 1 or 2 bytes are used to store the length. Trailing spaces are not removed when you retrieve the data.

‰ TEXT: There are four TEXT types — TINYTEXT, TEXT, MEDIUMTEXT, and LONGTEXT. Like VARCHAR, the TEXT types contain a variable number of characters. The difference between the four types is the maximum number of characters. The type defi nes the maximum number of characters; you do not. See Table 21-1.

TABLE 21-1:
TEXT Type Sizes
TEXT TYPE MAXIMUM CHARACTERS
TINYTEXT 255
TEXT 64K
MEDIUMTEXT 16M
LONGTEXT 4G

The second type of string is binary strings, which have no character sets or collations. Character strings contain text, whereas binary strings contain raw data such as images and other media. The binary types are subdivided in the same way that the text strings are, but the size limits are based on the number of bytes, not the number of characters. ‰ BINARY: This is the binary data type. You define exactly how many bytes are stored. For example, if you want a fi eld to be exactly 6 bytes long, you define it as BINARY(6). You can go all the way up to 255 bytes. ‰ VARBINARY: This data type has a variable number of bytes. You specify the maximum number of bytes, up to 65,535. If you have a field that could contain up to 50 bytes but would likely contain less, you define it as VARBINARY(50). There is a little overhead when using VARBINARY rather than CHAR because 1 or 2 bytes are used to store the length. ‰ BLOB: There are four BLOB types — TINYBLOB, BLOB, MEDIUMBLOB, and LONGBLOB. Like VARBINARY, the BLOB types contain a variable number of bytes. The difference between the four types is the maximum number of bytes. The type defines the maximum number of bytes; you do not. See Table 21-2.

TABLE 21-2: BLOB Type Sizes
BLOB TYPE MAXIMUM BYTES
TINYBLOB 255
BLOB 64K
MEDIUMBLOB 16M
LONGBLOB 4G

Numeric
As in PHP, numbers that do not have a decimal point are integers. MySQL has different integer types that are based on the size of the integer. Additionally, if the integer is SIGNED

— that is, has both negative and positive values — the range starts in the negative numbers. If

the field is flagged as UNSIGNED, the values start at 0 and go twice as high, as you see in Table 21-3.

TABLE 21-3: Integer Types
INTEGER TYPE RANGE IF SIGNED RANGE IF UNSIGNED TINYINT –128 to 127 0 to 255
SMALLINT –32,768 to 32,767 0 to 65,535
MEDIUMINT –8,388,608 to 8,388,607 0 to 16,777,215 INT (or INTEGER) –2,147,483,648 to 2,147,483,647 0 to 4,294,967,295 BIGINT –9,223,372,036,854,775,808 0 to 18,446,744,073,709,551,615 to 9,223,372,036,854,775,807

You may see these types written with a length such as TINYINT(1) or TINYINT(4). This refers to the number of digits to be displayed. It does not affect the value that is stored or the space needed to store the value. If you need decimals you use either a floating-point data type or a fixed-point data type. The floating-point types are similar to PHP floating-point types. FLOAT uses 4 bytes of storage and DOUBLE (also called DOUBLE PRECISION or REAL) takes 8. MySQL allows you to specify the total number of digits and the number of digits after the decimal point. So to specify a number between –999.9999 and 999.9999 you use FLOAT(7,4). MySQL rounds the decimal when storing it rather than truncating it if it is too long.

Date and Time

MySQL stores dates and times in the format of YYYY-MM-DD HH:MM:SS, unlike PHP. Your MySQL server dictates where you can store invalid dates or whether all invalid dates should be converted to zeros.

‰ DATETIME contains the date and the time. It has a range from the year 1000 through the year 9999.

‰ DATE contains just the date value.

‰ You can use TIMESTAMP to automatically contain the initial value or automatically update when something changes on the row. It has a range from 1970 through early 2038. It stores all values as of the UTC time zone.

‰ TIME displays the time portion of a date or an elapsed time.

‰ YEAR displays the year. It can be either YEAR(2) or YEAR(4) for two- or four-digit representation of the year. It has a range from the year 1901 through 2155. Two digits between 00 and 69 are converted to 2000 through 2069 and 70 to 99 are converted to 1970 through 1999.

Other Data Types MySQL has a data type ENUM that restricts the field to values from an enumerated list of values. Although you can use numbers as values, it is not recommended because errors can easily occur. Numbers can be misinterpreted as an index of a value instead of the value itself.

ENUM(_small‘, _medium‘, _large‘)

Although you can put your business logic here, if there‘s any chance it might change, it would be better to put the value checking in your program where it would be easier to make changes. MySQL has two other data types that you may come across:

‰ SET includes zero or more values from a defined list.

‰ BIT stores data at the bit level using binary values.

USING AUTO_INCREMENT

The primary key for a table should have the following characteristics:

- Unique
- Not Null
- Not optional
- Never needs to be changed
- Does not violate security policies

In addition, a short simple key that can be retrieved quickly helps performance. It can be difficult to find a data field that meets all of these requirements. For that reason, tables are often given artificial keys — arbitrary keys that have no meaning other than to be a primary key. MySQL supports this policy with the AUTO_INCREMENT attribute. You assign this attribute to a field and MySQL generates a unique sequential number for each new row. You can assign AUTO_ INCREMENT to either an integer or a floating-point data type, though an integer is the most common. Make sure that the data type you choose is large enough to hold the highest number you need. The following snippet of code shows the typical specifications for an artificial primary key. The name of the field is id; it is an integer data type that is unsigned, is a required field, will be automatically filled by MySQL, and is assigned as the primary key.

`id` INT UNSIGNED NOT NULL AUTO_INCREMENT PRIMARY KEY, The table keeps track of the next number to be assigned. It starts with 1 unless you tell it differently when you create the table. In Lesson 22, you learn how to add data to the tables. When you add the data, if you do not assign a value to id for new rows, or you assign a NULL or 0, a value is automatically assigned. MySQL has a function, LAST_INSERT_ID(), that contains the last AUTO_INCREMENT value. PHP also has a function that can retrieve this number if you need it.

CHAPTER 4
INTRODUCTION TO PHP

Introduction:

PHP started out as a small open source project that evolved as more and more people found out how useful it was. Rasmus Lerdorf unleashed the first version of PHP way back in 1994.

dynamic content, databases, session tracking, even build entire e-commerce sites. ,

Oracle, Sybase, Informix, and Microsoft SQL Server.

added support for Java and distributed object architectures (COM and CORBA), making n-tier development a possibility for the first time.

-Like.

Features of PHP

The basic features of PHP can be divided into 5 major sections:

Performance

Open Source Software

Platform Independent

Compatibility

Embedded

There are given many features of PHP.

- **Performance**: Script written in PHP executes much faster than those scripts written in other languages such as JSP & ASP.
- **Open Source Software**: PHP source code is free available on the web, you can developed all the version of PHP according to your requirement without paying any cost.
- **Platform Independent**: PHP are available for WINDOWS, MAC, LINUX & UNIX operating system. A PHP application developed in one OS can be easily executed in other OS also.
- **Compatibility**: PHP is compatible with almost all local servers used today like Apache, IIS etc.
- **Embedded**: PHP code can be easily embedded within HTML tags and script.

PHP coding

Escaping from HTML:

Here, a file is analysed and simply parsed until a special tag is reached. The entire text is interpreted as PHP code.

Instruction separation:

The instructions in PHP code are separated exactly the same way as in Perl or C. Each statement is terminated with a semicolon. In PHP, the closing tag suggests the end of a statement. The syntax is as follows:

```
<?php
echo —This is used for testing‖;
?>
```

Comments:

In PHP, C and C++ style comments are supported along with Unix shell like comments. The comment comes at the end of a line or in a PHP block of code.

Basic Syntax

-defined functions, classes, and keywords (e.g. if, else, while, echo, etc.) are

not case-sensitive

You can also begin a scripting block with (<?) and end with (?>). This is just a shortened version. It is always advisable to use the standard form of (<?php) in place of the shortened form (<?) as the former is clearer and generally supported.

Let‘s see how we can declare some PHP code: We can declare PHP code in three different forms:

— <?
PHP Here we insert PHP codes
?>

— <?php
PHP Here we insert PHP codes php
?>

— <script language=‖php‖>
PHP Here we insert PHP codes
</script>

As in an HTML file, PHP files also have HTML tags in addition to some PHP script code. Some important examples are given as
below using the text string —Hello World‖ and sending it to the
browser. <html>
<body>
<?php echo —Hello World‖; ?>
</body>
</html>

Here, each line of PHP code ends with a semicolon. This semicolon actually acts as a separator between two sets of instructions. Echo and Print are the two basic statements available to output text with PHP. Since, PHP scripts are basically embedded in an HTML document, you have the freedom to shift between HTML and PHP.

PHP is a Loosely Typed Language

st begin with a —$‖ sign

$var_name = value;

PHP | echo and print

There are two basic ways to get output in PHP:-

1. echo
2. print

PHP echo statement

In PHP _echo‘ statement is a language construct and not a function, so it can be used without paranthesis. But we are allowed to use paranthesis with echo statement when we are using more than one arguments with it. The end of echo statement is identified by the semi-colon (_;‘).

We can use _echo‘ to output strings or variables. Below are some of the usage of echo statement in PHP:

Displaying Strings: We can simply use the keyword echo followed by the string to be displayed within quotes. Below example shows how to display strings with PHP: <?php
echo "Hello,This is a display string example!";
?>

Output:

Hello,This is a display string example!

Displaying Strings as multiple arguments: We can pass multiple string arguments to the echo statement instead of single string argument, separating them by comma (‚,') operator. For example, if we have two strings say —Hello‖ and —World‖ then we can pass them as (—Hello‖,‖World‖). Below example shows how to do this:

```
<?php
echo "Multiple ","argument ","string!";
?>
```

PHP print statement

The PHP **print** statement is similar to the echo statement and can be used alteranative to echo at many times.It is also language construct and so we may not use parenthesis : print or print(). The main difference between the **print** and **echo** statement is that print statement can have only one agrument at a time and thus can print a single string. Also, print statement always returns a value 1.Like echo, print statement can also be used to print strings and variables. Below are some examples of using print statement in PHP:

- **Displaying String of Text**: We can display strings with print statement in the same way we did with echo statements. The only difference is we can not display multiple strings separated by comma(,) with a single print statement. Below example shows how to display strings with the help of PHP print statement:-

```
<?php

print "Hello, world!";

?>
```

- Output:
- Hello, world!

Comparison between Echo and Print in PHP:

Using Comments in PHP

Comments in PHP are similar to comments that are used in HTML. The PHP comment syntax always begins with a special character sequence and all text that appears between the start of the comment and the end will be ignored by the browser. In HTML a comment's main purpose is to serve as a note to you, the web developer or to others who may view your website's source code. However, PHP's comments are different in that they will not be displayed to your visitors. The only way to view PHP comments is to open the PHP file for editing. This makes PHP comments only useful to PHP programmers. In case you forgot what an HTML comment looked like, see our example below. HTML Code:

<!--- This is an HTML Comment -->

PHP Comment Syntax:

Single Line Comment

While there is only one type of comment in HTML, PHP has two types. The first type we will discuss is the single line comment. The single line comment tells the interpreter to ignore everything that occurs on that line to the right of the comment. To do a single line comment type "//" and all text to the right will be ignored by PHP interpreter. PHP Code:

```
<?php
echo "Hello World!"; // This will print out Hello World!
echo "<br />Psst...You can't see my PHP comments!"; // echo "nothing";
// echo "My name is Humperdinkle!"; ?>
```

Display:

Hello World!

Psst...You can't see my PHP comments!

Notice that a couple of our echo statements were not evaluated because we commented them out with the single line comment. This type of line commenting is often used for quick notes about complex and confusing code or to temporarily remove a line of PHP code.

PHP Comment Syntax:

Multiple Line Comment

Similiar to the HTML comment, the multi-line PHP comment can be used to comment out large blocks of code or writing multiple line comments. The multiple line PHP comment begins with " /* " and ends with " */ ".

PHP Code:

```
<?php
/* This Echo statement will print out my message to the place in which I reside on. In other words, the World. */
 echo "Hello World!";
/* echo "My name is Humperdinkle!";
echo "No way! My name is Uber PHP Programmer!"; */
 ?>
```

Display:

Hello World!

Good Commenting Practices

One of the best commenting practices that I can recommend to new PHP programmers is....USE THEM!! So many people write complex PHP code and are either too lazy to write good comments or believe the commenting is not needed. However, do you really believe that

you will remember exactly what you were thinking when looking at this code a year or more down the road? Let the comments permeate your code and you will be a happier PHPer in the future. Use single line comments for quick notes about a tricky part in your code and use multiple line comments when you need to describe something in greater depth than a simple note.

Benefits of PHP

PHP has several important benefits such as:

- It is not restricted to HTML output
- It provides cross-platform functionality
- PHP converses with several network protocols
- It is compatible with a wide variety of databases
- Strong text processing facilities are available
- It supports most current web servers

PHP can be used effectively on different operating systems such as Linux, Microsoft Windows, many Unix variants (like Solaris, HP-UX and OpenBSD), Mac OS X, RISC OS, and many others. As discussed earlier, in the present scenario, PHP supports most web servers. It works as a CGI processor in servers supporting the CGI standard. Each PHP script remains enclosed between two PHP tags commanding the server to recognise the information as PHP.

As PHP is a server-side language, its scripts only run on the operating web server. They never run in the user‘s browser. With PHP installed in your computer, you can use both procedural programming and object oriented programming (OOP). In some recent PHP versions, not every OOP feature is mentioned. Some code libraries and large applications have been written by using just the OOP codes.

Why Should You Care about What Your Code Looks Like?

It’ s important to follow good coding practices for three reasons:

- **For efficiency:**

The easier your code is to read and follow, the easier it will be to keep track of where you are within your code, and the quicker it will be to pick up where you left off after a break

- **For debugging:**

Knowing where your problem lies is a major debugging tool. If comments are used correctly, you can easily follow your own logic, and if you have line numbers and consistent formatting, you can easily scan your document to pinpoint a trouble area.

- **For future expansions and modifications:**

Using comments in your code is especially important for future changes because it ‘ s difficult to remember the logic behind code that was written years or even just months ago. Also, if you are working on code that involves a team, if everyone is using the same coding style, it will be much easier to make changes or additions to someone else ‘ s work down the road.

Creating Your First Program

You can ‘ t get much simpler than this first program, but try it out to get a feel for what the results look like. The PHP statement echo , seen in the example that follows, is one of the most commonly used PHP functions and one that you will undoubtedly become intimate with. It is used to send text (or variable values or a variety of other things) to the browser.

Using echo

Try using echo to see what results you achieve.

1. Enter the following program in your favorite text editor (Notepad, Simple Text, or whatever you choose), and save it as firstprog.php . Regardless of your editor, make sure

you save it in a plaintext format to avoid parsing problems. If you ‘ re using Notepad, double - check to ensure that the file is not saved as firstprog.php.txt by default.

Simple php program

Create a php webpage and print —hello world‖.

```
<Html>
 <Head>
 <Title> My Simple Program </Title>
</head>
 <Body>
< ?php
echo —I‘m a lumberjack.‖;
 ? >
 </Body>
 </Html>
```

2. Open this program using your browser. Your resulting screen should look like the

below

Integrating H TML with PHP

You will be better able to see how easily you can use HTML in the PHP program with the following practical example.

In this example, you ‘ ll use some PHP and HTML together.

1 . Modify the highlighted lines of firstprog.php :

```
< html >
< head >
< title > My First PHP Program < /title >
< /head >
< body >
< ?php
echo — < h1 > I‘m a lumberjack. < /h1 > ‖;
echo — < h2 > And I‘m okay. < /h2 > ‖;
? >
< /body >
```

< /html >
2.Save your file, and reload the page. Your screen should now look something like the one in

PHP - Variables

A variable is a means of storing a value, such as text string "Hello World!" or the integer value 4. A variable can then be reused throughout your code, instead of having to type out the actual value over and over again. In PHP you define a variable with the following form: • $variable_name = Value;

If you forget that dollar sign at the beginning, it will not work. This is a common mistake for new PHP programmers!

Let‘s look at the syntax of a PHP variable:

$variable_name = Value;

Example:

<?php

$learning = —Learning Variable!‖;

$x_numeral = 8;

$first_name = _John‘;
$lastName = _Denver‘;
$nextNumeral = 16;
?>

PHP Variable Naming Conventions

There are a few rules that you need to follow when choosing a name for your PHP variables.

• PHP variables must start with a letter or underscore "_".

• PHP variables may only be comprised of alpha-numeric characters and underscores. a-z, A Z, 0-9, or _ .

• Variables with more than one word should be separated with underscores. $my_variable • Variables with more than one word can also be distinguished with capitalization. $myVariable

Outputting a String -Echo

To output a string, use the PHP echo function. You can place either a string variable or you can use quotes, like we do below, to create a string that the echo function will output. PHP Code:

```
<?php
 $myString = "Hello!";
 echo $myString;
echo "<h5>I love using PHP!</h5>";
?>
```

Display:

Hello!
I love using PHP!

In the above example we output "Hello!" without a hitch. The text we are outputting is being sent to the user in the form of a web page, so it is important that we use proper HTML syntax!

In our second echo statement we use echo to write a valid Header 5 HTML statement. To do this we simply put the <h5> at the beginning of the string and closed it at the end of the string. **Variable Scope:**

- Local variables
- Function parameters
- Global variables
- Static variables.

Local Variables

A variable declared in a function is considered local; that is, it can be referenced solely in that function. Any assignment outside of that function will be considered to be an entirely different variable from the one contained in the function –

Example

```
<?php
 $x = 4;
 assignx();
 echo ("\$x outside of function is $x. <br />");
 function assignx ()
 {
 $x = 0;
 echo ( "\$x inside function is $x. <br />");
 }
```

```
?>
```

Output:

$x inside function is 0.

$x outside of function is 4.

Function Parameters

Function parameters are declared after the function name and inside parentheses. They are declared much like a typical variable would be –

```
<?php
// multiply a value by 10 and return it to the caller
function multiply ($value) {
$value = $value * 10;
return $value;
}

$retval = multiply (10);
Print "Return value is $retval\n";
?>
```

This will produce the following result –

```
Return value is 100
```

Global Variables

In contrast to local variables, a global variable can be accessed in any part of the program. However, in order to be modified, a global variable must be explicitly declared to be global in the function in which it is to be modified. This is accomplished, conveniently enough, by placing the keyword **GLOBAL** in front of the variable that should be recognized as global. Placing this keyword in front of an already existing variable tells PHP to use the variable having that name. Consider an example –


```
<?php
$somevar = 15;
function addit() {
GLOBAL $somevar;
$somevar++;

print "Somevar is $somevar";
}

addit();
?>
```

This will produce the following result –

```
Somevar is 16
```

Static Variables

The final type of variable scoping that I discuss is known as static. In contrast to the variables declared as function parameters, which are destroyed on the function's exit, a static variable will not lose its value when the function exits and will still hold that value should the function be called again.

You can declare a variable to be static simply by placing the keyword STATIC in front of the variable name.

```
<?php
function keep_track() {
STATIC $count = 0;
$count++;
print $count;
print "<br />";
}
keep_track();
keep_track();
keep_track();
?>
```

This will produce the following result –

```
1
2
3
```

Constants

A constant is a name or an identifier for a simple value. A constant value cannot change during the execution of the script. By default, a constant is case-sensitive. By convention, constant identifiers are always uppercase. A constant name starts with a letter or underscore, followed by any number of letters, numbers, or underscores. If you have defined a constant, it can never be changed or undefined.

To define a constant you have to use define() function and to retrieve the value of a constant, you have to simply specifying its name. Unlike with variables, you do not need to have a constant with a $. You can also use the function constant() to read a constant's value if you wish to obtain the constant's name dynamically.

constant() function

As indicated by the name, this function will return the value of the constant.

This is useful when you want to retrieve value of a constant, but you do not know its name, i.e. It is stored in a variable or returned by a function.

constant() example

```
<?php
define("MINSIZE", 50);

echo MINSIZE;
echo constant("MINSIZE"); // same thing as the previous line
?>
```

Only scalar data (boolean, integer, float and string) can be contained in constants. **Differences between constants and variables are**

- There is no need to write a dollar sign ($) before a constant, where as in Variable one has to write a dollar sign.
- Constants cannot be defined by simple assignment, they may only be defined using the define() function.
- Constants may be defined and accessed anywhere without regard to variable scoping rules.
- Once the Constants have been set, may not be redefined or undefined.

Multiple Choice Questions

1. Which one of the following databases has PHP supported almost since the beginning? a) Oracle Database
b) SQL
c) SQL+
d) MySQL
2. Which one of the following statements is used to create a table? **a) CREATE TABLE table_name (column_name column_type);** b) CREATE table_name (column_type column_name);

c) CREATE table_name (column_name column_type);
d) CREATE TABLE table_name (column_type column_name);

3. PHP is an example of _____ scripting language.

a) Server-side
b) Client-side
c) Browser-side
d) In-side

4. Which of the following is not true?

a) PHP can be used to develop web applications.
b) PHP makes a website dynamic
c) PHP applications can not be compile
d) PHP can not be embedded into html.

5. Which of the following is not used to begin php code
a) <?php
b) <?
c) <php
d) — <script language=‖php‖>

6. PHP is a ----------

a) Loosely typed language
b) Tightly typed language
c) Server typed language
d) Client typed language

7. Full form of PHP

a) PHP Hypertext Pre-processor
b) Hypertext Pre-processor
c) Plain Hypertext Pre-processor
d) Parsed Hypertext Pre-Processor

8. Php code ends with

a) ;
b) :
c) .
d) ,

9. Which of the following statement is not true about echo?
a) Not written within parenthesis
b) Can output more than 1 string
c) Slower than print
d) Echo($arg1[,$arg2……])

10. PHP variables must begin with a -------- sign

a) $
b) @
c) &
d) #

11. Constants are defined using which of the following function
a) Include
b) Require
c) Define
d) Main

12. Which of the following command gives information about the fields in a table?
a) **Describe**
b) Create
c) Use
d) Select

13. **Which of the following statements prints in PHP?**
A. Out
B. Write
C. Echo
D. Display

14. Which of the following is used to add multi line comment in PHP
a) {/ \}
b) //
c) /* */
d) {{ }}

15. What will be the output of the following php code?

```
< ?php
$num = "1";
$num1 = "2";
print $num+$num1 ;
?>
```

a) 3
b) 1+2
c) Error
d) 12

16. What will be the output of the following PHP code?

```
<?php
$num = 1;
$num1 = 2;
print $num . "+". $num1;
?>
```

a)3
b)1+2
c)1.+.2
d) Error

17. **Which of the following is not the scope of Variable in PHP?**
A. Local

B. Global
C. Static
D. Extern
18. What is the range of unsigned TINYBIT Integer
a) 0 to 255
b) -128 to 127
c) 10 to 265
d) 8 to 263
19. Which among the following datatypes is not case sensitive
a) VARCHAR
b) TINYBLOB
c) TINYTEXT
d) TINYBIT
20. Which of the following command is used to show the database created inside MYSQL.
a) SHOW
b) USE
c) CREATE
d) SELECT
21. Which of the following command is used to connect to MYSQL a) SHOW
b) USE
c) CREATE
d) SELECT
22. Each Table within the database is been defined and created by which of the following command
a) SHOW
b) USE
c) CREATE
d) SELECT
23. Which of the following command is used to print all the records that match the query? a) SHOW
b) USE
c) CREATE
d) SELECT
24. Which of the following is scalar data?
a) Boolean
b) Integer
c) Float
d) Array
25. Which of the following is not true about constant?
a) There is no need to write a dollar sign ($) before a constant
b) Constants can be defined by simple assignment
c) Once the Constants have been set, may not be redefined or undefined. d) Constants may be defined and accessed anywhere without regard to variable scoping rules.

Long Questions

1. What is the use of CREATE TABLE and SHOW TABLE Command, Give the syntax?
2. Give the syntax of the following

a) Insert
b) Select
c) Update

d) Delete
3. What are steps involved to create table using MySQL
4. Explain how the text string is further defined?
5. Write a note on date and time datatype in MySQL
6. What is the use of autoincrement in MySQL
7. Explain the different features of PHP 8. With a simple code explain the basic syntax of PHP
9. Explain php echo statement with example
10. With syntax explain print statement 11. Explain 2 types of comments available in php
12. Write a note on scope of variable in php
13. Write a note on constants, how is it different from variable

UNIT III
FUNDAMENTALS OF PHP

Echoing Variables and Text Strings

All variable names must start with the $ character. After that there must be a letter. The rest of the name can consist of both letters and numbers. The following are three examples of valid names for a variable: $name, $address2 and $colour_30. The _ (underscore) character is often used in variable names. It is used as a replacement for space, since space is an illegal character in a variable name.

Once a variable is named it needs to be assigned a value to be used in any program. Assigning a value to variable is done as follows:

```
$name= 'Jitesh';
```

The variable name is on the left of the = sign (i.e. assignment operator) and the value of the

variable is on its right. Here 18 is assigned as a value to the variable $age:

$age= 18;

There are several different types of variables. The integer and string types have already been demonstrated.

NUMBERS

Dealing with numbers is easy with PHP. Just use them as required. All the normal rules about precedence apply:

$a = 4;
$b = 7;
$c=2+3*$a+5*$b; (**This is evaluated as 2+(3'*4)+(5*7) = 49**)

Everything works as expected. Any variable is automatically substituted with its value. This is done before the new value is stored in the variable on the left side of the = sign. This means that something like this can be done:

$a = 5;
$b = 10;
$a= (**2 * $a + 5)/$b; (Evaluated as $a (2*5+5) /10= 1.5**)

STRINGS

To assign a string to a variable, the string must be enclosed in quotes. Either single quotes(') or double quotes (") can be used. The kind of quotes chosen depends on the string being worked with in a given situation.

There are some differences between the two types of quotes. The following code should demonstrate the differences:

$first_name = 'Chhaya';
$greeting1 = "Hello, my first name is $first_name. ";
echo $greeting1;
$Iast_name = 'Bankar';
$greeting2 = 'Hello, my last name is $Iast_name. ';

echo $greeting2;

This code produces the following output:

Hello, my first name is Chhaya.
Hello, my last name is $Iast_name.

When double quotes are used, PHP performs what is known as variable expansion. That means that PHP expands (substitutes) $first_name with it's value. The result is that the string stored in $greetingl is Hello, my name is Chhaya with variable expansion being done on the variable $firsCname. When assigning a value to the variable $greeting2, using single quotes, PHP does not do any variable expansion hence $greeting2 ends up with Hello, my last name is $Iast_name, (i.e. anything enclosed in single quotes is treated as a string constant and not to be changed in anyway by PHP)

Double quotes also expand other special characters such as newline characters (\n)
This means that the following string:

echo —Chhaya\nBankar";

will look like this when rendered in the client browser:

Chhaya
Bankar

The echo statement just outputs the string after it to the Web browser. As said earlier there's no trace of the PHP code, but notice that there's a newline character between the two words. The newline character can only be seen in the source code of the HTML page, because the Web browser treats the newline character as a normal space. Notice that there's no space before or after the \n character.

This is because the (\ ) backslash is used to indicate that the next character is special. In PHP code spec write (\ \ ) when a single (\ ) is required. The backslash (\ ) is called an escape character, i.e. it makes characters escape from their normal role.

Its only when expressions are evaluated (i.e. such as in assignments and echo statements) that the difference between single and double quotes comes into play. After the assignment is done, no one can tell how the string was produced. Consider this code.

$first_name = 'Chhaya';
$Iast_name = "Bankar";
$varl = "$firsCname $lasCname";
$var2= 'Chhaya Bankar';

The two variables $varl and $var2 will both contain the string Chhaya Bankar after the evaluation, PHP will not make any distinction between the values stored in the two variables.

To concatenate (add together) strings use the (•) period character (i.e. a dot or full stop) this:

$first_name = 'Chhaya';
$Iast_name = 'Bankar';
$furr_name = $first_name.$last_name;

Now $full_name will contain the string "ChhayaBankar". That's probably not what is wanted it would be better with a space between the two words. To do this, execute the following code:

$full_name = _$first_name ' , _ $last_name‘;

Notice that the space between the variable $first_name and the dot is ignored, it's the string with the space that's important. Use the dot (i.e. period character) each time two strings have to be concatenated.

But it is also seen how this could be solved using variable substitution. This is often easier to read, just remember to use double-quotes around the string. So this code gives the same result:

$full_name = "$first_name $Iast_name";

Data Types:

PHP has a total of eight data types which we use to construct our variables:

-point numbers, like 3.14159 or 49.1.

rings: are sequences of characters, like 'PHP supports string operations.'

-defined classes, which can package up both other kinds of values and functions that are specific to the class.

database connections).

The first five are simple types, and the next two (arrays and objects) are compound - the compound types can package up other arbitrary values of arbitrary type, whereas the simple types cannot.

_Data Types‘ can be divided into two groups: _Core Data Type‘ and _Special Data Type‘. The _Core data type‘ group includes Integer, Float/Double, String and Boolean. The _Special data types includes Null, Array, Object and Resources.

Integers: As discussed earlier, Integers are whole numbers. It does not include precision. Negative values are also regarded as Integers.

Example: -32, 32, 986, 1245, etc.

Floating-Point Number or Double: Fractional numbers are grouped as Floating point numbers or Double data type. Simply put, Double variables hold numbers with decimal points. Example: 123.56, 5.6, etc.

The syntax of the _Floating-Point Number or Double is as follows:

```
<?php
$a = 1.234;
$b = 1.2e3;
$c = 7E-10;
?>
```

Boolean:

They have only two possible values either true or false. PHP provides a couple of constants especially for use as Booleans: TRUE and FALSE, which can be used like so: if (TRUE)

```
echo ("This will always print<br>");
else
echo ("This will never print<br>");
```

NULL:

NULL is a special type that only has one value: NULL. To give a variable the NULL value, simply assign it like this:

```
$my_var = NULL;
```


The special constant NULL is capitalized by convention, but actually it is case insensitive; you could just as well have typed:

```
$my_var = null;
```

String Literals:

We have already discussed that Strings hold both words and sentences. These are always inserted within quotation marks. If it starts with a single quotation mark then it must end with the same. If a single quotation is inserted at the beginning of a string then it can not be closed with a double quotation mark. If the quotation marks are inserted in a code without any characters, then it will be treated as _Null‘ string. A numeric character is treated as a string if it is inserted within quotation marks. For example, if the number 9 is inserted in a PHP code, then it will be treated as a number. On the other hand, if 9 is inserted in a PHP code, then it will be treated as a string.

Example: —It is an example of a string with double quotes‖ _It is an example of a string with single quotes‘ —It is also an example of _a string‘ where the single quote will be ignored‖ _It is an example of —a string‖ where the double quote will be ignored‘ —4‖ — — (Null string)

Escape Sequences:

You can achieve the same effect in double-quoted strings by using the escape character, which, in PHP, is a backslash \. Escape sequences, the combination of the escape character \ and a letter, are used to signify that the character after the escape character should be treated specially. For example, if you wanted to have the string "And then he said, "That is

amazing!", which was true", you would need escape characters because you have double quotes inside double quotes. Here is a list of the escape sequences in PHP:

Operators

In PHP, variables and values are performed by Operators, that is, they operate on variables and values in PHP. Look at the following expression: $z = $x + $y;

In the above expression x and y are two numbers. It is clear from the above expression that it would add x with y and the sum is z. The plus sign (+) inserted between x and y is an operator (Arithmetic Operator).

Operators used in PHP are categorically grouped in various sections:

1. Assignment Operators
2. Arithmetic Operators
3. Comparison Operators
4. String Operators
5. Logical Operators
6. Conditional Operators

Assignment operators

You can use the Assignment Operator to assign a value to a variable. Often a variable is assigned a value of another variable. In this case assignment operators are used. The equal character (=) is used here. Look at the following expression:

Example:

$first_var = 5;

$second_var = $first_var;

Here the values of both _$first_var‘ and _$second_var‘ variables are assigned the same

value i.e. 5.

Arithmetic operators

Look at the various Arithmetic Operators:

Example 01:

```
$adding = 2 + 4;
    $minus = 6 - 2;
$multiply = 5 * 3;
$divide = 15 / 3;
 $percent = 5 % 2;
echo —Result adding: 2 + 4 = —.$adding.‖<br />‖;
echo —Result minus: 6 - 2 = —.$minus.‖<br />‖;
echo —Result multiply: 5 * 3 = —.$multiply.‖<br />‖;
echo —Result divide: 15 / 3 = —.$divide.‖<br />‖;
echo —Result percent: 5 % 2 = — . $percent;
```

The output of the above program is as follows:

Result adding: 2 + 4 = 6
Result minus: 6 - 2 = 4
Result multiply: 5 * 3 = 15
Result divide: 15 / 3 = 5
Result percent: 5 % 2 = 1.

Comparison operators :

The _Comparison Operators‘ verify the relationship between a variable and its value. These operators are usually inserted within a conditional statement and it returns boolean values like true and false. Look at the various types of Comparison Operators:

String operators

There are two types of _String Operators‘:

- The Concatenating Operator (_.‘) and
- The Concatenating Assignment Operator (_.=‘).

The Concatenating Operator joins the right and the left string into a single string. The Concatenating Assignment Operators add the argument that is placed on the right side of the equal operator with the argument placed on the left side of the _equal‘ operator. Example:

```
$first_string = —Welcome‖;
$second_string = — Jack‖;
$third_string = $first_string . $second_string;
echo $third_string . —!‖;
```

The output of the above program is as follows:

Welcome Jack!

Logical operator

incrementing and decrementing

Incrementing and Decrementing operators are unary operators. Incrementing Operators

Increment operator increases the value of its operand by 1. The operand(variable) must be a integer value.

We have two types of Increment operator,

1. Pre-increment operator

++$var (Pre-increment : Increments $var by 1, then returns $var) **2.** Post-increment operator

$var++ (Post-increment : Returns $var, then increments $var by one)

Example 1: **Pre-increment operator**

```
<?php
$i=2;
//Increments $i by 1, then returns $i
echo ++$i ."<br>";
echo $i;
?>
```

Output

3
3

Example 2: **Post-increment operator**

```
<?php
$i=2;
//Returns $i, then increments $i by one echo $i++ ."<br>";
echo $i;
?>
```

Output

2
3

We also have two types of Decremental Operator's,

1. Pre-decrement Operator

++$var (Pre-decrement : Decrements $var by 1, then returns $var) **2.** Post-decrement Operator

$var++ (Post-decrement : Returns $var, then decrements $var by one)

Example 3: **Pre-decrement operator**

```
<?php
$i=2;
Decrements $i by 1, then returns $i
echo --$i ."<br>";
echo $i;
?>
```

Output

1
1

Example 2: **Post-decrement Operator**

```
<?php
$i=2;
//Returns $i, then decrements $i by one
echo $i-- ."<br>";
echo $i;
?>
```

Output

2

1

The ? : Operator

Let's check **conditional operator ? :** which can be used to replace **if...else** statements. It has the following general form:

Exp1 ? Exp2: Exp3;

Where Exp1, Exp2, and Exp3 are expressions. Notice the use and placement of the colon. The value of a ? expression is determined like this: Exp1 is evaluated. If it is true, then Exp2 is evaluated and becomes the value of the entire ? expression. If Exp1 is false, then Exp3 is evaluated and its value becomes the value of the expression.

Precedence of PHP Operators:

Operator precedence determines the grouping of terms in an expression. This affects how an expression is evaluated. Certain operators have higher precedence than others; for example, the multiplication operator has higher precedence than the addition operator:

For example

x = 7 + 3 * 2;

Here x is assigned 13, not 20 because operator * has higher precedence than + so it first get multiplied with 3*2 and then adds into 7.

Here operators with the highest precedence appear at the top of the table, those with the lowest appear at the bottom. Within an expression, higher precedence operators will be evaluated first.

PHP Control structure

The _Control Structure‘ controls the program flow of PHP. It can also check whether a block of code is executed or not. The syntax of the _Control Structure‘ is as follows: <?php

if (expression) statement

?>

Let‘s look at various types of _Control Structure‘:

- if
- elseif/else if
- switch
- while
- do-while
- for

- foreach

- if: It is used for conditional execution of code fragments. It returns Boolean values (true/false).

Look at the syntax of _if‘ Control Structure:

if (expr) statement

Example:

<?php

if ($x > $y)

{

echo —x is bigger than y‖;

}

?>

else: If an expression in the _if‘ statement returns false, then the _else‘ _Control Structure‘ is used.

Example:

<?php

```
if ($x > $y)
 {
 echo —x is bigger than y‖;
 }
else
{
echo —x is NOT bigger than y‖;
}
 ?>
```

elseif/else if:

It is a combination of _if‘ and _else‘ Control Structure. If the _if‘ Control Structure‘ returns a _false‘ value, then a different statement is executed by using the _else‘ Control Structure‘.

Example 1:

```
<?php
$t = date("H");

if ($t < "10") {
 echo "Have a good morning!";
 } elseif ($t < "20") {
 echo "Have a good day!";
 } else {
 echo "Have a good night!";
 }
?>
```

Example 2:

```
<?php //Change the messages to what you want.
$afternoon = "Good afternoon! ";
$evening = "Good evening! ";
$late = "Working late? ";
$morning = "Good morning! ";
$friday= "Get ready for the weekend! ";

//Get the current hour
```



```
$current_time =date('G');

//Get the current day
$current_day = date('l');
echo $current_time;
echo $current_day;

//12 p.m. - 4 p.m.
if ($current_time >= 12 && $current_time <= 16)
 {
echo $afternoon;
 }

// 5 p.m. to 11 p.m.
elseif ($current_time >= 17 && $current_time <= 24)
 {
 echo $evening;
 }
```

```
//12 a.m. - 5 a.m.
elseif ($current_time >= 1 && $current_time <= 5)
 {
 echo $late;
 }

// 6 a.m. to 11 a.m.
elseif ($current_time >= 6 && $current_time <= 11)
 {
 echo $morning;
 }

//If it's Friday, display a message
if ($current_day == "Friday")
 {
 echo $friday;
 }

?>
```

switch:

This Control Structure is similar to a series of _if' statements.
If you want to select one of many blocks of code to be executed, use the Switch statement.
The switch statement is used to avoid long blocks of if..elseif..else code. Syntax

```
switch (expression)
{
 case label1: code to be executed if expression = label1;
 break;
case label2: code to be executed if expression = label2;
 break;
     default: code to be executed if expression is different from both label1 and label2;
```



```
 }
```

Example

```
<?php
$favcolor= "red";

switch ($favcolor) {
 case "red":
 echo "Your favorite color is red!";
 break;
   case "blue":
 echo "Your favorite color is blue!";
 break;
   case "green":
 echo "Your favorite color is green!";
 break;
   default:
 echo "Your favorite color is neither red, blue, nor green!";
 }
?>
```

PHP Loop Types

while:

The _while‘ Control Structure executes the nested statements repetitively until the _while‘ statement returns a false value. The syntax of _while‘ control structure is as follows: while (expr)
statement
Example

```
<?php
$x = 1;

while($x <= 5)
{
 echo "The number is: $x <br>";
 $x++;
 }
?>
```

do-while :

It is very much similar to the _while‘ Control Structure. The only difference is that here the truth expression is checked at the end of every repetition. Look at the syntax of _do-while‘: <?

```
php
 $i = 0;
 do
{
 echo $i;
 } while ($i > 0);
?>
```

for:

This is one of the complex loops in PHP. The syntax of the _for‘ control structure is as follows:
for (expr1; expr2; expr3) statement
Example


```
<html>
<head>
<title>STAR</title>
</head>
<body>
<h2>PYRAMIND</h2>
<?php
if(isset($_POST["Submit"]))
{
$val = $_POST["val"];
$symbol = $_POST["symbol"];
 }
else if(isset($_POST["clear"]))
{
$val = "";
$symbol = "";
 }
?>
<form method="POST">
Enter the loop Number <input type="text" name="val" value=" <?php echo $val; ?
>" /> </br>
Enter the Symbol <input type="text" name="symbol" value=" <?php echo $symbo; ?>"/>
```

```
</br>
<input type="submit" name="Submit">
<input type="submit" name="clear" value="Reset" >
</form>
<?php
if($val and $symbol)
{
if(is_numeric($val))
{
for($i=1;$i<=$val;$i++)
{
for($j=1;$j<=$i;$j++)
{
echo "  ".$symbol;
 }
echo "<br />";
 }
 }
else
{
echo "Enter loop in Digits";
 }
 }
?>
</body>
</html>
```

foreach:

The foreach statement is used to loop through arrays. For each pass the value of the current array element is assigned to $value and the array pointer is moved by one and in the next pass next element will be processed.

Syntax

```
foreach (array as value)
  {
 code to be executed;
  }
```

Example

Try out following example to list out the values of an array.

```
<html>
<body>
<?php
 $array = array( 1, 2, 3, 4, 5);
foreach( $array as $value )
{
 echo "Value is $value <br />";
 }
?>
 </body>
</html>
```

This will produce following result:

Value is 1

Value is 2
Value is 3
Value is 4
Value is 5

The break statement

The PHP break keyword is used to terminate the execution of a loop prematurely. The break statement is situated inside the statement block. If gives you full control and whenever you want to exit from the loop you can come out. After coming out of a loop immediate statement to the loop will be executed.

Example

In the following example condition test becomes true when the counter value reaches 3 and loop terminates.

```
<html>
<body>
 <?php
 $i = 0;
 while( $i < 10)
 {
 $i++;
 if( $i == 3 )break;
 }
 echo ("Loop stopped at i = $i" );
 ?>
 </body>
</html>
```

This will produce following result:

Loop stopped at i = 3

The continue statement

The PHP continue keyword is used to halt the current iteration of a loop but it does not terminate the loop.

Just like the break statement the continue statement is situated inside the statement block containing the code that the loop executes, preceded by a conditional test. For the pass encountering continue statement, rest of the loop code is skipped and next pass starts.

Example

In the following example loop prints the value of array but for which condition becomes true it just skip the code and next value is printed.

```
<?php
$x=1;
echo 'List of odd numbers between 1 to 10 <br />';
while ($x<=10)
{
if (($x % 2)==0)
{
$x++;
continue;
 }
else
{
echo $x.'<br />';
$x++;
 }
```

}
This will produce following result
List of odd numbers between 1 to 10
1
3
5
7
9

CHAPTER 6

DATE FUNCTION ()

In PHP the date() function is used to format a timestamp or a date. It arranges a timestamp into a readable date and time. Using the date/ time functions, you can format date and time on the server. However, these functions entirely depend on the server settings. Here you can use the syntax,
date (format, timestamp).
Look at the table below:
Format: This parameter is essential. It assigns the timestamp format.
Timestamp: This Parameter is optional. This takes the Date or/and time that you want to format. If no value is provided then the current time is used for formatting. In the date function, the first parameter specifies about formatting date and time. Several letters are used to represent date and time formats. Some commonly used letters are given below:

- d - Represents day of a month (01-31)
- D - Represents day in three letter text format
- m - Represents month, as a number (01-12)
- M - Represents month in three letter text format
- Y - Represents year in four digits
- y - Represents year in two digits
- a – —am‖ or —pm‖
- A – —AM‖ OR —PM‖
- F – Full name of the month (January- December)
- g – Hours in 12- hour format without leading zero (1-12)
- G – Hours in 24- hour format without leading zero (0-23)

- h – Hours in 12- hour format with leading zero (01-12)
- H – Hours in 24- hour format with leading zero (00-23)
- i – minutes with leading zero(00-59)
- j – day of month without leading zero
- l – the full name of the day (Monday- Sunday)
- n – the month as a number, without leading zero(1-12)
- s – the seconds with leading zero(00-59)
- t – the number of days in a given month (28-31)
- w – the day of the week as a number (0-6, 0=Sunday)

Arrays

In PHP, arrays are ordered data maps and are used to store, manage and operate a set of variables. To put it simply, an array is a data structure that holds multiple data within a single identifier. There are two parts in an Array - Values and Keys. While Values contain information to be stored, Keys are used to identify these values. It is allocated to a single variable. It holds significant information, popularly termed as Array Elements. This information can be used for a number of times in a program. Either non negative Integers or Strings are used as Keys. The arrays that use non-negative Integers as Keys are termed as Scalar Arrays. These are Associative Arrays that use Strings as keys. An Array may contain different Array(s) popularly known as Multidimensional Arrays.

The syntax of an Array is as follows:

$array[key] = value;

Look at the simple example below:

Example:

$student_array[0] = —Rohit‖;
$student_array[1] = —Rahul‖;
$student_array[2] = —Sourav‖;
$student_array[3] = —Abdul‖;

In the above example, the names of the students (Rohit, Rahul, Sourav and Abdul) are the Values and the numeric characters (0, 1, 2 and 3) are the Keys of this array. **Array function**
array — Create an array
count — Count all elements in an array
current — Return the current element in an array
prev () - Rewind the internal array pointer
next () - Advance the internal pointer of an array

end () - Set the internal pointer of an array to its last element

```
<?php
$transport = array('foot', 'bike', 'car', 'plane');
$mode = current($transport); // $mode = 'foot';
$mode = next($transport); // $mode = 'bike';
$mode = current($transport); // $mode = 'bike';
$mode = prev($transport); // $mode = 'foot';
$mode = end($transport); // $mode = 'plane';
$mode = current($transport); // $mode = 'plane';
?>
```

sizeof()
The sizeof() function returns the number of elements in an array.
The sizeof() function is an alias of the count() function.

```
<?php
$cars=array("Volvo","BMW","Toyota");
echo sizeof($cars);
?>
```

Output:
3
Pos()
The pos() function returns the value of the current element in an array.

This function is an alias of the current() function.

```
<?php

$people = array("Peter", "Joe", "Glenn", "Cleveland");

echo pos($people) . "<br>";
?>
```

Output

Peter
Reset()

The reset() function moves the internal pointer to the first element of the array.

```
<?php

$people = array("Peter", "Joe", "Glenn", "Cleveland");
```

```
echo next($people) . "<br>";

echo reset($people);
?>
```

Output
Joe
Peter

Variable function

isset — Determine if a variable is declared and is different than **NULL**

```
<?php

$var = '';

// This will evaluate to TRUE so the text will be printed.
if (isset($var)) {
 echo "This var is set so I will print.";
 }
?>
```

empty — Determine whether a variable is empty

```
<?php
$var = 0;

// Evaluates to true because $var is empty
if (empty($var)) {
 echo '$var is either 0, empty, or not set at all';
 }

// Evaluates as true because $var is set
if (isset($var)) {
```



```
 echo '$var is set even though it is empty';
 }
?>
```

There are three different kind of arrays and each array value is accessed using an ID c which is called array index.

- **Numeric array** – An array with a numeric index. Values are stored and accessed in linear fashion.

- **Associative array** – An array with strings as index. This stores element values in association with key values rather than in a strict linear index order.

- **Multidimensional array** – An array containing one or more arrays and values are accessed using multiple indices

Numeric Array

These arrays can store numbers, strings and any object but their index will be represented by numbers. By default array index starts from zero.

Example

Following is the example showing how to create and access numeric arrays. Here we have used **array()** function to create array. This function is explained in function reference.

```
<html>
 <body>
 <?php
```

```
$numbers[0] = "one";
$numbers[1] = "two";
$numbers[2] = "three";
$numbers[3] = "four";
$numbers[4] = "five";
foreach( $numbers as $value ) {
echo "Value is $value <br />";
}
?>
</body>
</html>
```

Output

Value is one
Value is two
Value is three
Value is four
Value is five

Associative Arrays

The associative arrays are very similar to numeric arrays in term of functionality but they are different in terms of their index. Associative array will have their index as string so that you can establish a strong association between key and values.

Example

```
<!DOCTYPE html>
<html>
<body>
<?php
$age = array("Peter"=>"35", "Ben"=>"37", "Joe"=>"43");
echo "Peter is " . $age['Peter'] . " years old.";
?>
```

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

OUTPUT

Peter is 35 years old.

Multidimensional Arrays

A multi-dimensional array each element in the main array can also be an array. And each element in the sub-array can be an array, and so on. Values in the multi-dimensional array are accessed using multiple index.

Example

In this example we create a two dimensional array to store marks of three students in three subjects –

This example is an associative array, you can create numeric array in the same fashion. <html>

```
<body>
<?php
$marks = array(
"mohammad" => array (
"physics" => 35,
"maths" => 30,
"chemistry" => 39
),
"qadir" => array (
"physics" => 30,
"maths" => 32,
"chemistry" => 29
),

"zara" => array (
"physics" => 31,
"maths" => 22,
"chemistry" => 39
)
);

/* Accessing multi-dimensional array values */
echo "Marks for mohammad in physics : " ;
echo $marks['mohammad']['physics'] . "<br />";
echo "Marks for qadir in maths : ";
echo $marks['qadir']['maths'] . "<br />";
echo "Marks for zara in chemistry : "
echo $marks['zara']['chemistry'] . "<br />";
?>
</body>
</html>
```

This will produce the following result –

```
Marks for mohammad in physics : 35
```

Marks for qadir in maths : 32
Marks for zara in chemistry : 39

Strings and string operations

A string is a sequence of characters, like "Hello world!". PHP uses several functions related to string operations

The PHP strlen() function

The strlen() function returns the length of a string, in characters. The example below returns the length of the string "Hello world!": strlen() is often used in loops or other functions, when it is important to know when a string ends. (i.e. in a loop, we might want to stop the loop after the last character in a string).

```
<?php
echo strlen("Hello world!"); // outputs 12
?>
```

Output:

12

Count The Number of Words in a String

The PHP str_word_count() function counts the number of words in a string: Example

```
<?php
echo str_word_count("Hello world!"); // outputs 2
?>
```

Outputs:

2

Reverse a String

The PHP strrev() function reverses a string:

Example

```
<?php
echo strrev("Hello world!"); // outputs !dlrow olleH
?>
```

Outputs:

!dlrow olleH

Search For a Specific Text Within a String

The PHP strpos() function searches for a specific text within a string.

If a match is found, the function returns the character position of the first match. If no match is found, it will return FALSE.

The example below searches for the text "world" in the string "Hello world!": Example

```
<?php
echo strpos("Hello world!", "world"); // outputs 6
?>
```

Outputs:

6

Replace Text Within a String

The PHP str_replace() function replaces some characters with some other characters in a string.
The example below replaces the text "world" with "Dolly":
Example

```
<?php

echo str_replace("world", "Dolly", "Hello world!"); // outputs Hello Dolly!

?>
```

Outputs:
Hello Dolly!

PHP strtolower() function
The strtolower() function returns string in lowercase letter.
Syntax
string strtolower (string $string)

Example
```
<?php
$str="My name is KHAN";
$str=strtolower($str);

echo $str;
?>
```

Output:
my name is khan
2) PHP strtoupper() function
The strtoupper() function returns string in uppercase letter.
Syntax
string strtoupper (string $string)

Example

```
<?php
$str="My name is KHAN";
$str=strtoupper($str);

echo $str;
?>
```
Output:
MY NAME IS KHAN

strcasecmp()
The strcasecmp() function is used to compare two case sensitive strings. This function was introduced in PHP3. Look at the example below:
```
<html>
 <body>
 <?php
 $text1 ="Good morning";
 $text2 = "Good morning";
```



```
 if (strcasecmp($text1, $text2) == 0) {
 echo '$text1 is equal to $text2 in a case-insensitive string comparison'; }    ?>
 </body>
</html>
```
Output
$text1 is equal to $text2 in a case-insensitive string comparison
substr_count()
The substr_count() function is used to count the number of times a substring appears in a string. This function was introduced in PHP4.
```
<html>
 <body>
 <?php print substr_count("Hello how are you and what are you doing now?", "are"); ?>
</body>
```

</html>
Output
2

Multiple choice questions

1. Which of the following is not a valid example of variable declaration? a. $name
b. $address2
c. $colour_30.
d. $2name
2. Give the output for the following code
$first_name = 'Chhaya';
$greeting1 = "Hello, my first name is $first_name. ";
echo $greeting1;
a. Hello, my first name is Chhaya.
b. Hello, my last name is $Iast_name.
c. $greeting1
d. Hello, my first name is
3. To concatenate 2 strings which of the following character is used **a. .**

b. ,
c. $
d. *
4. ----------are named and indexed collections of other values. a. Strings
b. Arrays
c. Objects
d. Resources
5. _____hold references to resources external to PHP
a. Strings
b. Arrays
c. Objects
d. Resources

6. Which of the following is not a —special datatype‖?
a. Boolean
b. Null
c. Array
d. Object
7. Which of the following is used to print the next character as a dollar not as a part of variable?
a. \d
b. $
c. \\$
d. \$

8. Which of the following represents conditional operator
a. ?:
b. ??
c. ?;
d. ?.
9. Which keyword is used to halt the current iteration of a loop but it does not terminate the loop

a. Continue
b. Break
c. Halt
d. Stop
10. Which Letter is used to represent —AM‖ in Date
a. A
b. a
c. D
d. d
11. Which of the following is used to Set the internal pointer of an array to its last element?
a. count
b. current
c. next
d. end
12. Which of the following determines if a variable is declared and is different than **NULL**
a. Isset
b. Empty

c. Current
d. Set
13. An array with string index is called as
a. Numeric array
b. Associative array
c. Multidimensional array
d. Indexed Array
14. PHP‘s numerically indexed array begin with position _____ a.
1
b. 2
c. 0
d. -1
15. Which of the following function is used to get the value of the previous element in an array?
a. last()
b. before()
c. prev()
d. previous()
16. Multidimensional arrays are simple arrays that have
a. One dimensional
b. Many arrays stored in them
c. No indexes
d. 1 element
17. For finding nonempty elements in array we use
a. is_array ( ) function
b. sizeof ( ) function
c. array_count ( ) function
d. count ( ) function

18. When we simply want iteration through looping an array values we can use a. current ( )

b. foreach ( )
c. next ( )
d. prev()

19. Count ( ) function is identical to
a. is_array ( ) function
b. in_array ( ) function
c. sizeof ( )
d. isset ( ) function
20. How does the identity operator === compare two values?
a. It converts them to a common compatible data type and then compares the resulting values
b. It returns True only if they are both of the same type and value
c. If the two values are strings, it performs a lexical comparison
d. It bases its comparison on the C strcmp function exclusively
21. Which of the following is not a global variable?
a. $_POST
b. $GLOBALS
c. $_REQUEST
d. $NUM

22. _____ loop will execute at least once.
a. While
b. Do while
c. For
d. Foreach
23. Which among the following has highest precedence over others? a.
==
b. ++
c. &&
d. +
24. Which of the following is unary operator?
a. --
b. -
c. *
d. &&
25. _____ are used in PHP to performs what is known as variable expansion **a. Double quotes**
b. Single quotes
c. Comma
d. Semicolon

Long Question
1. What are the different datatypes available in PHP
2. What is Escaping Characters? Write brief notes on Escaping Characters. 3. Explain the following with example
a. Assignment operator
b. Logical operator
4. With appropriate example explain the difference between post increment and pre increment
5. With syntax and example explain, else if and switch statements in PHP

6. Why do we need break and continue statements, explain with example? 7. Explain date () function with its syntax. List and explain any eight format which can be used with it
8. What is an array give its syntax? Explain Reset () and Sizeof () function with example 9. Define numeric and associative array with example
10. With example, explain multi-dimensional array
11. With syntax and example explain the following:
a. String length
b. Count the Number of Words in a String
c. Reverse a String
d. Search for a Specific Text Within a String
12. Explain the following with example, and give respective output.
a. substr_c ount()
b. strcasec mp()

UNIT IV
WORKING WITH FORM

PHP Forms
Building form

GET and POST

query string portion of the URL

ing the POST method, its values will not be displayed the query string portion of the URL

An interactive web site requires user input, which is generally gathered through forms. As in the paper - based world, the user fills in a form and submits its content for processing. In a web application, the processing isn ‘ t performed by a sentient being; rather, it is performed by a PHP script. Thus, the script requires some sort of coded intelligence. When you fill in a paper form, you generally use a means to deliver its content (the postal service is one example) to a known address (such as a mail - order bookstore). The same logic applies to online forms. The data from an HTML form is sent to a specific location and processed.

The form element is rather simple in HTML. It states where and how it will send the contents of the elements it contains once submitted. It is after that point that PHP comes into play. PHP uses a set of simple yet powerful expressions that, when combined, provide you with the means to do virtually anything you want. The PHP script receives the data from the form and uses it to perform an action such as updating the contents of a database, sending an e - mail, testing the data format, and so on.

Handling forms is a multipart process. First a form is created, into which a user can enter the required details. This data is then sent to the web server, where it is interpreted, often with some error checking. If the PHP code identifies one or more fields that require reentering, the form may be redisplayed with an error message. When the code is satisfied with the accuracy of the input, it takes some action that usually involves the database, such as entering details about a purchase.

To build a form, you must have at least the following elements:
• An opening <form> and closing </form> tag
• A submission type specifying either a GET or POST method
• One or more input fields
• The destination URL to which the form data is to be submitted