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Kendriya Vidyalaya Sangathan



Guwahati Region

STUDY MATERIAL

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TIPS FOR STUDENTS

1. Prepare those questions first, which you feel easy for you.
2. Important terms of a topic must be memorized.
3. Practice the solutions in writing rather than just reading.
4. Practice all similar type questions at a time.
5. Read all the questions carefully, before answering.
6. Attempt such questions first, for which you are confident that it will leave a good impression.
7. Don't stretch the answer unnecessarily.
8. Try to write answer in points.
9. Important point should be underlined but be careful, don't waste your time.
10. Try to illustrate your answer graphically, if possible.
11. Don't leave any question unanswered.
12. Solve previous years question papers.
13. Make precise and concise notes, point wise for exam time preparation/quick revision.
14. Plan your study judiciously.
15. A proper timetable for study should be followed strictly.
16. Take healthy and timely diet during examinations. Also take sound sleep everyday.
17. Take a break from time to time in each study period.
18. Do not forget to revise all the topics one day prior, to the day of examination.
19. Take good care of your health.

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CHAPTER 1

NETWORKING AND OPEN STANDARDS

Brief Summary of the Chapter:

In this chapter we are going to study about computer Networks, associated terminology and related concept along with network devices.

Key Points of the Chapter:

- **Network:** A Computer Network is a number of computers (Usually called terminals) interconnected by one or more transmission paths.
- **Need of Networking:**
 1. Resource Sharing
 2. File and data sharing.
 3. Data security and centralized security
 4. High Reliability :
 5. Communication Media
 6. High Speed
 7. Flexible working environment
 8. Cost factor
- **Application of Networks**
 1. Sharing of data, services and resources
 2. Access to remote database
 3. Communication facilities

a. Elementary Terminology of Networks :

1. **Nodes (Workstations):-** The term nodes refer to the computers that are attached to a network and are seeking to share the resources.
 2. **Server:-** A computer that facilitates the sharing of data, software and hardware resources on the network
 3. **Network Interface Unit (NIU) (MAC Address):-** A network interface unit is interpreter that helps in establishing the communication between the server and the client.
 4. **IP Address:-** Every machine on a TCP bar IP Network has a unique identifying no. called an IP Address.
 5. **Domain Name:-** It is a way to identify and locate the computers connected to the internet. It must be unique.
- a. **NETWORK TOPOLOGIES :** The term Network Topologies refer to the way in which the nodes of a network are physically connected together. The important network topologies are

1) Bus Topology or Linear Topology : In this topology a single length of the transmission medium is used onto which the various nodes are attached. The transmission from any station travels the length of the bus, in both directions and can be received by all other stations. The bus has a terminator at either end which absorbs the signal, removing it from the bus.

Characteristics:

- Short cable length and Simple wiring layout
- A single cable called trunk is used through which all data propagates and to which all nodes are connected
- Easy to extend
- There is no central point of failure on a bus because there is no hub.
- Entire network shuts down if there is break in the main cable.
- Terminators are required at both ends of the backbone cable.
- Difficult to identify the problem if the entire network shut down.
- Addition of nodes negatively affects the performance of the whole network.
- Only one computer can send messages at a time

2) Ring Topology: In a ring topology each node is connected to two and only two neighboring nodes. Data is accepted from one of the neighboring nodes and is transmitted onwards to another. Thus data travels only one direction.

- Every computer serves as a repeater to boost signals
- Short cable length.
- Suitable for optical fiber
- Difficult to add computers
- More expensive
- If one computer fails, whole network fails
- Data clashes can also occur if two machines send messages at the same time.

3) Star Topology: A star topology is designed with each node connected directly to the server via hub or switch. This topology is used in most existing information network. Data on a star network passes through the hub or concentrator before continuing to its destination.

- Easy to install and wire
- No disruptions to the network when connecting or removing devices.
- Easy to add new station as each station has direct cable connection to hub or switch.
- Depending on the intelligence of hub, two or more computers may send message at the same time
- One malfunctioning node does not affect the rest of the network.
- Required more cable length than a linear topology.
- All signals transmission through the hub; if down, entire network down

NETWORK DEVICES

1. MODEM(MODulator DEModulator) : Modem is a device that converts digital data originating from a terminal or computer to analog signals used by voice communication network such as the telephone system.

At one end, modems convert the digital pulse to audible tones and convert audio tones back to digital pulses at the other

2. RJ –45 Connector:

The RJ-45 is a single line jack for digital transmission over ordinary phone wire. It is a 8 wire connector which is commonly used to connect computers on the LAN(especially Ethernets). RJ – short for Registered Jack – 45

3. **Ethernet Card or NIC or NIU:** A NIC(Network Interface card) is a computer circuit board or card that is installed in computer so that it can connect to network. It is suitable for coaxial or twisted pair cables.
4. **Hub:** Hub is a device used to connect several computers together. It is a multi-port card. Hubs forward any data packets including e-mail, word processing documents or print request – they receive over one port from one workstation to all of their remaining ports
5. **Switches :** Switches are smart hubs that send data directly to the destination rather than everywhere within network. When the switch receives a packet, the switch examines the destination and source hardware address and compares them to a table of network segments and addresses. If the segments are the same the packet is dropped and if the different then the packet is forwarded to the proper segments.
6. **Repeaters :** A repeater is a device that amplifies a signal being transmitted on the network. Since a signal loses strength as it passes along a cable, it is often necessary to boost the signal with this device.. The repeater electrically amplifies the signal it receives and rebroadcasts it.
7. **Router:**
A device that works like a bridge but can handle different protocols, is known as router. It is used to separate different segments in a network to improve performance and reliability.

Solved Questions:

Q1. What is MAC Address?

Ans : In computer networking, a **Media Access Control address** (MAC) is a unique identifier assigned to most network adapters or network interface cards (NICs) by the manufacturer for identification, and used in the Media Access Control protocol sub-layer.

Q2. Write two advantages of networks.

Ans: Advantages: i) Data or information can be shared among the users.
ii) Fast communication can be achieved.

Q3. Write two disadvantages of networks.

Ans : Disadvantages of networks:

- i. Sophisticated Hardware and software technology is required.
- ii. Expensive to install network.

Q4. What is communication channel? Name the basic types of communication channels available.

Ans: What is communication channel? Name the basic types of communication channels available. Communication channels mean the connecting cables that link various workstations. There are 3 basic types of cables:

- Twisted Pair cables
- Coaxial cables
- Fiber-optic cables

Q5. Define a network.

Ans: A computer network is a system in which computers are connected to share information and resources.

Q6. What is IP address?

Ans A unique number consisting of 4 parts separated by dots, e.g. 165.113.245.2 Every machine that is on the Internet has a unique IP number - if a machine does not have an IP number, it is not really on the Internet.

Q7. What is domain name? How is it alternatively known?

Ans The unique name that identifies an Internet site. Domain Names always have 2 or more parts, separated by dots. The part on the left is the most specific, and the part on the right is the most general. E.g.: matisse.net

Q8. What are the various types of networks?

Ans : Network can be classified on the basis of their size, complexity and geographical spread. On the basis of geographical spread it can be classified as Local Area Network, Metropolitan Area Network and Wide Area Network.

Q9. What is the difference between MAN and WAN?

Ans : A **metropolitan area network (MAN)** is a large computer network that usually spans a city or a large campus.

WAN is a *network* that covers an area larger than a single building or campus such as across the cities or countries.

Q10. What is meant by Topology? Name some popular topologies.

Ans: **Network topology** is defined as the interconnection of the various elements (links, nodes, etc.) of a computer network. In computer networking, topology refers to the layout of connected devices.

- Bus topology
- Star topology
- Ring topology
- Tree topology
- Mesh topology

Q11. What are the similarities and differences between bus and tree topologies?

Ans: In bus topology each machine is connected to a single cable. Each computer or server is connected to the single bus cable through some kind of connector.

Tree topology is a network with the shape of an inverted tree in which a single link between two nodes.

Q12. What are the limitations of star topology?

Ans i) Central node dependency: In this topology central node is a controller of the network. If the central node fails, the entire network will be failed.

ii) Difficult to expand: The addition of a new node to a network involves a connection all the way to the central node.

Unsolved Questions:

1. What are the goals of network?
2. Write the applications of network?
3. What do you understand by domain name resolution?
4. What are communication channels? Discuss various channels available for networks?
5. Advantages and disadvantages of the followings :
 - i. optic fiber
 - ii. coaxial cables
 - iii. twisted pair cables
 - iv. radio waves
 - v. microwaves
 - vi. Satellites
6. Discuss and compare various types of networks?
7. Explain mostly used topologies.
8. What are hubs? What are its types?
9. What is the role of a switch in a network?
10. Discuss repeater.
11. What are common threats to network security?

12. What are denial of services attacks?
13. How can you prevent/ counter threats of network security?
14. When do you think, ring topology becomes the best choice for a network?
15. Write the two advantages and two disadvantages of star topology in network.
16. Write the disadvantages of twisted pair cables.
17. Define Hub.
18. Define switch.

Chapter 2

FREE AND OPEN SOURCE SOFTWARE

Brief Summary of the Chapter:

In this chapter we are going to discuss about various open source software and how they are different from software which are not open source.

Key Points:

Free Software: It means software is freely accessible, free to use, changed, improved, copied, and distributed without any payments.

Four kinds of freedom:

- ▶ Freedom to run the program for any purpose
- ▶ Freedom to redistribute copies.
- ▶ Freedom to study how the program works
- ▶ Freedom to improve the program and release your improvements to the public

Open Source Software:

Definition: The categories of software / programs whose Licenses do not impose many conditions.

Features:

1. Freedom to run and use the software
2. Modify the program
3. Redistribute copies of either original or modified program (without paying royalties to previous developers).

It can be freely used for modifications, but it does not have to be free of charge. Its source code is available.

Criteria for the distribution of open source software

1. Free distribution
2. Source code
3. Derived works
4. Integrity of the Author's Source code
5. No discrimination against fields of endeavor.
6. Distribution of License
7. License must not be specific to a product
8. License must not restrict other software.

FOSS (free and open software):Free software- no payments

Open source software- for technical progress

OSS and FLOSS

- ▶ OSS- Source code is available

(Open source modified and redistributed software) free of cost or with nominal charge.

► FLOSS- (free libre and open source software)

FSF (free software foundation)

- Founded by Richard Stallman in 1985 to support GNU project.
- Non-profit organization created for the purpose of supporting free software movement

GNU (free and open source)

- Objective: To create a system compatible to UNIX but not identical with it.
- Now it offers a wide range of software, including applications apart from operating system.

Proprietary software (neither open nor freely available)

- Definition- Its use is regulated and further distribution and modification is either forbidden or requires special permission by the supplier
- Source code is not available.

Freeware

- Free of cost
 - Copying and further distribution but not modification.
 - Source code is not available
- Example Internet Explorer

Shareware

- Right to redistribute copies
- After a certain period of time license fee should be paid.
- Source code is not available.
- Modifications are not possible.
- Objective- to increase user's will to pay for the software. Limits functionality after a trial period of 1-3 months.

Important Software's

LINUX

- Linux: - free and open source software.
- It can be downloaded from www.linux.org
- Linux is a part of popular web server program LAMP (Linux, apache, MySql, PHP).

Mozilla

- Freeware
 - No source code available
 - free internet software
- It can be downloaded from www.mozilla.org

Apache Server

- The most common web server (or HTTP server) software on the Internet.
- Apache is designed as a set of modules, enabling administrators to choose which features they wish to use and making it easy to add features to meet specific needs including handling protocols other than the web-standard HTTP.
- Apache HTTP server is an open source web server.
- It is component of LAMP.

Denial-of-services attacks:

DOS are those attacks that prevent the legal users of System from accessing or using the resources, information or capabilities of the system. It may be of following types:

- Denial of Access to Information: Such attacks cause deletion or changing of important information to non-readable format.
- Denial of Access to Applications: Such attacks make the applications unusable or unavailable for legal user of the system.
- Denial of Access to Communications: Such attacks includes cutting of communication wire, jamming radio communications, flooding a system with junk mail.

Threats to network security: It may be of following types:

- **Snooping:** It refers to unauthorized access to someone else's data, email or computer activity.
- **Eavesdropping:** It refers to unauthorized listening / intercepting someone else's private communication / data/ information.

Standards:

Standards refers to an established set of rules or requirements which are approved by recognized body or widely used across various software platforms. For ex.: PDF (Portable documents format) is a technical standard widely used by the industry.

They are of two types: Proprietary Standards and Open Standards.

Proprietary standards are those for which users have to buy license to use them. For e.g. MS Office format .doc, .ppt, .xls etc

Open Standards are internationally accepted technical standards that guarantee that data can be exchanged across platforms and for any applications. Open is freely open to all.

Advantages of Open Standards:

- Making the data accessible to all.
 - It ensures data is application and platform independence.
 - Diversity and Interoperability in the Industry i.e. it enables business and people to go for any technology of their choice as per their needs and budget.
- E.g.: ASCII Characters, HTML file, Joint Photographic Expert Group, Portable Network Graphic etc.

Ogg Vorbis:

- It is a new audio compression which is open format developed by Xiph.org. It is roughly comparable to mp3, mpeg-4 formats and is completely free, open and unpatented. Hence it imposes no restrictions on its usage, types of usage, distributions, redistribution etc.

Indian Language Computing:

- Indian Language computing refers to ability to interact in diverse Indian language on electronic system.

How to represent character in Memory?

- ASCII: American Standard Code for Information Interchange is widely used alphanumeric code in most microcomputers and minicomputers and in many mainframes. It is 7 bit code hence it can represent standard $2^7 = 128$ characters.

ISCII:

- Indian Standard Code for Information Interchange (ISCII) is an eight bit code capable of coding 256 characters. It retains all ASCII characters and also offers coding for Indian Scripts.

Transliteration:

- When we type Indian Language words phonetically in English script and tool will automatically convert them into corresponding language words called as transliteration.

Unicode

- Unicode provides a unique number for every character, no matter what the platforms, no matter what the program, no matter what the language. Unicode can represent 94140 characters. Unicode standard has incorporated Indian Scripts under the group named Asian scripts. Indian

scripts included as Devnagari, Bengali, Gurumukhi, Gujarati, Oriya, Tamil, Telgu, kannada, and Malayalam.

Fonts:

- A Font refers to a set of displayable text characters called glyphs, having specific style and size. There are two categories of font: **True Type Font** and **Open Type Font**.
- **True Type Font:** It is developed by Apple and licensed to Microsoft. It is 8 bit font which is compatible with Microsoft Windows and MAC OS.
- **Open Type Font:** It is the extension of the True Type Font Format which is 16 bits font and support 65536 characters (Unicode characters).

Indian Language Text Entry:

Many Tools / software have been developed to facilitate the typing of Indian Language text. There are two types text entries:

- **Phonetic Text Entry:** Words typed as per their pronunciation in English script and later on converted to Corresponding (Hindi/Gujarati) language work is known as phonetic text entry.
- **Key map based text entry:** When you type text from a keyboard having key mapping of Indian language characters, is known as key map based text entry.

Questions and Answer

Q1. What is OSS?

Ans Open Source Software is a software available with source code and free to change/edit / redistribute and imposed no further restrictions on product or its usage.

Q2. Expand the terms: OSI, FLOSS, FSF, GNU, W3C, and PHP.

Ans: **OSI:** Open source Initiative

FLOSS: Free Libre and Open Source Software.

FSF: Free software Foundation created for the purpose of supporting free Movement.

GNU : GNU's Not Unix Project established with an objective to create a system Compatible to UNIX but not identical with it.

W3C: World Wide WEB consortium is responsible for producing the software standards for World Wide Web.

PHP: Hypertext Pre-processor is a widely used open source programming language primarily for server side applications and developing dynamic web content.

Q3. What is free software?

Ans : Free Software means the software is freely accessible and can be freely used, changed, improved, copies and distributed to others.

Q4. Define freeware and shareware.

Ans The freeware is the software available free of cost and allows copying and further distribution but does not allows modification as its source code is not available.

Shareware is as software which is available for redistribution for stipulated time but after some time some license fee is required to be paid.

Q5. What is openoffice.org?

Ans It is Office an application suite which is free software and directly competes with Microsoft Office. It is compatible with MS Operating System, UNIX, MAC OS.

Q6. What is font? What is OTF?

Ans : A font is a set of displayable or printable text characters having specific style and size. Open Type Font: It is the extension of the True Type Font Format which is 16 bits font and support 65536 characters (Unicode characters).

Q7. What are different font categories?

Ans : There are two categories of font: True Type Font and Open Type Font.

True Type Font: It is developed by Apple and licensed to Microsoft. It is 8 bit font which is compatible with Microsoft Windows and MAC OS.

Open Type Font: It is the extension of the True Type Font Format which is 16 bits font and support 65536 characters (Unicode characters).

Q8. Define ODF.

Ans : ODF is an Open Document file Format used for exchanging office documents such as memos, reports, spreadsheets, database, charts and presentations. Open document is open, XML based file format used for exchanging office documents such as memos, reports, spreadsheets, database, charts and presentations.

Q9. What is key map based text entry?

Ans: When you type text from a keyboard having key mapping of Indian Languages characters is known as key map based text entry.

Q10. What is Unicode?

Ans10: Unicode provides a unique number for every character, no matter what the platforms, no matter what the program, no matter what the language. Unicode can represent 94140 characters.

Q11. What is ISCII?

Ans : Indian Standard Code for Information Interchange (ISCII) is a coding scheme for representing various writing systems of India. It encodes the main Indic scripts and a Roman transliteration. When we type Indian Language words phonetically in English script and tool will automatically convert them into corresponding language words called as transliteration.

Q12. What is Indian Script key map known as?

Ans : **Key map based text entry:** When you type text from a keyboard having key mapping of Indian language characters, is known as key map based text entry.

Unsolved Questions

1. What is open source software?
2. Compare Free software and open source software.
3. Compare OSS and floss.
4. Compare Proprietary software and free software.
5. Compare Free ware and shareware.
6. Compare Freeware and free software
7. Write Short notes on GNU.
8. Write short notes on LINUX.
9. Write Short notes on MOZILLA.
10. Write short notes on APACHE.
11. Write short notes on POSTGRE SQL.
12. Write short notes on PHP.
13. Write short notes on Open Office.
14. What are technological standard and its various categories?
15. Mention some advantages of open standards.
16. What is the significance of Unicode in terms of Indian Language Computing?
17. How phonetic text entry is different from key map based text entry?
18. What is Ogg Vorbis? Why?
19. How to represent character in Memory?
20. What is font and its types?

Chapter 3

PROGRAMMING FUNDAMENTALS

Brief Summary of the Chapter:

In this chapter we well understand Basics of programming and programming environment tools.

Key Points:-

IDE- Integrated development Environment:

- A programming environment, where all the tools required for programming are available under one roof is called IDE.

RAD- Rapid Application Development:

- A programming style which aims at building programs fastly through the use of tools and wizards is called RAD.

Token:

- The smallest individual unit in a program is known as Token. Java has the following types of tokens: *keyword, Identifier, literal, punctuators and operators*.

1) **Keywords:** Keywords are words that have a specific predefined meaning in Java. They cannot be used as variable names. They are also known as reserve words. Eg. int, void, private, for, while etc.

2) **Literals:** These having fixed data values are referred to as Literals. They are also known as Constants. Various types of literals available in Java are :

- *integer literals*
- *Floating literals*
- *Boolean literals*
- *Character literals*
- *String literals*
- *Null literals*

3) **Identifiers:** These have various names given to the program segments. For example variable name, class name, function name.

There are four rules to create Identifiers:

- i) It is a combination of alphabets, numbers, underscore and dollar sign
- ii) First character must be alphabet or underscore or dollar sign
- iii) Blank space are not allowed.
- iv) Reserve words cannot be used as variable name.

4) **Operators:** Operators are symbols or group of symbols, which represent a operation in java. Operators in java can be classified as Unary operator- operators that require only one operand like ++, -- etc; Binary operator – operator that require two operands like +, - *, > <, == etc.; ternary operator – which require three operands like?::.

Other types of operator are : Airthmetic operator, Relational operator and Logical operator.

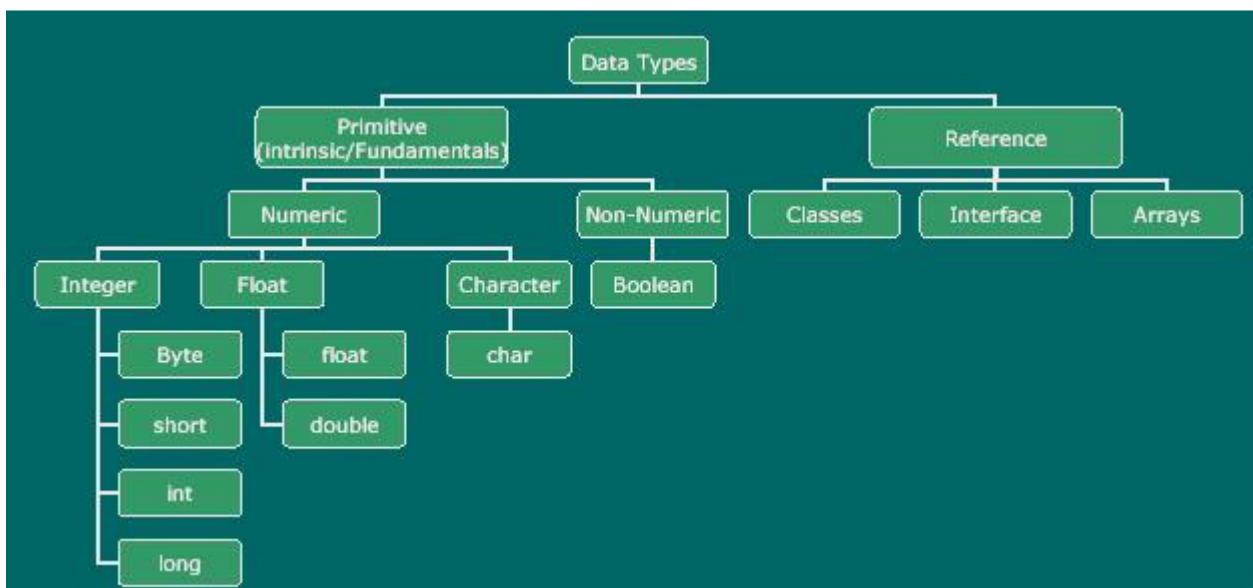
5) **Punctuator or Separator:** There are nine separator in Java:

() { } [] . ; ,

- **Escape Sequence:** When a backslash is encountered in a string of characters, the next character is combined with the backslash to form an escape sequence. Escape sequences are normally used to control printed or displayed output. For example, \a, \b, \n, \t, etc.
- **Primitive Data Types:** The Java programming language is statically-typed, which means that all variables must first be declared before they can be used.A primitive type is predefined by the language and is named by a reserved keyword. The eight primitive data types supported by the Java programming language are:

1. **byte:** The byte data type is an 8-bit signed two's complement integer. It has a minimum

- value of -128 and a maximum value of 127 (inclusive).
2. **short**: The short data type is a 16-bit signed two's complement integer. It has a minimum value of -32,768 and a maximum value of 32,767 (inclusive).
 3. **int**: The int data type is a 32-bit signed two's complement integer. It has a minimum value of -2,147,483,648 and a maximum value of 2,147,483,647 (inclusive).
 4. **long**: The long data type is a 64-bit signed two's complement integer. It has a minimum value of -9,223,372,036,854,775,808 and a maximum value of 9,223,372,036,854,775,807 (inclusive).
 5. **float**: The float data type is a single-precision 32-bit IEEE 754 floating point.
 6. **double**: The double data type is a double-precision 64-bit IEEE 754 floating point.
 7. **boolean**: The boolean data type has only two possible values: true and false. Use this data type for simple flags that track true/false conditions.
 8. **char**: The char data type is a single 16-bit Unicode character. It has a minimum value of '\u0000' (or 0) and a maximum value of '\uffff' (or 65,535 inclusive).
- **Reference Data Types** : These are constructed by using primitive data types, as per user need. Reference data types store the memory address of an object. Class, Interface and Array are the example of Interface and Array are the example of Reference Data types.



Scope of a Variable:

- The part of program where a variable is usable is called scope of a variable.

Block:

- A group of statement enclosed in pair of parenthesis {} is called block or a compound statement.

If Statement: If statement helps to execute a block of statement based on the result of a condition. If the condition set evaluates to true on block of statement is executed otherwise another block is executed.

Syntax:

```

if (Expression or condition)
{
    Statement1;
    Statement2;
    .
    .
    Statementn;
}
else
{
    Statement1;
}
  
```

```

Statement2;
.
.
Statementn;
}

```

‘else’ part of ‘if statement’ is optional, if the user doesn’t provide an else part and the condition evaluates to false, then nothing would happen. Complier will not produce an error in this case.

Switch Statement: A Switch statement is used execute a statement from a group of statement based on the result of a expression. The expression must result in either of byte, short, integer or character.
Syntax:

```

Switch(Expression)
{
    case 1:
        statement(s);
        break;
    case 2:
        statement(s);
        break;
    .....
    .....
    case n:
        statement(s);
        break;
    default:
        statement(s);
}

```

The default statement is executed when none of the above mention case matches with the result of the switch expression. Default is optional.

Loop/Iteration:

- loop or iterations helps to repeat a group of statements number of times under a condition. Java supports three kinds of loop: while loop, for loop, do while loop

Entry control loop / Pre-Tested loop/ Top-Tested loop:

- An entry control loop first test the terminating condition and then executes the loop body. If the condition is found true the loop body is execute other wise the loop terminates. In case if the condition is false in first time only then the loop will not get execute even once.

Exit control loop / Post-Tested loop/ Bottom-Tested loop:

- An exit control loop first executes the loop body and then test the terminating condition. If the condition is found true the loop body executed again other wise the loop terminates. In case if the condition is false in first time only then the loop will still get execute at-least once.

While loop: It is an entry control loop

```

Syntax:
Initialization;
while (condition)
{
    statement(s);
    increment;
}

```

for loop: It is a compact entry control loop, which all the tree parts of the loop (i.e. initialization, terminating condition, and increment/decrement of the counter variable) exists in a single line.

Syntax:

```

for(initialization ; terminating condition ; increment/decrement)
{
    Statement(s); (Body of the loop) }

```

It is to be noted that all the parts of the loop in the above statement are optional. In case if a programmer wants to specify more than one initialization or increment/decrement then it has to be separated by (,).

```
for(int i=1; i<= 10; i++)
for(i=1, j = 10; i<j; i++, j++) // more than one initialization or increment/decrement
for(i = 10, j= 20; i>= 1 && j<= 30 ; i-- , j++) // more than one condition joined using &&
for(; i<= 10; i++) //initialization missing still using ;
for(; i<= 10;) //initialization, inc./dec. missing still using ;
```

do while loop: it is a exit control loop

Syntax:

```
Initialization;
do
{
    statement(s);
}
while (condition);
```

Break Statement:

- break is used to terminate the current switch statement or the loop.

Continue Statement:

- Continue statement skips the remaining part of the current loop and begins the next iteration of the loop.

Commonly available Swing Controls in Java:

jFrame:	A Frame is a container control, in which all the controls can be placed.
jLabel:	JLabel allows placing un-editable text on the Frame/Panel
jTextField:	JTextFiled allows placing editable text on the Frame/Panel. User can enter text in a textFiled during runtime.
jbutton:	is used to initiate an action when it is clicked.
jList:	is a group of values or items from which one or more selections can be made.
jComboBox:	jComboBox is similar to jList but also allow to enter editable text during run time. It is a combination of jTextField and jList.
jPanel:	Act like a frame, to group one or more controls.
jRadioButton:	Allow us to choose a single item from a group of jRadioButton options.
jCheckBox:	Allow us to choose one or more items from a group of jCheckBox options.
jPasswordField:	Allow us to enter a text during the run time but shows an encrypted text instead of the original text
jTextArea:	JTextArea is a multi-line text component to enter or edit text.

Questions and Answers

Q1. Name any two Object Oriented Programming languages?

Ans. C++ and Java

Q2. Why is java called a platform independent language?

Ans Java program can be easily moved from one computer system to another, anywhere anytime. Changes and upgrade in operating system, processors and system resources will not force any change in the Java program. Hence it is called a platform independent language.

Q3. Elaborate the java Compilation process.

Ans. The source program is first converted into a **byte code** using a java compiler. This byte code is machine independent i.e. same for all the machines. Later the byte code is executed on the machine using an interpreter.

Q4. Why do we write a comment in a program? What are the two ways of writing comment in a java Program?

Ans. Comments are added to a program for the following purposes:-

1. Make the more readable and understandable
2. For future references we can add comments in a Java program in the following ways:
 - i) Adding // before the line which is to be commented. This can be used only for single line comments.
 - ii) using a pair of /* and */ for multi-line comments.

Q5. What is a syntax error in context of a program? Give an example.

Ans. Error in the way of writing a statement in a program, results in a syntax error.

For e.g.

for (i=0, i<=100. i++), will result in a syntax because the program has written comma instead of a semi comma in the for loop.

Q6. What is RAD programming? Why is program development in java using Netbeans IDE is RAD?

Ans. RAD stands for **Rapid Application Development**. A programming style which aims at building programs fastly through the use of tools and wizards is called RAD.

Program development using Netbeans IDE is RAD as it

- provides GUI
- Provides online help and suggestions during typing of the program (using ctrl+ Spacebar key)
- Error alerts while typing of the program.

Q7. What is IDE? Name two IDE for Programming in java.

Ans. A programming environment, where all the tools required for programming are available under one roof is called IDE. Two IDE for Java are Netbeans and BlueJ

Q8. Name any two type of Tokens available in Java.

Ans. Keyword, Identifier, Literal, Punctuators ad Operators.

Q9. What are primitive data types? Name the various primitive data type available in Java.

Ans. Data types that are directly available with java are called primitive data type.

Various primitive data types available in java are byte, short, int, long, float, double, char and boolean.

Q10. What are Reference data types?

Ans. Data types created by the programmer using the primitive data type are called reference data type e.g. Classes, interfaces etc.

Q11. What is type casting?

Ans. Converting a value form one type to another is called type casting.

For e.g. int a = 5 . here 'a' is a integer, which can be cased to float as follows

float b = (float) a;

Q12. Name and explain the usage of any two data types used in Java to store numbers with decimals.

Ans. Two data types available in java for storing numbers with decimals are

1. *float*: for single precision floating point values for e.g. float num = 10.0F

2. *double*: for double precision floating point value. This is the default data type for decimal numbers. for e.g. double num = 10.0

Q13. What are Keywords? Give two examples of keywords available in Java.

Ans. Keywords are words that have a specific predefined meaning in Java. They cannot be used as variable names. Eg. void, private, if, while etc.

Q14. Name and explain the usage of any one relational and one logical operator in Java.

Ans. One relational operator in java is ==. This operator results in true if both its operands are equal otherwise false. One logical operator in java is &&. This operator is used to combine two logical values. The result of the && will be true if and only if both its operands are true otherwise false.

Q15. What is the difference between = and == operator in java?

Ans. Represent an assignment operator. It sets the value of the variable on its left side with the result of expression on its right side. == represent a conditional equal to operator. It checks for

the equality of both its operands. If both the operands are equal, condition evaluates to true otherwise to false.

Q16. Name the two type of selection statement available in Java.

Ans. Two selection statement available in java are ‘if’ and ‘Switch’

Q17. Write the purpose of Switch Statement with the help of an example. Which Java Statement can be used in place of switch statement? In the switch statement, what happens if every case fails and there is no default option?

Ans. A Switch statement is used execute a statement from a group of statement based on the result of a expression. The expression must result in either of byte, short, integer or character.

An ‘*if statement*’ can be used in place of switch statement. In a *switch statement* if none of the statement satisfies and even there is no default case then nothing would happen. This would not result in any sort of error.

Q18. What is the purpose of ‘break’ statement in java?

Ans. Break is used to terminate the current switch statement or the loop.

Q19. What is the purpose of ‘continue’ statement in java?

Ans. Continue statement skips the remaining part of the current loop and begins the next iteration of the loop.

Q20 Find the output of the following code snippet written in java public static void main(String [] args)

```
{  
    long a=78345,s1=0,s2=0,r;  
    while(a>0)  
    {  
        r=a%10;  
        if (r%4==0)  
            s1+= r;  
        else  
            s2+=r;  
        a/=10;  
    }  
    System.out.println("S1 =" + s1);  
    System.out.println("S2 =" + s2);  
}
```

Ans. Output:

```
s1= 12  
s2= 15
```

Q21. Correct the errors in the following program segment written in JAVA. You are just required to write the corrected code, underlying the corrections made.

```
public Static Void Main (String [] args)  
{  
    Integer Nos = 100;  
    while (Nos => 45)  
    {  
        If (Nos % 5 = 0);  
        Nos+=10;  
        otherwise  
        Nos += 20;  
    }  
}
```

Ans: Corrected Code

```
public static void main (String [] args)  
{  
    int Nos = 100;  
    while (Nos >= 45)
```

```

{
if (Nos % 5 == 0)_
Nos+=10;
else
Nos += 20;
}
}

```

Unsolved Questions

- 1.** What will be output of the following code:

```

byte b;
double d= 417.35;
b= (byte) d;
System.out.println(b);

```

- 2.** Given the value of a variable, write a statement, without using if construct, which will produce the absolute value of a variable.
3. What is wrong with the following code fragment?

```

Switch (x)
{
case 1:
n1= 10;
n2= 20;
case 2:
n3=30;
break;
n4= 40;
}

```

- 4.** What will be the output of the following program code?

```

int m = 100;
int n = 300;
while(++m < --n);
System.out.println(m+” + n);

```

- 5.** What does the following fragment display

```

String s = “Six:” + 3+ 3;
System.out.println(s);

```

- 6.** What is the output of the following code?

```

String s = new string();
System.out.println(“s = “ + s);

```

- 7.** What will be the output of the following code snippet?

```

int x= 10;
int y = 20;
if ((x<y)|| (x=5) > 10)
System.out.println(x);
else
System.out.println(y);

```

- 8.** State the output of the following program:

```

public static void main(String args[ ])
{
int x = 10;
int y = 15;

```

- ```

 System.out.println((x>y)? 3.14: 3);
 }
9. State the output of the following program:
public static void main(String args[])
{
 int x = 10;
 float y = 10.0;
 System.out.println((x>y)? true: false);
}

```
10. Given a package named EDU.student, how would you import a class named Test contained in this package? Write one line statement.
11. Consider the following class definition:
- ```

Class Student
{
    abstract double result( )
}

```
- This code will not compile since a keyword is missing in the first line. What is the keyword?
12. Can an abstract method be declared final? Yes or No.

CHAPTER-4

JAVA GUI PROGRAMMING REVISION TOUR – II [Swing Controls]

Brief Summary of the Chapter:

In this chapter we shall be revising the JAVA GUI programming concepts using Swing API through NetBeans IDE. Java GUI applications are created through RAD tools with Classes, Object and methods etc.

Key Points:

- Swing API includes graphical components for building GUIs.
- Swing components can be either container or non container component.
- Swing provide seven different Layout manager.
- Frame is a top level window with a title and a border, created through jFrame component of Swing.
- Common properties of buttons are: background, border, font, foreground, enabled, Horizontal Alignment, Vertical Alignment.
- Label control displays text, that the user can not changed directly.
- Label is created through jLabel class component.
- TextField is created through jTextField class component.
- Password field takes input without showing it on the screen, created through jPasswordField class component.
- TextArea is multiline component to display or enter text, created through jTextArea class component.

- Checkbox is a rectangular area that can be checked or unchecked created through jCheckBox class component.

SOLVED QUESTIONS

1.What does getPassword() on a password field return?

- (a) a string (b) an integer (c) a character array.

Ans: (c) a character array

2. Which of the following component is the best suited to accept the country of the user?

- A. List B. Combo box C. Radio button D. Check box

Ans: B. Combo box

3. What command do you need to write in actionPerformed() event handler of a button, in order to make it exit button?

- a. System.out.println(); b. System.exit(0); c. System.out.print()

Ans: b. System.exit(0);

4.What method would you use, in order to simulate a button's(namely Okbtn) click event, without any mouse activity from user's side?

- a. Okbtn.setText() b.Okbtn.getText() c. Okbtn.doClick()

Ans: Okbtn.doClick()

5. What would be the name of the event handler method in the ListSelection listener interface for a list namely CheckList to handle its item selections?

- a. CheckListValueChanged() b. getSelectedValue() c. clearSelection()

Ans: a. CheckListValueChanged()

6. Which control displays text that the user cannot directly change or edit?

- a.TextField b. Checkbox c. Combobox d. Label

Ans: d.Label

7.Which control provides basic text editing facility?

- a.TextField b. Checkbox c. Combobox d. Label

Ans: a. TexfField

8. Occurrence of an activity is called:

- a. Function b. Class c. Object d. Event

Ans: d.Event.

9. Which property is used to set the text of the Label?

- a. font b.text c.name d. icon

Ans: b.text

10. The object containing the data to be exhibited by the combo box by which property.

- a. editable b. model c.selectedIndex d.selectedItem

Ans: b. model

11. What is GUI programming?

Ans: A GUI(Graphical User Interface) is an interface that uses pictures and other graphic entities along with text, to interact with user.

12. How is swing related to GUI programming?

Ans: We can create a GUI application on Java platform using Swing API (Application Programming Interface), which is part of Java Foundation Classes(JFC).

13. What is an event? What is event handler?

Ans: An event is occurrence of some activities either initiated by user or by the system. In order to react, you need to implement some Event handling system in your Application. Three things are important in Even Handling-

Event Source: It is the GUI component that generates the event, e.g. Button.

Event Handler or Event Listener: It is implemented as in the form of code. It receives and handles events through Listener Interface.

Event Object or Message: It is created when event occurs. It contains all the information about the event which includes Source of event and type of event etc.

14. What is the default name of action event handler of a button namely TestBtn?

Ans: private void TestBtnActionPerfomed(java.awt.action.ActionEvent evt){ }.

15. What property would you set to assign access key to a button?

Ans: mnemonic property is used to assign access key or shortcut (Alt + Key).

16. Which method can programmatically performs the click action of a push button?

Ans: private void TestBtnActionPerfomed(java.awt.action.ActionEvent evt){ }.

17. Which property would you set the setting the password character as ‘\$’?

Ans:echoChar

18. Which method returns the password entered in a password field?

Ans: char [] getPassword().

19. Which list property do you set for specifying the items for the list.

Ans: model

20. Which method would you use to determine the index of selected item in a list?

Ans: int getSelectedIndex().

21. Which method would you use to insert an item at specified index, in the list?

Ans: void setSelectedIndex(int index).

22. How you can determine whether 5th item in a list is selected or not?

Ans: isSelectedIndex(4).

23. Which method you would use to insert ‘Hello’ at 10th position in the Text Area control.

Ans: void insert(“Hello”, 9).

24. Which method you would like to use to insert an Icon (picture) on a Push Button.

Ans: void setIcon(Icon).

25. Which property would you like to set to make a Combo box editable?

Ans: editable.

26. What is Layout Manager? Name the layout managers offered by NetBeans?

Ans: Layout managers enable you to control the way in which visual components are arranged in GUI forms by determining the size and position of components within containers.

There are seven types of layout are available–

- Flow Layout
- Grid Layout
- Card Layout
- Spring Layout
- Border Layout
- GridBag Layout
- Box Layout

27. Name three commonly used properties and methods of the following controls.

(a) text field (b) text area (c) Check Box

Ans: (a) Properties: text, font, editable. Methods: void setText(), String getText(), void setEditable(boolean).

(b) Properties: enabled, editable, wrapStyleWord Methods: setText(), getText(), isEnabled()

(c) Properties: font, text, selected . Methods: getText(), isEnabled(), isSelected().

28. What is dispose() used for ?

Ans: dispose() is used for hide and dispose of the frame when the user closes it. This removes the frame from the screen and frees up any resources used by it.

29. What is the difference between-

(a) Text field & Text area

(b) Text field & password field

(c) Radio Button & Check Box

Ans: (a) A text field's text property can hold single line of text unless it is an HTML text. While a text area's text can hold any number of lines of text depending upon its rows property.

(b) Though a text field and a password field can obtain a single line of text from the user, yet these are different.

A password field displays the obtained text in encrypted form on screen while text field displays the obtained text in unencrypted form.

(c) **Radio Button:** A jRadioButton control belongs to JRadioButton class of Swing controls. It is used to get choices from the user. It is grouped control, so that only one can be selected at a time among them. Radio Button works in group, so that they must be kept in a ButtonGroup container control like so that only one can be selected at the same time.

Some features of jRadioButton control are-

- It can be used to input choices typed input to the application.
- Only one Radio button can be selected at a time.
- They must be kept in a Button Group container control to form a group.

Check box: A jCheckBox control belongs to JCheckBox class of Swing controls. It indicates whether a particular condition is on or off. You can use Check boxes to give users true/false or yes/no options. Check Boxes may work independently to each other, so that any number of check boxes can be selected at the same time.

Some features of jCheckBox control are-

- It can be used to input True/False or Yes/No typed input to the application.
- Multiple check boxes can be selected at the same time.

30. What is the significance of following properties of a text area ?

(a) lineWrap (b) wrapStyleWord

Ans: (a) Defines Wrapping featureenable/disable (b) Determines where line wrapping occurs. If true, the component attempts to wrap only at word boundaries. This property is ignored unless linewrap is set to true.

31. What is the significance of a button group? How do you create a button group?

Ans: We must add a **ButtonGroup control** to the frame to group the check boxes by using Button Group property of the check box. By dragging buttongroup control from palette window.

32. What do you understand by focus?

Ans: A Focus is the ability to receive user input/response through Mouse or Keyboard. When object or control has focus, it can receive input from user.

- An object or control can receive focus only if its enabled and visible property are set to true.
- Most of the controls provides FOCUS_GAINED() and FOCUS_LOST() method in FocusEvent by the FocusListener. FOCUS_LOST() is generally used for validation of data.
- You can give focus to an object at run time by invoking the requestFocus() method in the code.

Ex. jTextField2.requestFocus();

33. What is meant by scope of a variable?

Ans: In Java, a variable can be declared anywhere in the program but before using them.

- The area of program within which a variable is accessible, known as its scope.
- A variable can be accessed within the block where it is declared.

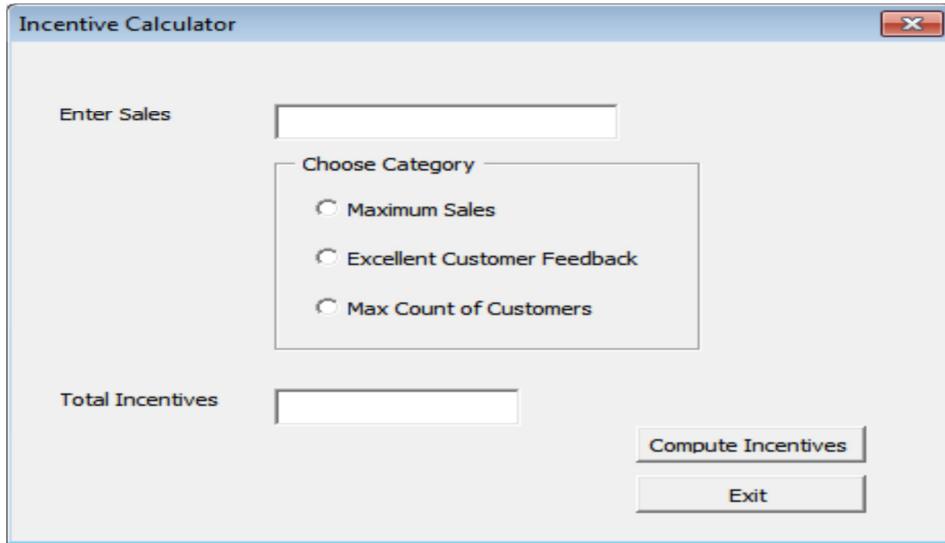
```
{  
int x=10;  
if (a>b)  
{ int y=5;  
..... Scope of x and y  
}  
else  
{ int z=3;  
..... Scope of z  
}  
.....  
}
```

34. Create a Java Desktop Application to find the incentive (%) of Sales for a Sales Person on the basis of following feedbacks:

Feedback	Incentive (%)
Maximum Sales	10
Excellent Customer Feedback	8
Maximum Count Customer	5

Note: that the sales entry should not be space.Calculate the total incentive as :Sales amount* Incentive. The feedback will be implemented in JCheckBox controls.Using a JButton's (Compute Incentive) click event handler,display the total incentives in a JTextField control. Assume the nomenclature of the swing components of your own.

Note that the JFrame from IDE window will be shown as given:



```

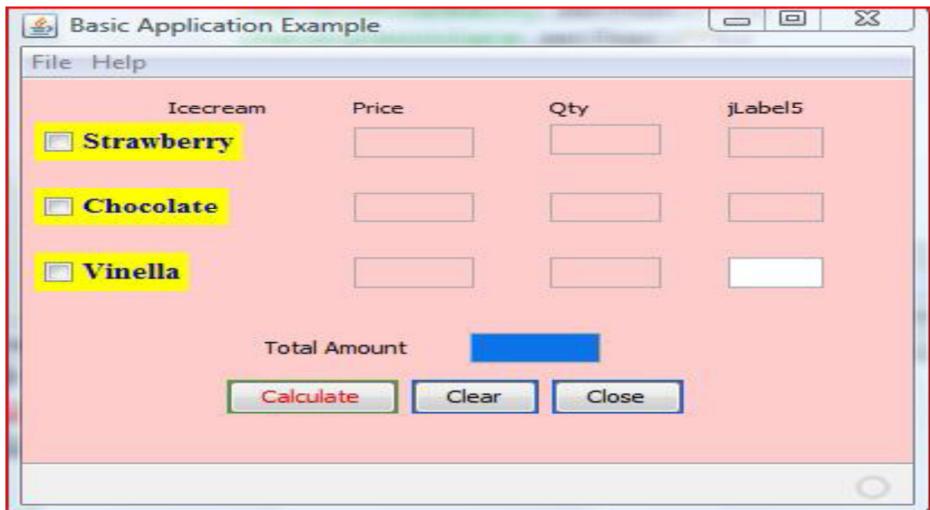
Ans:- private void btnIncActionPerformed (java.awt.ActionEvent evt) {
int sales = 0;
if (! txtSales.getText( ).trim( ).equals( "")){
sales=Integer.parseInt(txtSales.getText( ).trim ( ));
}
double incentive = 0.0;
if (jCheckBox1.isSelected ( )) {
incentive = incentive + 0.1;
}
if (jCheckBox2.isSelected ( )) {
incentive = incentive + 0.8;
}
if (jCheckBox3.isSelected ( )) {
incentive = incentive + 0.05;
}
txtInc.setText ( “ “ + Math.round(sales * incentive));
}

```

35. Assume the following interface built using Netbeans used for bill calculation of a ice-cream parlor. The parlor offers three verities of ice-cream – vanilla, strawberry, chocolate. Vanilla icecream costs Rs. 30, Strawberry Rs. 35 and Chocolate Rs. 50. A customer can chose one or more ice-creams, with quantities more than one for each of the variety chosen. To calculate the bill parlor manager selects the appropriate check boxes according to the verities of ice-cream chosen by the customer and enter their respective quantities.

Write Java code for the following:

- On the click event of the button ‘Calculate’, the application finds and displays the total bill of the customer. It first displays the rate of various ice-creams in the respective text fields. If a user doesn’t select a check box, the respective ice-cream rate must become zero. The bill is calculated by multiplying the various quantities with their respective rate and later adding them all.
- On the Click event of the clear button all the text fields and the check boxes get cleared.
- On the click event of the close button the application gets closed.



Ans: (a)

```
private void jBtncalculateActionPerformed(java.awt.event.ActionEvent evt)
{
if(jchkStrawberry.isSelected()==true)
jTxtPriceStrawberry.setText("35");
else
{
jTxtPriceStrawberry.setText("0");
jTxtQtyStrawberry.setText("0");
}
if(jChkChocolate.isSelected()==true)
jTxtPriceChocolate.setText("50");
else
{
jTxtPriceChocolate.setText("0");
jTxtQtyChocolate.setText("0");
}
if(jChkVinella.isSelected()==true)
jtxtPriceVinella.setText("30");
else
{
jtxtPriceVinella.setText("0");
jTxtQtyVinella.setText("0");
}
int r1,r2,r3,q1,q2,q3,a1,a2,a3,gt;
r1=Integer.parseInt(jTxtPriceStrawberry.getText());
r2=Integer.parseInt(jTxtPriceChocolate.getText());
r3=Integer.parseInt(jtxtPriceVinella.getText());
q1=Integer.parseInt(jTxtQtyStrawberry.getText());
q2=Integer.parseInt(jTxtQtyChocolate.getText());
q3=Integer.parseInt(jTxtQtyVinella.getText());
a1=r1*q1;
jTxtAmtStrawberry.setText(""+a1);
a2=r2*q2;
jTxtAmtChocolate.setText(""+a2);
a3=r3*q3;
jTxtAmtVinella.setText(""+a3);
gt=a1+a2+a3;
jTxtTotalAmt.setText(""+gt);
}
```

Ans.(b)

```
private void jBtnClearActionPerformed(java.awt.event.ActionEvent evt)
{
jTxtPriceStrawberry.setText("");
jTxtPriceChocolate.setText("");
jtxtPriceVinella.setText("");
jTxtQtyStrawberry.setText("");
jTxtQtyChocolate.setText("");
jTxtQtyVinella.setText("");
jTxtAmtStrawberry.setText("");
jTxtAmtChocolate.setText("");
jTxtAmtVinella.setText("");
jchkStrawberry.setSelected(false);
jChkChocolate.setSelected(false);
jChkVinella.setSelected(false);
}
```

Ans: (c)

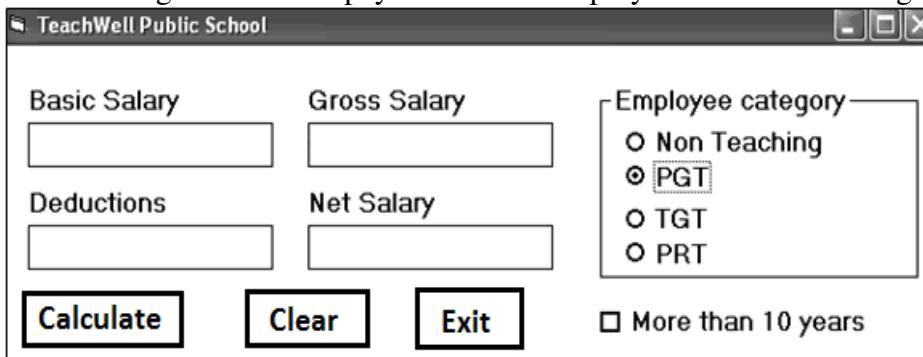
```
private void jBtncloseActionPerformed(java.awt.event.ActionEvent evt)
{
System.exit(0);
}
```

36. Read the following case study and answer the questions that follow.

TeachWell Public School wants to computerize the employee salary section.

The School is having two categories of employees : Teaching and Non Teaching. The Teaching employees are further categorized into PGTs, TGTs and PRTs having different Basic salary.

The School gives addition pay of 3000 for employees who are working for more than 10 years.



Employee Type	Basic Salary	DA (% of Basic Sal)	HRA (% of Basic Sal)	Deductions (% of Basic sal)
Non Teaching	12500	31	30	12
PGT	14500	30	30	12
TGT	12500	21	30	12
PRT	11500	20	25	12

(a) Write the code to calculate the Basic salary, deductions, gross salary and net salary based on the given specification. Add 3000 to net salary if employee is working for more than 10 years.

Gross salary=Basic salary + DA + HRA

Net salary = Gross salary – deductions

(b) Write the code to exit the application.

(c) Write the code to disable textfields for gross salary, deductions and netsalary.

Ans: (a)

```
double bs=0,da=0,net=0,ded=0,gross=0,hra=0;
if (rdnon.isSelected()==true)
{
    bs=12500;
    da=(31*bs)/100;
    hra=(30*bs)/100;
    ded=(12*bs)/100;
}
else if (rdpgt.isSelected()==true)
{
    bs=14500;
    da=(30*bs)/100;
    hra=(30*bs)/100;
    ded=(12*bs)/100;
}
else if (rdtgt.isSelected()==true)
{
    bs=12500;
    da=(21*bs)/100;
    hra=(30*bs)/100;
    ded=(12*bs)/100;
}
else if (rdprt.isSelected()==true)
{
    bs=11500;
    da=(20*bs)/100;
    hra=(25*bs)/100;
    ded=(12*bs)/100;
}
gross=bs+da+hra;
net = gross – ded;
if(chk10.isSelected()==true)
{
    net=net+3000;
}
tfded.setText(" "+ded);
tfgross.setText(" "+gross);
tfnet.setText(" "+net);
tfbs.setText(" "+bs);
```

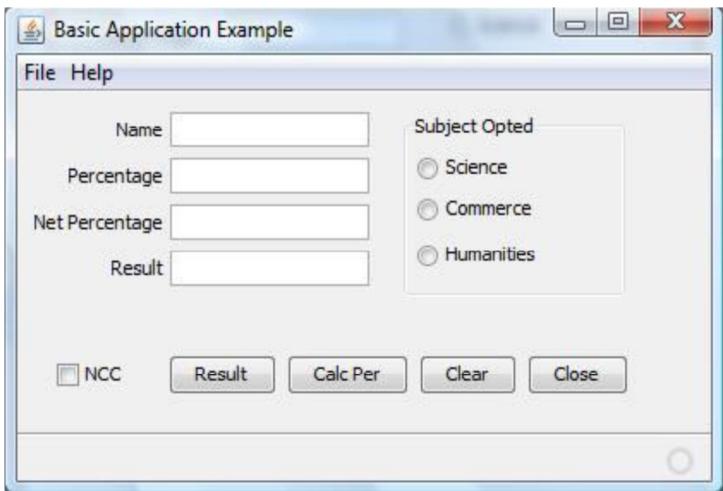
Ans:(b)

```
System.exit(0);
```

Ans:(c)

```
tfgross.setEditable(false);
tfded.setEditable(false);
tfnet.setEditable(false);
```

37. ABC School uses the following interface built in java to check the eligibility of a student for a particular stream from science, commerce and humanities. The user first enters the total percentage and selects the desired stream by selecting the appropriate option button. An additional 5% is marks is given to students of NCC. Write Java Code for the following
- On Action event of the button ‘Calc Percentage’ Net percentage of the student is calculated and displayed in the appropriate text filed. Net percentage is same as that of the actual percentage if the student doesn’t opt for NCC otherwise 5% is added to actual percentage.
 - On Action event of the button ‘Result’, the application checks the eligibility of the students. And display result in the appropriate text field. Minimum percentage for science is 70, 60 for commerce and 40 for humanities.
 - On the Click event of the clear button all the text fields and the check boxes get cleared.
 - On the click event of the close button the application gets closed.



Ans:

a.

```
private void jBtnCalcPerActionPerformed(java.awt.event.ActionEvent evt)
{
int p;
p=Integer.parseInt(jTextField2.getText());
if (jCheckBox1.isSelected())
p=p+5;
jTextField3.setText(Integer.toString(p));
}
```

b.

```
private void jBtnResultActionPerformed(java.awt.event.ActionEvent evt)
{
int p;
p=Integer.parseInt(jTextField3.getText());
if( jRadioButton1.isSelected())
{
if ( p>=70)
jTextField4.setText("Eligible for all subject");
else
jTextField4.setText("Not Eligible for science");
}
else if( jRadioButton2.isSelected())
{
```

```

if ( p>=60 )
jTextField4.setText("Eligible for Commerce and Humanities");
else
jTextField4.setText("Not Eligible for Science and Commerce");
}
else
{
if ( p>=40 )
jTextField4.setText("Eligible for Humanities");
else
jTextField4.setText("Not Eligible for any subject ");
}
}
c.
private void jBtnClearActionPerformed(java.awt.event.ActionEvent evt)
{
jTextField1.setText(" ") OR jTextField1.setText(null)
jTextField1.setText(" ") OR jTextField1.setText(null)
jTextField1.setText(" ") OR jTextField1.setText(null)
jTextField1.setText(" ") OR jTextField1.setText(null)
jCheckbox1.setSelected(false);
}

```

d.

```

private void jBtnCloseActionPerformed(java.awt.event.ActionEvent evt)
{
System.exit(0);
}

```

Unsolved Questions:

1. Describe the relationship between properties, methods and events.
2. What is container tag?
3. What does a getPassword() method of a password field returns?
4. What will be the contents of jTextArea1 after executing the following statement: 1
5. jTextArea1.setText("Object\nOriented\tProgramming");
6. What is difference between jRadioButton and jCheckBox?
7. What does a JList fire when a user selects an item?
8. What is Layout Manager? Discuss briefly about layout managers offered by NetBeans?
9. Name three commonly used properties and methods of the following controls.
10. (a) text field (b) text area (c) label (d) Check Box (e) button.
11. What is dispose() used for ?
12. What is the difference between-
13. (a) Text field & Text area
14. (b) List & Combo
15. (c) Radio Button & Check Box
16. What is the significance of following properties of a text area ?
17. (a) lineWrap (b) wrapStyleword
18. What is the significance of a button group ? How do you create a button group ?
19. Discuss about some commonly used properties of lists and a combo boxes.
20. What methods obtains the current selection of a combo box ? Give a code example.
21. The FOR U SHOP has computerized its billing. A new bill is generated for each customer. The shop allows three different payment modes. The discount is given based on the payment mode.



Credit Card Type	Shopping Amount	Discount
Cash	< 10000	20 %
	≥ 10000	25 %
Cheque	< 15000	10 %
	≥ 15000	15 %
Credit Card	< 10000	10 %
	≥ 10000	12%

- Write the code for the CmdClear Button to clear all the Text Fields.
- Write the code for the CmdCalc Button to display the Discount Amount and Net Price in the TxtDisc and the TxtNet Text Fields respectively.

CHAPTER-5

JAVA GUI PROGRAMMING REVISION TOUR – III [Methods etc.]

Brief Summary of the Chapter:

In this chapter concept related with Class, Objects, Constructors and methods are discussed. In Java method or function is a sequence of some declaration and executable statements.

In Java, which is strictly Object-oriented, any action can take place through methods and methods have to be exist as a part of the class.

Key points:

- Methods is a sequence of statements that carry out specific tasks.
- Methods returns a value through return statement.
- Class is a blue print for creating objects of a certain charactersticks.
- Class contains fields and methods.
- Classes created through keyword class.
- Object is instance of a class created through new operator.
- Constructor is method with the same name as of that class it is used to initialized object of class.
- Constructor can either be parameterized or non-parameterized.
- The “this” keyword is used to refer to current object.

SOLVED QUESTIONS

1. In java, methods reside in _____.

- (a) Function (b) Library (c) Classes (d) Object

Ans: (c) Classes

2. The number and type of arguments of a method are known as _____.

- (a) Parameter list (b) Calling (c) Definition (d)None to these.

Ans: (a) Parameter list

3. The first line of method definition that tells about the type of return value along with number and type of arguments is called _____.

- (a) Class (b) Object (c) Prototype (d) Datatype

Ans: (c) Prototype

4. A member method having the same name as that of its class is called _____ method.

- (a) Destructor (b) Constructor (c) Object (d) Variable

Ans: (b) Constructor

5. A constructor method has _____ return type.

- (a) float (b) void (c) no (d) int

Ans: (c) no

6. A _____ constructor takes no arguments.

- (a) Copy constructor (b) Non-Parameterized constructor (c) Parameterized constructor

Ans: (b) Non-Parameterized constructor

7. A _____ constructor creates objects through values passed to it.

- (a) Copy constructor (b) Default constructor (c) Parameterized constructor

Ans: (c) Parameterized constructor

8. The keyword _____ refers to current object.

- (a) void (b) goto (c) this (d) null

Ans: (c) this

9. Define a method. What is method prototype and signature?

Ans: A message to an object is a call to the object's method requesting that it performs some specified action.

```
int absval(int a) {  
    return(a<0?-a:a);  
}
```

The first line of the method definition is the prototype of the method i.e. the prototypes of method defined above is:

```
int absval(int a)
```

10. How are following passed in Java: (i) primitive types (ii) reference types?

Ans: (i) By Value (ii) By reference

11. The String objects being reference types are passed by reference but changes, if any, are not reflected back to them. Why?

Ans: The String objects are immutable in Java, which means once they are created, they cannot be changed. That is why, even though Strings are passed by reference, they cannot be changed.

12. At what time is the constructor method automatically invoked?

Ans: Every time an object is created, the constructor method is automatically invoked.

13. What are Composite and user defined data types?

Ans: The data types that are based on fundamental or primitive data types, are known as Composite Datatypes. Since these data types are created by users, these are also known as User Defined Datatypes.

14. Can you refer to a class as a composite type/ user-defined type?

Ans: Yes, class is referred to as a composite type/user defined type.

15. How is a constructor invoked?

Ans: A constructor is automatically called with a new operator in order to create a new object.

16. Which method of a class is invoked just once for an object? When?

Ans: The constructor method.

It is invoked for initializing values of the object at the time of its creation.

17. Passing the address means call by value or call by reference?

Ans: Call by reference.

18. What's wrong with the following constructor definition for the class PlayInfo?

```
public void PlayInfo( int sticks)  
{
```

```
    nsticks = sticks;
}
```

Ans: A constructor cannot have a return type, not even void.

19. How many values can be returned from a method?

Ans: Only one value can be returned from a method though a method can have multiple return statements but only one gets executed which is reached first and thus returns the value.

20. What do you understand by Class and Object?

Ans: The basic unit of OOP is the Class. It can be described as a blue print of Objects. In other words, an Object is an instance of a class. A JAVA program may have various class definitions.

An Object is an entity having a unique Identity, characteristics (Properties) and Behavior (Methods).

21. How to declare a class in Java?

Ans: In Java a Class is declared/defined by using class keyword followed by a class name.

For example:

```
public class Student
{
    String Name;
    int RollNo;
    String FName;
    String DOB;
    void getAdmission()
    {.....
     .....
    }
    void getTransfer()
    {.....
     .....
    }
    void feeDeposit()
    { .....
     .....
    }
}
```

22. What is the difference between instance and static variable?

Ans: **Instance Variable**- These data members are created for every object of the class i.e. replicated with objects.

Class variable (static)- These data members are declared once for each class and all objects share these members. Only a single copy is maintained in the memory. These are declared with static keyword.

23. What do you understand by constructor in OOP?

Ans: A Constructor is a member method of a class, used to initialize an Object, when it is created (instantiated).

24. What are the properties of Constructor?

Ans: There are some properties of constructor:

- A Constructor must have the same name as the class name and provides initial values to its data members.
- A constructor has no return type not even void.
- JAVA automatically creates a constructor method, if it is not defined with default values.

25. What do you understand by methods? What are the advantages of methods?

Ans: **Definition:** A Method or function is a sequence of statements which are written to perform a specific job in the application. In Object Oriented Programming, Method represents the behavior of the object. A message can be thought as a call to an object's method.

The following three advantages/reasons describe why we use methods.

To cope with complexity:

When programs become more complex and big in size, it is best technique to follow “Divide and conquer” i.e. a complex problem is broken in to smaller and easier task, so that we can make it manageable. Some times it is also called Modularization.

Hiding Details:

Once a method is defined, it works like a Black-box and can be used when required, without concerning that “How it Works?”

Reusability of code:

Once a method is implemented, it can be invoked or called from anywhere in the program when needed i.e. Method can be reused. Even a packaged method may be used in multiple applications. This saves our time and effort. Most of the method like Math.sqrt() is available as ready to use which can be used anywhere in the application.

26. How to define a method?

Ans: A method must be defined before its use. The method always exist in a class. A Java Program must contain a main() method from where program execution starts. The general form of defining method is as-

[Access specifier]<return_type> <method_name>(<parameter(s)>)

{..... ;

body of the method i.e. statement (s);

}

Access Specifier:

It specified the access type and may be public or protected or private.

Return Type:

Specifies the return data type like int, float etc. Void is used when nothing is to be returned.

Method Name:

Specified the name of method and must be a valid Java identifier.

Parameters List:

It is list of variable(s), also called Formal Parameter or Argument, which are used to catch the values when method is invoked. Also a method may have no parameters.

27.What are the way to pass values to methods in Java?

Ans: You can pass arguments (Actual parameters) to method (Formal Parameters) using valid data types like int, float, byte, char, double, boolean etc. or Reference data type like Object and Arrays.

A method can called in two ways –

Call by Value: In this method, the values of Actual parameters are copied to Formal parameters, so any changes made with Formal parameters in Method’s body, will not reflected back in the calling function.

The original value of Actual parameters is unchanged because the changes are made on copied value.

Call by Reference:

In Reference method, the changes made on the formal parameters are reflected back in the Actual parameters of calling function because instead of values, a Reference (Address of Memory location) is passed.

In general, all primitive data types are passed by Value and all Reference types (Object, Array) are passed by Reference..

28. Differentiate between constructor and method.

Ans: Though Constructor are member method of the class like other methods, but they are different from other method members-

Constructor creates (initializes) an Object where a method is a group of statements which are packaged to perform a specific job.

Constructor has no return type, even void also. Whereas method may have any return type including void.

The Constructor has the same name as Class, but method may have any name except Class name.

It is called at the time of object creation, but a method can be called any time when required.

29. What is “this” keyword?

Ans: As you are aware that static data and method members of a class is kept in the memory in a single copy only. All the object are created by their instance variables but shares the class variables (static) and member methods.

```
public class test
{ int x, y;
static int z;
static method1()
{.....}
static method2()
{.....}
}
```

Suppose method2() is changes X data member, then big question arises that which object’s x variable will be changed?

This is resolved by using ‘this’ keyword. The keyword ‘this’ refers to currently calling object. Instead of using object name, you may use ‘this’ keyword to refer current object.

Ex. **this.method2()**

30. How can we use a class as a composite data type?

Ans: Since a class may have various data members of primitive data types like int, float, long etc. In general class may be assumed as a bundle of primitive data types to make a user-defined composite data type.

```
// use of class as composite data type
class date
{ byte dd, mm, yy;
public date( byte d, byte m, byte y)
{ dd= d;
mm= m;
yy= y;
} v
oid display()
{system.out.println(""+dd+"/"+ ""+mm+"/"+ ""+yy);
}
};
date DOB = new date(13,2,1990);
```

UNSOLVED QUESTIONS

1. How are parameterized constructors different from non-parameterized constructors?
2. List some of the special properties of the constructor methods.
3. Differentiate between Instance member and static members of a class.
4. What do you mean by actual and formal parameters of a method? Explain with an example.
5. Identify the errors in the method skeletons given below:
 - (1) float average (a, b) { }
 - (2) float mult (int x, y) { }
 - (3) float doer (int, float = 3.14) { }
6. Given the method below write an ActionPerformed event method that includes everything necessary to call this method.

int thrice (int x)
{ return (a * 3); }

CHAPTER-6 **MORE ABOUT CLASSES AND LIBRARIES**

Brief Summary of the Chapter:

In this chapter the way access of members of a class i.e. about access specifier will be discuss. Java include predefined classes in the form of packages which are also called Java class Library. Some of the used packages are: java.lang. java.util, java.io, java.swing. java.awt, java.applet etc.

Key points:

- The public member of object are accessed through .(dot) operator.
- The private members are accessible only inside their own class.
- The protected members are accessible inside their own class, sub class and packages.
- The default members are accessible inside their own class as well to classes in the same package.
- Related classes and interfaces are grouped together in the form of package.
- Packages and class are imported through import command.

SOLVED QUESTIONS

1. Which keyword can protect a class in a package from accessibility by the classes outside the package?

- (a)private (b)protected (c) final (d) None of these

Ans: (d) None of these.

2. We would like to make a member of a class visible in all subclasses regardless of what package they are in. Which one of the following keywords would achieve this?

- (a)private (b)protected (c) final (d) public (e) None of these

Ans: (b) protected.

3. Which of the following keywords are used to control access to a class member?

- (a) default (b) abstract (c)protected (d) interface (e) public.

Ans: (c) and (e) public

4. The public members of objects are accessed through which operator.

- (a) arrow (b) dot (c) this (d) none of these

Ans: (b) dot

5. The private members are accessible only inside their _____ class.

- (a) own (b) sub (c) super (d) none of these

Ans: (a) own

6. Which command is used to import packages and their classes?

- (a) include (b) import (c) public (d) inline

Ans: (b) import

7.Which statement is used to create a package in Java?

- (a) Class (b) super (c) this (d) package

Ans:(d) package

8. In Java, all strings are objects?

- (a) True (b) False (c) don't say

Ans: (a) True

9. What do you understand by Package in Java?

Ans: A group of classes is called package

10. Given a package named EDU. Student, how would you import a class named Test contained in this package? Write one line statement.

Ans: import EDU.Student.Test;

11. What will be the output of the following code

```
StringBuffer city = new StringBuffer("Madras");
```

```
StringBuffer string = new StringBuffer();
string.append(new String(city));
string.insert(0,"Central");
string.out.println(string);
```

Ans: CentralMadras.

12. Give the output of the following program:

```
class MainString
{ public static void main( String agrs[])
    { StringBuffer s = new StringBuffer("String");
        if(s.length() > 5) && (s.append("Buffer").equals("x"));
            System.out.println(s);
    }
}
```

Ans: StringBuffer.

13. What is the output of the following code fragment if "abc" is passed as argument to the func()?

```
Public static void func(string s1)
{
    String s = s1 + "xyz";
    System.out.println("s1=" + s1);
    System.out.println("s = " +s);
}
```

Ans: s1= abc

s =abctxyz

14.What are the access specifiers in Java? Explain.

Ans: The Access Specifiers control access to members of class from / within Java Program. Java supports various Access Specifiers to control the accessibility of class members.

Private : A variable or method declared as private, may not be accessed outside of the class. Only class member can access them, since they are private to others.

Protected: Protected members can be accessed by the class members and subclasses (derived classes) and current package, but they are not accessible from beyond package or outside.

Public: Class members declared as public, are accessible to any other class i.e. everywhere , since they are public.

Package (default): If no any specifier is mentioned, default or friendly access is assumed. Class member may be accessed by any other Class members available in the same package, but not accessible by the other classes outside the package, even subclasses.

15. What do you meant by private, public, protected, package(friendly) access specifiers?

Ans: **Private Access Specifier**

Members declared as private are accessible by the members of the same class, since they are private. A private key word is used to specify.

//e.g to demonstrate private specifier.//

```
class abc
```

```

{ private int p;
private void method1()
{ p=10;
system.out.print("I am Private method");
}
}
class xyz
{.....
void method2()
{ abc x = new abc();
x.p =10;
x.method1() ;
}
}

```

Protected Access Specifier

Protected members are accessible by all the classes in the same package and sub-classes (same or different packages). A protected key word is used to specify.

```

Package mypackage;
class abc
{ protected int p;
protected void method1()
{ p=10;
system.out.print("Protected
method");
}
}
class xyz
{.....
void method2()
{ abc x = new abc();
x.p =10;
x.method1() ;
}
}

```

Lets another Package...

```

package yourpackage;
import mypackage.*;
class pqr extends abc
{ void method3()
{ abc x=new abc();
pqr y=new pqr();
x.p=10;
x.method1();
y.p=10;
y.method1();
}
}

```

Public Access Specifier

Public Members can be access at anywhere i.e. same or different package. A public key word is used to specify.

```

packagemypackage;
class abc
{ public int p;
public void method1()

```

```
{ p=10;  
system.out.print("Public method");  
}  
}
```

```
package yourpackage;  
import mypackage.* ;  
class xyz  
{.....  
void method2()  
{ abc x = new abc();  
x.p =10;  
x.method1() ;  
}  
}
```

Package (friendly) Access Specifier

If no specifier is explicitly specified, Java assumes default (friendly) access i.e. all the members are accessible in all other classes of the same package only, since they are trusted or friends. This is called Package level access. No any key word is used to specify default access.

```
package mypackage;  
class abc  
{ int p;  
void method1()  
{ p=10;  
system.out.print("Package method");  
}  
}  
class xyz  
{.....  
void method2()  
{ abc x = new abc();  
x.p =10;  
x.method1() ;  
}  
}
```

16. What do you understand by Library in Java?

Ans: A library is readymade and reusable component/codes that can be used in a program to perform predefined task.

Some commonly used Java libraries are Math Library, String Library, Utility Library and IO Library etc.

You can use import statement at the top of the program to include the Java libraries.

```
import java.io.*;
```

The java.lang is the default imported library in your program without writing import statement.

String Library & its commonly used methods

1 .boolean equals(str) - Compare this (current) string to given string and returns true if both are true otherwise false. e.g. boolean test=str1.equals(str2);

2. int compareTo(str1,str2) - Compare two strings in alphabetical order.

boolean equalsIgnoreCase(str) - Compare this string to given string but ignores case difference.

3. int length() -Returns the length of this string.

e.g. int x=str1.length();

Math Library & its commonly used methods

Java provides math library, which available under java.lang package.

- In order to use functions/methods of math library, you need to invoke function using math keywords before the function.
e.g. `x=math.abs(-7.5);`

1. **pow(num1,num2)** - It computes num1 num2 , where num1 and num2 are numbers.

e.g. `system.out.print(""+math.pow(2,3);`

- 2. **round(num1)** - It rounds off a given number to its nearest integer. It can take float/double as argument.

e.g.

`system.out.print(""+math.round(1.5)); 2`

`system.out.print(""+math.round(-1.5)); -1`

Using Dates & Times in JAVA

- Java offers two classes in java.util package to manipulate date and time.

1. `java.util.Date` 2. `java.util.Calendar`

- In order to use Date & calendar, you need to import `java.util` package. E.g. `import java.util.*;`

Date d=new Date(); -It returns system date in the given format.

Tue Jul 20 17:30:22 GMT+05:30 2010

UNSOLVED QUESTIONS

1. What are the different types of access specifier supported by java?
2. Which is the default package of java?
3. What is friendly access of class member?
4. How does a class enforce information hiding?
5. Define an abstract class and abstract methods.
6. What is an interface? What is the use of Interface.

CHAPTER 7

CONCEPT OF INHERITANCE IN JAVA

Brief Summary of the Chapter:

This chapter talks about Inheritance, the capability of one class to derive properties from another class. Here we can learn how the inheritance is implemented in Java.

KEY POINTS

- **Inheritance:** Inheritance is the capability of one class to inherit properties from an existing class. Inheritance supports reusability of code and is able to simulate the transitive nature of real life objects.
- **Derived/Sub and Base/Super classes**

A class from which another class is inheriting its properties is called base class and the class inheriting properties is known as a sub class and derived class.

1. Single (1:1)

→ when a class inherits from a single base class.

2. Hierarchical (1:M)

→when several classes inherit from the same class.

3. Multilevel (1:1:1)

→ When a subclass is the base class of another class.

- **Method Overriding:** If Base class has a method with same signature as in sub class the method of subclass overshadows the method of base class , it is called Method overriding.
- **Method Overloading:** Two methods with same name but different signatures are there in the same scope of program.
- **Abstract Class:** The class that is used as only base class, no object of this class is used in the program.

Solved Questions:

1. What is inheritance ?

Ans: Inheritance is a form of software reusability in which new classes are created from existing classes by absorbing their attributes and behaviours.

2. What is the primary purpose of inheritance ?

Ans: The primary purpose of inheritance is code reusability.

3. Name three basic concepts in Java which are used in Object oriented programming.

Ans: The three basic concepts are Classes , Objects and inheritance.

4. Which constructor is called first: subclass or superclass ?

Ans: A subclass constructor always calls the constructor for its superclass first explicitly or implicitly to create and initialize the subclass members.

5. What is abstract class?

Ans: An Abstract class is the one that simply represents a concept and whose objects can't be created. It is created through the use of keyword abstract.

The superclass set up as an abstract class does not allow objects of its prototype to be created. In this case only objects of the subclass are used.

6. What is method overriding in Java?

Ans: A method in a subclass hides or overshadows a method inherited from the superclass if both methods have same signature.(i.e. the same name, number and type of arguments and the same return type.) This property is known as Overriding the Inherited method.

7. What is an Interface in Java?

Ans: An Interface defines a protocol of behaviour or it is a collection of constants and abstract methods. These are not classes, but they can be used in the definition of a class.

8. What is the significance of abstract class in Java program?

Ans: When a class defines a method using the same name, return type, and arguments as a method in its superclass, the method in the class overrides the method in the superclass.

When the method is invoked for an object of the class, it is the new definition of the method that is called, and not the method definition from superclass. Methods may be overridden to be more public, not more private.

9. What types of inheritance does Java have?

Ans: Java supports only these inheritance types:

i. Single inheritance ii. Multilevel inheritance iii. Hierarchical

10. State True and False

- a. A subclass inherits both member variables and member methods of superclass.
- b. A class created with keyword abstract can have at the most one object.
- c. Overloading and Overriding are similar concepts in Java.
- d. Java supports single inheritance only at multiple levels of inheritance.
- e. Interfaces are used for multiple inheritance.

Ans: a. True b. False c. False d. True e. False

11. Declare and explain the basic syntax of inheritance.

Ans:The basic syntax for specifying an inherited class is as:

```
class child_class extends parent_class {  
    // class contents  
}
```

The syntax represents the definition of the class child_class. The child_class automatically inherits an initial set of methods and variables from the parent class. The inherited variables and method can be used by the child class as if they had been declared locally in the child_class.

12. How does inheritance support software reuse?

Ans:Because a new class can be derived from an existing one, the characteristics of the parent class can be reused without the erroneous process of copying and modifying code.

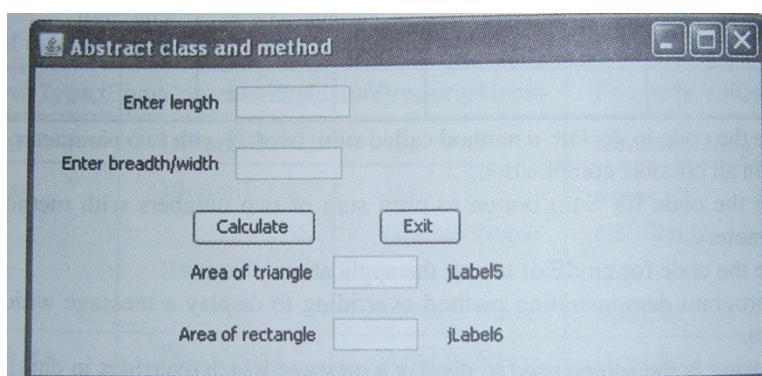
13. Differentiate between method overloading and method overriding.

Ans: Overloading: The methods with the same name but it differ by types of arguments and number of arguments.

Overriding: The methods with the same name and same number of arguments and types but one is in base class and second as in derived class. Derived class overrides over base class.

14. Write a program to find the area of triangle and rectangle through abstract class and abstract class method.

The following is the screen used to find the area of triangle and rectangle using abstract class and abstract class methods:



The list of controls for the above form is as follows:

Control Type	Control Name	Property Name	Property Value
JFrame	AbstractU1	title	Abstract class and method
JTextField	JTextField1 JTextField2 JTextField3 JTextField4	text Variable Name text Variable Name text Variable Name text Variable Name	[None] txtL [None] txtH [None] txtAreaT [None] txtAreaR
JButton	JButton1	text Variable Name text Variable Name	Calculate cmdCalc Exit cmdExit

- a) Write the code to declare an abstract class Figure with an abstract method area(). Notice that the class should declare the possible variables for area operation.
- b) Write the code to declare two classes called Rectangle and Triangle which will calculate the area for both rectangle and triangle using the abstract method area(). Use suitable constructors for both classes.
- c) Write the code for Calculate button to access the abstract method for both triangle and rectangle.
- d) Write the code for cmdExit to exit the application.

Ans:

a) **abstract class Figure {**

```
    double L;
    double BH;
    Figure( double a, double b){
        L= a;
        BH = b;
    }
    Abstract double area( );
}
```

b) **class Rectangle extends Figure {**

```
    Rectangle ( double a, double b){
        super( a, b );
    }
    double area( ) {
        jLabel5.setText(" Inside Area of Rectangle. ");
        return L* BH;
    }
}
```

Class Triangle extends Figure {

```
    Traingle ( double a, double b) {
        Super( a, b);
    }
    double area( ) {
        jLabel6.setText("Inside Area for Triangle.");
        return L * BH /2;
    }
}
```

c) **int len, heigh;**

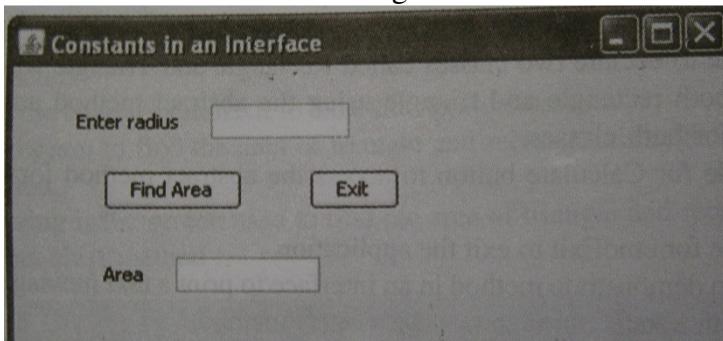
```
len = Integre.parseInt(txtL.getText());
heigh= Integre.parseInt(txtH.getText());
Rectangle r = new Rectangle ( len, heigh);
Triangle t = new Triangle ( len, heigh);
Figure F;
F=r;
txtAreaR.setText(String.valueOf(F.area( )));
F= t;
txtAreaT.setText(String.valueOf(F.area( )));
```

d) **System.exit(0);**

15. Write a program to demonstrate constant in an interface to find the area of circle. Notice that the interface should declare the value of pie as a constant. That is:

```
interface valuePie {
    double PIE= 3.14;
}
```

Using class, implement the interface constant and find the area of circle. The following is the screen used to find area of circle using interface constant.:



The list of controls for the above form is as follows:

Control Type	Control Name	Property Name	Property Value
JFrame	IntAreaUi	Title	Constant in an Interface
JTextField	JTextField1 JTextField2	text Variable Name text Variable Name	[None] txtR [None] txtArea
JButton	JButton1	text Variable Name text Variable Name	Find Area cmdArea Exit cmdExit

- a) Write the code to declare an interface for constant with implementation class method area().
- b) Write the code for FindArea button to access the abstract method and display the area of circle in textbox.
- c) Write the code for cmdExit to exit to exist the application.

Ans:

```
a) interface valuePie {
    double PIE=3.14;
}

class cArea implements valuePie {
    public double area ( float r){
        return ( PIE *r*r);
    }
}

b) float r = Float.parseFloat(txtR.getText( ));
cArea C = new cArea ();
txtArea.setText (String.valueOf (C.area( )));

c) System.exit(0);
```

Unsolved Questions:

1. What members of a class out of private, protected and public are inheritable?
2. When do we declare a method or class ‘final’?
3. What is an abstract class?
4. When do we declare a method or class abstract?
5. What is the difference between an abstract class and an interface?

CHAPTER 8

GUI DIALOGS AND TABLES

Brief Summary of the Chapter:

This chapter tells us about how we can create dialogs in Java Swing through NetBeans IDE.

KEY POINTS:

- **A Dialog:** It is a small separate window that appears to either provide or request to/from the user.
- Java Swing provides four dialog types: **a) JDialog**(General purpose dialogs) **b) JOptionPane** (Pre-defined styles) **c) JFileChooser** (dialog for choosing files) **and d) JColorChooser**(dialog for choosing colour)
- **JOptionPane dialog Type:**

There are four built-in dialog styles:

 - 1) Message dialog → **JOptionPane.showMessageDialog()** displays the message dialog
 - 2) Input dialog → **JOptionPane.showInputDialog()** displays the input dialog
 - 3) Confirm dialog → **JOptionPane.showConfirmDialog()** displays the confirm dialog
 - 4) Option dialog → **JOptionPane.showOptionDialog()** displays the option dialog

Solved Questions:

1. What is dialog in Java?

Ans: A dialog is a small separate window that appears to either provide or request to / from the user.
2. Write the import statement required for using JOptionPane class.

Ans:import javax.swing.JOptionPane;
3. What is showConfirmDialog () method of JOptionPane class do ?

Ans: This method displays a dialog with several buttons and returns as int option type corresponding to the button pressed (mostly one from Yes, No or Cancel)
4. What is showInputDialog () method of JOptionPane class do ?

Ans: This method displays a dialog which is intended to receive user input, and returns a String if the input component is a text field. It displays two buttons : OK and Cancel.
5. What is the difference between a dialog created with JDialog and a dialog created with JOptionPane?

Ans: The dialog created with **JDialog** can be customised in any form the user wants. Also with **JDialog**, a window's default closing behaviour is available with minimize, maximaize and close buttons.

A dialog created with **JOptionPane** can be one of the four pre-defined styles. Also, it only offers a close button for window closing.

Unsolved Questions:

1. What are the various type of dialog options supported by **JOptionPane**?
2. Name four methods associated with **JOptionPane** dialog.
3. Explain the various possible value for Option type property of **JOptionPane** dialog.

CHAPTER 9

JAVA DATABASE CONNECTIVITY TO MYSQL

Brief Summary of the Chapter:

In this chapter we shall know how to connect the front end NetBeans application with back-end databases through JDBC,ODBC for making GUI applications.

KEY POINTS:

➤ **Classes used for Database Connectivity**

- Driver Manager Class,
- Connection Class,
- Statement Class,
- ResultSet Class

➤ **Prerequisites for connecting to MySQL from Java**

MySQL provides connectivity for client applications developed in the Java Programming language via a JDBC driver known as MySQL Connector/J

➤ **Connection:**

A connection is the session between the application program and the database. To do anything with database, one must have a connection object.

➤ **Connecting to MySQL from Java :**

Steps for Creating Database Connectivity Application

There are mainly six steps –

Step-1 Import the Packages Required for Database Programming.

Step-2 Register the JDBC Driver

Step-3 Open a Connection

Step-4 Execute a Query

Step-5 Extract Data from Result set

Step-6 Clean up the Environment

Now to connect to a database, you need to know database's complete URL, the user's Id and password-

`Jdbc:mysql://localhost/<database-name>?user="username" & password="password"`

➤ **ResultSet Methods**

A result set (represented by a ResultSet object) refers to a logical set records that are fetched from the database by executing a query and made available to the application –program. There are various resultSet methods such as:-

- next() :moves the cursor forward on row.
- first() :moves the cursor to the first row in the ResultSet Object.
- Last() :moves the cursor to the last row in the ResultSet object.
- relative(in rows) :moves the cursor relative to its current position.
- Absolute(int rno) :positions the cursor on the rno-th row of the ResultSet object.
- getRow() :Retrieves the current row number the cursor is pointing at.

That is if cursor is at first row the getRow() will return 1.

SOLVED QUESTIONS:

1. What is the importance of java.sql.*; in java jdbc connection ?

Ans: The java.sql.package has to be imported first before we can create a java jdbc connection to the database.

6. What is DriverManager ?

Ans: DriverManager a class of java.sql package that controls a set of JDBC drivers. Each driver has to be registered with this class.

7. What is the purpose of connection.close() method?

Ans: This method is used for disconnecting the connection. It frees all the resources occupied by the database.

8. Name the four components of JDBC.

Ans: JDBC consists of four components: The JDBC API, JDBC Driver Manager, The JDBC Test Suite and JDBC-ODBC Bridge.

9. What are the steps involved in establishing a connection?

Ans: To establish a connection we need to follow two steps: a) loading the driver and b) making a connection.

10. What is ResultSet ?

Ans: A result set (represented by a ResultSet object) refers to a logical set of records that are fetched from the database by executing a query and made available to the application program.

11. What type of parameter that used in executeQuery() method?

Ans: The executeQuery() method has a single String parameter. This parameter must be valid SQL command.

12. What is Connection? What is its role?

Ans: A Connection (represented through Connection object) is the session between the application program and the database. To do anything with database, one must have a connection object.

13. What all JDBC classes/objects are used in a database connectivity application?

**Ans: a) DriverManager Class b) Connection Object c) Statement Object
d) ResultSet Object**

14. What is JDBC? What is its basic functionality?

Ans: The JDBC(Java Database Connectivity) API defines interfaces and classes for writing database applications in Java by making database connections. Using JDBC we can send SQL, PL/SQL statements to almost any relational database. JDBC is a Java API for executing SQL statements and supports basic SQL functionality. It provides RDBMS access by allowing us to embed SQL inside Java code. Because Java can run on a thin client, applets embedded in Web pages can contain downloadable JDBC code to enable remote database access.

15. What is the JDBC-ODBC Bridge?

Ans: The JDBC-ODBC Bridge is a JDBC driver which implements JDBC operations by translating them into ODBC operations. To ODBC it appears as a normal application program. The Bridge implements JDBC for any database for which an ODBC driver is available. The Bridge is implemented as the sun.jdbc.odbc Java package and contains a native library used to access ODBC.

16. Explain the purpose of DriverManager.

Ans: The DriverManager looks after the managing the drivers for a JDBC application. When it is instantiated it makes an attempt to load the driver classes. When the method getConnection() is invoked, the driver manager attempts to locate the suitable driver. The DriverManager obtains the information about the drivers such as registering, locating, finding the drivers loaded, setting the time to wait when it tries to get the connection to a database.

17. Name the methods which are useful for executing SQL statements.

Ans: There are two methods which are responsible for executing SQL statements. These are:

- **executeQuery()**- For SQL statements that produce a single result set (like simple SQL query).
- **executeUpdate()**- For executing INSERT,UPDATE OR DELETE statements and also SQL DDL(Data Definition Language) statements.

Unsolved Questions:

1. Differentiate between JDBC and ODBC ?

2. What are the main tasks of JDBC ?

3. What are the various steps involved in establishing a JDBC connection?

4. Name the method used to trigger an update query using JDBC.

CHAPTER 10 **WEB APPLICATION DEVELOPMENT**

Brief Summary of the Chapter:

World Wide Web is an example of an information protocol/service that can be used to send and receive information over the internet. It supports:

- Multimedia Information (Text, Movies, Pictures, Sound, Programs etc...)
- Hyper Text Information :(Information that contains links to other information resources)
- Graphical User Interface :(So users can point and click to request information instead of typing in text commands)

The World Wide Web is an example of an information protocol/service that works using a Client/Server software design. A service that uses Client/Server design requires two pieces of software to work: Client software (e.g. Web Browser) to request information, and Server software(Web server) to answer requests and provide their information. Most Web applications are designed this way.

Key Points of the Chapter:

Uniform Resource Locator: The uniform resource locator (URL) is the unique identifier of a web page. The address or URL of the current page you are on appears in the "Address Bar" of the web browser.

What is Web Server: Web server delivers (serves) content, such as web pages, using the Hypertext Transfer Protocol (HTTP), over the World Wide Web.

What is Web Browser: A web browser is a client that initiates communication by making a request for a specific resource. The server then responds with the content of that resource, or an error message if unable to do provide the contents due to any reason.

Client Server Computing: It refers to a network set-up in which programs and information reside on the server and clients connect to the server for network access.

Dynamic Web Page: A dynamic document is created by web server whenever a browser requests the documents.

Static Web Page: A static document is a fixed content document that is created by web server whenever a browser requests the documents.

Solved Questions:

1. Identify the web browser software from the following options:
(a) Apache Web Server (b) MS Word (c) HTML (d) Mozilla Firefox

Ans. (d) Mozilla Firefox

2. A _____ document is created by web server whenever a browser requests the documents.
(a) active (b) static (c) dynamic (d) none of the above

Ans. (c) Dynamic

3. A _____ document is a fixed content document that is created by web server whenever a browser requests the documents.
(a) active (b) static (c) dynamic (d) none of the above

Ans. (b) Static

4. Identify the web server software from the following options:
(a) Apache (b) MS Word (c) HTML (d) Mozilla Firefox

Ans. (a) Apache

5. The address of a resource on the net is known as:
(a) ISP (b) HTTP (c) URL (d) WWW

Ans. (c) URL

6. A program that serves requested HTML files and pages.
(a) Web Address (b) Web Page (c) Web Server (d) None of these

Ans. (c) Web Server

7. What is Uniform Resource Locator?

Ans: The uniform resource locator (URL) is the unique identifier of a web page. The address or URL of the current page you are on appears in the "Address Bar" of the web browser. You can go directly to a web page if you know its URL by simply typing the URL in the address bar. You can click in the address bar at any time and overwrite the current address with another URL to jump to a different web page. The most general form of a URL syntax is as follows:

Protocol://domain name/<directory path>/<object name>

For example:

http://www.openoffice.org/dev_docs/features/3.2/rc2.html

8. What is Web Server?

Ans: Web server delivers (serves) content, such as web pages, using the Hypertext Transfer Protocol (HTTP), over the World Wide Web.

9. What is Web Browser?

Ans: A web browser is a client that initiates communication by making a request for a specific resource. The server then responds with the content of that resource, or an error message if unable to do provide the contents due to any reason.

Unsolved Questions:

1. In the URL, <http://www.mycorp.com/pr/master.htm>, what is the http component?
2. In the URL, <http://www.mycorp.com/pr/master.htm>, what is the www.mycorp.com component?
3. In the URL, <http://www.mycorp.com/pr/master.htm>, what is the /pr/master.htm component?
4. What do you mean by Web Browser, and Web Server?
5. Which protocol is used to upload/ transfer the file from host to server Internet?
6. What is WWW? How does it function?
7. A web browser & web server are an application of client/server computing concept. Comment on this statement?
8. What is URL ? What are its components?
9. What is CGI? How it works in Dynamic web Page service?
10. Differentiate between Static and Dynamic Web Service?

CHAPTER 11 **HTML-I : BASIC HTML ELEMENTS**

Brief Summary of the Chapter:

The World Wide Web (or simply the Web or WWW) is a system of sharing interlinked hypertext documents over the internet. These documents are stored on web-servers on the internet and contain text, images, videos and other multimedia. These documents also contain hyperlinks to navigate among them. HTML (Hyper Text Markup Language) is the basic language which is used to create Hypertext documents. In this lesson we are going to learn how to create hyper text documents using HTML.

Key Points of the Chapter:

- HTML stands for Hyper Mark-up Language.
- HTML is the subset of SGML (Standard Generalised Markup Language)
- The head of the HTML document is where you enter the title of the page.
- Headings are typically displayed in larger and/or bolder fonts than normal body text. HTML has six levels of heading, numbered 1 to 6, with 1 being the largest.
- The BACKGROUND is the image attribute in <BODY> tag where you can place graphic object to make more attractive Web page.
- The BGCOLOR attribute is used to set the background color of your Web page with <BODY> tag.

Solved Questions:

1. HTML tags must be written within:

- (a) <> (b) { } (c) [] (d) ()

Ans: (a) <>

2. Which of the following is the correct structure of HTML tags?

- (a) < HTML> </HTML> <HEAD> </HEAD> <BODY> </BODY>
- (b) <HTML> <HEAD> </HEAD> </HTML> <BODY> </BODY>
- (c) <HTML> <HEAD> <BODY> </BODY> </HEAD> </HTML>
- (d) <HTML> <HEAD> </HEAD> <BODY> </BODY> </HTML>

Ans: (d) <HTML> <HEAD> </HEAD> <BODY> </BODY> </HTML>

3. What is HTML?

Ans: HTML stands for Hyper Text Markup Language. It is a markup language used to create HTML documents. An HTML document defines a web page.

4. Define <html> tag

Ans: The <html> tag identifies the document. An HTML document begin with <html> ends with </html>.

5. Give two differences between HTML and XML.

Ans: The three differences between HTML and XML are:

1. HTML is designed to display data and hence, focussed on the ‘look’ of the data, whereas XML is designed to describe and **carry data and hence, focuses on ‘what data is’.**
2. **In HTML tags are predefined, while in XML, tags can be created as per needs.**
3. **HTML tags are not case sensitive**, whereas XML tags are case sensitive

Unsolved Questions:

1. What do you need to do work with HTML?

2. Write as HTML code line to set the background image as CLOUDS.GIF.

3. Write an HTML code line to set the BGCOLOR as YELLOW.

4. Write the HTML codes to set the BGCOLOR as PURPLE and a text “I am in Class X-A” as BLUE.

5. Write the HTML codes to set the BGCOLOR as LIME, header 1 <H1> text “Text Example with size and color” as BLUE, text font size as 30 and color=”RED”.

6. Write the HTML codes to set the BGCOLOR as NAVY, header 1 <H1> text “Text Example with size color, and font face” as WHITE, text font size as 20, color ”RED” and font face “ARIAL”.

7. What is the method of using comment line in HTML code?

8. What is the use of tag in HTML code? Write any two options used with this tag.

9. Which tag is used to insert heading of third level on a web page?

10. How would you display in the title bar of browser?

11. How
 tag is different from <P> tag?

12. What is the purpose of using the tag <H1>...<H6>?

13. How can the font size of a single line on a web page be changed?

14. What will be displayed on the web page for the following web page?

<I Atomic weight of> /I> O <sub> 2

15. What is the use of <BODY> tag in HTML code? Write any two attributes used with this tag.

16. Which tag do we use to change the size and style (face) of the text of an HTML file viewed on a web browser? Also explain any two attributes used with this tag.

17. Distinguish between <SUP> and <SUB> tags with example.

CHAPTER 12

HTML-II : LISTS, TABLES AND FORMS

Brief Summary of the Chapter:

Making information more accessible is the single most important quality of HTML. The language's excellent collection of text style, formatting tools, and links tools help you organize your information into documents that readers quickly understand, scan, and extract.

Beyond embellishing your text width specialized text a tag, HTML also provides a rich set of tools that help you organize content into formatted lists. Apart from lists, you can insert images into your documents to enhance its visual approach. Also many documents can be linked together using HTML's sophisticated linking tools.

Also, there are situations where you need to represent tabular data(data in rows and columns). For this, HML provides Table tags.

Key Points of the Chapter:

- The numbered/ordered list tag is used to indicate a list item as contained in an ordered or numbered form.
- An ordered list is also a list of items. The list items are marked with numbers.
- Bulleted/unordered list tag is used to indicate a list item as contained in an unordered or bulleted form.
- LI list tag is used to denote the beginning of each new list item.
- The TYPE attribute is used to change the bulleted symbol in a list. The attribute may have a value of circle, disc, or square. For example, <UL TYPE=disk>.
- The list items are marked with bullets (typically small black circles).
- The START attribute is used to change the beginning value of an ordered list. Normally, the ordered list starts with 1. For example, <OL START = 10>.
- The IMG SCR tag specifies an image to be displayed in a Web page. This is an empty element, which is coded in HTML document. It has attributes like : SRC, ALIGN, BORDER, HEIGHT, WIDTH and ALT.
- A table is divided into rows (with the <tr> tag), and each row is divided into data cells (with the <td> tag).\ The letters td stands for “table data”, which is the content of a data cell.
- Links between Web pages is known as hyperlink.
- The anchor tag <A> marks the text as hypertext link.
- The HREF attribute specifies the destination of a link.
- The HREF or the name attribute must be present in the <A> tag.
- A URL, basically, is a way to tell your web browser (or other program) where to look for something. If you want to make a hypertext link to a page. You will need its URL.
- HREF is an attribute for the <A> tag, which is displayed in a browser, the work Text describing link would appear underlined and in another order to indicate that clicking that text initiates the hypertext link.

Solved Questions:

1. What is an unordered list?

Ans: Bulleted/unordered list tag is used to indicate a list item as contained in an unordered or bulleted form.

2. What is ordered list?

Ans: The numbered/ordered list tag is used to indicate a list item as contained in an ordered or numbered form.

3. What is table? What are the basic commands for creating a table?

Ans: Table is a collection of rows and column.

Followings are important tags

<Table> :- used to give identification to a table

<TH> :- To provide headings in a table

<TR>:- (Table Row) to create Row in a table

<TD> :- (Table Data) to create columns in a row

4. What do you understand by ALINK? Explain with an example.

Ans: Links which are currently being visited in web page are known as Active Links (ALINK).

Example:

```
<BODY TEXT = "#FFFFFF" ALINK="#FF0000">
```

```
<A HREF="www.kvsangathan.nic.in"> Kendriya Vidyalaya Sangathan </A><BR>
```

```
<A HREF = "www.cbse.nic.in"> Central Board of Secondary Education </A>
```

```
</BODY>
```

5. What is FORM tag? Explain with example.

Ans: To create or use forms in a web page <FORM> tag is used. Form is means to collect data from the site visitor. It is done with the help of controls that collect data and send it over.

Example:

```
<FORM method = "POST" action=submitform.asp>
```

6. What is INPUT tag? Explain with example.

Ans: Text boxes are single line text input controls that are created using <INPUT> tag whose TYPE attribute has a value as "Text".

Example:

```
<FORM method = "POST" action=submitform.asp>
```

First Name:

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```
<INPUT TYPE="text" NAME = "fname"/>
```

```
<BR>
```

Last Name:

```
<INPUT TYPE="text" NAME = "lname" />
```

```
</FORM>
```

7. What is the purpose of select tag?

Ans: <SELECT> tag is used to create a drop down box in which many options are available; user can make selection from the list.

Example:

```
<SELECT name = "stream">
```

```
<OPTION value="Science"> Science</OPTION>
```

```
<OPTION value="Commerce"> Commerce </OPTION>
```

```
<option value="Humanities"> Humanities </OPTION>
```

```
</SELECT>
```

Unsolved Questions:

1. What types of list are supported by HTML?

2. Which three tags let you create the definition list?

3. Which three tags let you create the (i) un numbered lists? (ii) numbered lists?

4. What is a table? Which tag is used to create tables in HTML?

5. Which attributes are used to give border to a table?

6. Which attribute lets you control the display of select border sides of a table?

7. Which attributes is used to control the inside table border?

8. How is spacing in cells of table controlled?

9. What is the role of ALIGN attribute of <TABLE> tag?

10. How can you specify following in table?

- (a) background image (b) background colour.
 (c) Table height. (d) Table width.
11. What tag is used to specify
 (i) Table data (ii) Table header (iii) Table row?
12. Name the attributes used for following?
 (i) Setting the cell width. (iii) Setting cells background colour.
 (ii) Changing the cell span. (iv) Aligning cell contents vertically.
13. What for are <TH> and <TR> tags used?
14. What are forms? Which methods and actions are commonly used with Forms?
15. Name different control types supported by HTML forms.
16. Write the tags to define the following :
 (i) A text box (ii) A text area (iii) A radio button
 (iv) A check box (v) A Password box (vi) A Pop up box
 (vii) Submit button (viii) A label.
17. How will you nest an un order list inside an ordered list?
18. How would you indent a single word and put a square bullet in front of it?
19. Write code to produce following HTML tables?

1	3
	4
2	5

21. Write HTML code to produce these controls
 (i) a text box (ii) a text area with 10 rows and 30 columns
 (iii) A password text box (iv) A pop up box to choose class from it.

CHAPTER 13

eXtentensible Markup Language

Brief Summary of the Chapter:

It is a markup language. Markup language is a set of rules that defines the structure and format of text while presenting text. XML stands for eXtentensible Markup Language. XML is designed to transport, store and describe data. Whereas HTML was designed to display data. XML tags are not predefined. We must define your own tags in XML. An XML document that follows all grammar rules is well-formed document.

KEY POINTS OF THE CHAPTER

- A markup language is a set of rules that defines the structure and format of text while presenting text.
- XML is a markup language.
- A meta-language is a language that is used to define other languages.
- XML is based on SGML.SGML was the first markup language.
- XML is different from HTML as it does not display the data but describes and carries it.
- XML is free and extensible.
- XML is platform independent.
- The XML document that obeys XML grammar rule is called well-formed document.
- DTD (Document definition type) is a set of rules that defines what tags appear in an XML document.

- CSS (Cascading Style Sheet) are a collection of forming rules that control the appearance of content in a webpage.

SOLVED QUESTIONS

1. XML expand to _____
Ans. - eXtensible Markup Language
2. An XML document has a logical structure and a _____ structure.
Ans. -Physical
3. First generic markup language is
Ans-SGML
4. CSS means

(a) Colored system software	(b) combined style sheet
(c) Colored style sheet	(d) cascading style sheet

Ans.-(d)
5. XML is case sensitive(T/F)
Ans. -T
6. Define DTD?
Ans. -DTD is a set of rules that defines what tags appear in an XML document.
7. To link an XML document with a stylesheet

(a) Create XML document	(b) create a separate CSS stylesheet for XML file
(c) Link the two files	(d) All of the above

Ans. -All of the above
8. Two important software that validates or process XML documents are

(a) XML validator	(b) XML Parser	(c) both (a) and (b)	(d) None of these
-------------------	----------------	-----------------------	-------------------

Ans.-(c)
9. I enclose all other elements of an XML document. Who am I?
 (a) Processing Instruction (b) Parsed data (c) Root data (d) Attribute
Ans. - Root data
10. XML documents can be viewed as web page properly if proper stylesheet file is also available along with XML file.(T/F)
Ans.-T
11. The XML file confirming to syntax rules or grammar rules is called

(a) Correct document	(b) valid document
(c) Well-formed document	(d) confirmed document

Ans. - well-formed document
12. What is markup language?
Ans.-A markup language is a set of rules/tags that defines the structure and format of text while presenting text.
13. What is XML?
Ans. - XML is eXtensible Markup Language which allows creating application specific structured document by allowing creation of new tags. These structured documents can later be presented in human-understandable manner in different ways.
14. Expand the following terms
 - (i) XML (ii) EDI (iii) CSS (iv) DTD**Ans.**-(i) XML-extensible Markup Language
(ii) EDI-Electronic Data Interchange
(iii) CSS- Cascading Style Sheet
(iv) DTD- Document Type Definition

15. Compare HTML and XML briefly

Ans. - HTML versus XML

	HTML	XML
1	HTML document formats and displays	XML documents carry data along with their
2	HTML tags are predefined	New tags can be created as per our
3	HTML may not have closing tags.	XML must have closing tags.
4	HTML tags are not case sensitive	XML tags are case sensitive.
5	HTML documents are directly viewable in a browser.	XML documents are viewed only if proper style sheet file is also available along with

16. Describe features of XML

Ans. - Features of XML:

1. XML is designed to carry data not to display data.
2. XML was created to structure, store and to send information.
3. XML is self-descriptive. Tags are not pre-defined; rather they are created to describe the content in appropriate manner.
4. XML is free and extensible.
5. XML is platform independent.
6. XML can separate Data from HTML. XML stores and describes data, which can later be formatted and presented in desired way.
7. XML can be used to create new languages, since it is a Meta language.
8. XML is supported and recommended by World Wide Web Consortium (W3C).

CHAPTER 14

MYSQL REVISION TOUR

Brief Summary of the Chapter:

A database system is basically a computer based record keeping system. There are different data models are available. The most popular data model is Relational Data Model (RDBMS). In RDBMS data is arranged in the form of table. MYSQL is software to manipulate database. It is free, open-source RDBMS. In order to access data within MYSQL database, all programs and users must use, Structured Query Language (SQL).SQL is the set of commands that is recognized by nearly all RDBMs. SQL commands can be classified into three categories. These are DDL (Data Definition Language), DML (Data Manipulations Language) and TCL (Transmission Control Language). Apart from MYSQL is commands, it has various functions that performs some operation and returns a single

value. In this chapter we will learn various commands and functions in MYSQL and its implementation.

KEY POINTS OF THE CHAPTER

- **Structure Query Language**
A non-procedural UGL used for querying upon relational database
- **DDL: Data Definition Language**
Part of the SQL that facilitates defining creation/modification etc. of database object such as tables, indexes, sequences etc.
- **DML: Data Manipulation Language.**
Part of the SQL that facilitates manipulation (additions/deletions/modification) of data which residing in the database tables.
- **Meta Data**
Facts/data about the data stored in table.
- **Data Dictionary**
A file containing facts/data about the data stored in table
- **Relational Data Model**
In this model data is organized into tables i.e. rows and columns. These tables are called relations.
- **The Network Data Model**
In this model data are represented by collection of records & relationships among data. The collections of records are connected to one another by means of links.
- **The Hierarchical Data Model**
In this model records are organized as trees rather than arbitrary graphs.
- **Object Oriented Data Model**
Data and associated operations are represented by objects. An object is an identifiable entity with some characteristics and behavior.
- **Relation:**
Table in Database

- **Domain:**
Pool of values from which the actual values appearing
- **Tuple:**
A row of a relation
- **Attribute:**
A column of relation
- **Degree:**
Number of attributes
- **Cardinality:**
Number of tuples
- **View:**
Virtual table that does not really exist in its own right
- **Primary Key:**
Set of one or more attributes that can uniquely identify tuples with in the relation.
- **Candidate Key:**
A Candidate Key is the one that is capable of becoming Primary key i.e., a field or attribute that has unique value for each row in the relation.
- **Alternate Key:**
A candidate key that is not primary key is called alternate key.
- **Foreign Key:**
A non-key attribute, whose values are derived from the primary key of some other table.
- **Integrity Constraints**
Integrity Constraints are the rules that a database must comply all the times. It determines what all changes are permissible to a database.

- **Accessing Database in MySql :**

Through USE keyword we can start any database

Syntax:

USE <database Name>;

Example: USE STUDENT;

- **CREATING TABLE IN MYSQL**

Through Create table command we can define any table.

CREATE TABLE <tablename>

(<columnname> <datatype>[(<Size>)],.....);

CREATE TABLE Student(SRollNo integer, Sname char(20));

- **INSERTING DATA INTO TABLE**

The rows are added to relations using INSERT command.

INSERT INTO <tablename>[<columnname>]

VALUES (<value>, <value>...);

INSERT INTO student (Sid, Sname)

VALUES (100,'ABC');

- **SELECT COMMAND:**

It lets us make queries on the database.

SELECT * FROM tablename WHERE condition;

SELECT * FROM student WHERE Sid=100;

- **Eliminating Redundant Data**

DISTINCT keyword eliminates redundant data

SELECT DISTINCT Sid FROM Student;

- **Selecting from all the rows-ALL Keyword**

SELECt ALL Sid FROM Student;

- **Viewing structure of table:**

DESCRIBE/DESC <tablename>;

DESCRIBE student;

Using column aliases:

SELECT <column name> AS [columnalias][,...]

FROM <tablename>;

SELECT rollno, name AS "studentname"

FROM student;

- **Condition based on a range:**

Keyword BETWEEN used for making range checks in queries.

SELECT rollno, name FROM student WHERE rollno BETWEEN 10 AND 20;

- **Condition based on a list:**

Keyword IN used for selecting values from a list of values.

SELECT rollno, name FROM student WHERE rollno IN (10, 20, 60);

- **Condition based on a pattern matches:**

Keyword LIKE used for making character comparison using strings

percent(%) matches any substring

underscore(_) matches any character

SELECT rollno, name FROM student WHERE name LIKE '%ri';

- **ORDER BY clause:**

It is used to sort the results of a query.

SELECT <column name> [, <column name>, ...]

FROM <table name>

[WHERE <condition>]

```
[ORDER BY <column name>];  
SELECT *  
FROM student  
WHERE marks>50  
ORDER BY name;
```

- **MySQL functions:**

A function is a special type of predefined command set that performs some operation and returns a single value.

String functions :(Lower / LCASE(), Upper/UCASE(), Concat(), Instr(), Length(), RTrim(), LTrim(), Substr())

Numeric function :(Round(), Truncate(), Mod(), Sign())

3.Date functions:(Curdate(), Date(), Month(), year(), DayName(), DayofMonth(), DayofWeek(), DayofYear(), Now(), SysDate())

- **Creating tables with SQL Constraint :**

CREATE TABLE command is used to CREATE tables

```
CREATE TABLE tablename  
(columnname datatype size, ...);
```

- **SQL Constraint:**

A Constraint is a condition or check applicable on a field or set of fields.

- **NOT NULL/UNIQUE/DEFAULT/CHECK/PRIMARY KEY/FOREIGN KEY Constraint:**

```
CREATE TABLE student (Srollno integer NOT NULL, ...);
```

```
CREATE TABLE student (Srollno integer UNIQUE ...);
```

```
CREATE TABLE student (Srollno integer NOT NULL, Sclass integer, Sname varchar(30),  
Sclass DEFAULT 12 );
```

```
CREATE TABLE student (Srollno integer CHECK (Srollno>0), Sclass integer, Sname  
varchar(30));
```

```
CREATE TABLE student (Srollno integer NOT NULL PRIMARY KEY, Sclass integer,  
Sname varchar(30));
```

```
CREATE TABLE teacher (Tid integer NOT NULL, FOREIGN KEY (Studentid )  
REFERENCES student (Sid));
```

- **Inserting data into table:**

INSERT INTO command is used to insert data into table

```
INSERT INTO tablename VALUES (value1,...);
```

```
INSERT INTO student VALUES (1,'Ram', 12);
```

- **Modifying data in tables:**

Existing data in tables can be changed with UPDATE command.

```
UPDATE student SET Sclass=11 WHERE Sname='Ram';
```

- **Deleting data from tables:**

Tuples in a table can be deleted using DELETE command.

DELETE FROM student WHERE Srollno>10;

SOLVED QUESTIONS

1. What do you mean by a Database Management System?

Ans- Database Management is a collection of programs and files that allow a user to define structure of a database, store data into it, modify the structure and manipulate the data.

2. What do you mean by Relational database?

Ans-Relational Database is a type of database in which relation is used as its basic element. Row and columns are used to store data.

3. What is a foreign key?

Ans If a key is available in a table as a primary key then this key is called foreign key in another table.

4. What is primary key?

Ans-Primary key is a unique key in a relation which can uniquely identifies a tuple (row) in a given relation.

5. What is SQL?

Ans-SQL is stands for structured query language. This language is used to manipulate data stored in a table.

6. What is referential integrity?

Ans-This is a rule which ensures that in DBMS relationships between records in related tables are valid. And that user don't accidentally delete or change related data.

7. What is MySql?

Ans-MySQL is an open source RDBMS which uses SQL.

8. What is DDL?

Ans- DDL provides commands to define or redefine the schema of a table. Table is created, altered and dropped using DDL.

9. What are DML commands?

Ans- DML commands are used to manipulate data stored in a table. Insertion, deletion and modifications are possible using DML commands.

10. Maximum how many characters can be stored in a (i) text literals (ii) numeric literal

Ans-(i) Text literals can have 4000 bytes (ii) A numeric literals can store 53 digits.

11. What is null value in MySql?

Ans-If a column in a row has no value, then column is said to be null.

12. Which keyword eliminates redundant data in from a query result?

Ans- DISTINCT

13. How would you display system date as the result of a query?

Ans- CURDATE()

14. What is NOW() function in MySql?

Ans- It returns the current date and time.

15. What is NOT NULL constraint?

Ans- NOT NULL constraints impose a condition that value of a row cannot be left blank.

16. What is error in following statement?

UPDATE EMPL;

Ans- WHERE clause is missing in given query.

17. Identify the error?

DELETE ALL FROM TABLE EMP;

Ans-There is no need to write ALL and TABLE word in above query.

Correct form is-DELETE FROM EMP;

18. Differentiate WHERE and HAVING clause?

Ans-:- Where clause is used to select particular rows that satisfy condition whereas having clause is used in connection with aggregate function, group by clause.

19. How SQL commands are are classified?

Ans-SQL Commands are classified into three categories

- (i) Data Definition Language (DDL)-Commands that allow us to perform tasks related to data definition. E.g. creating, altering and dropping
- (ii) Data Manipulation Language (DML) - Commands that allows us to perform data manipulation e.g retrieval, insertion, and modification of data stored in a database.
- (iii) Transaction Control Language (TCL)-Commands that allow us to manage and control the transactions.

20. What is difference between char and varchar?

Ans-The difference between char and varchar is that of fixed length and variable length.The CHAR datatypes specifies a fixed length character string.When a column is given datatype as CHAR(n) then MySQL ensures that all values stored in that column have this length.But on other hand when a column is given datatype as VARCHAR(n) ,then the maximum size of a value in this column stores exactly what we specify.

21. What do you understand by the terms primary key and degree of a relation in relational data base?

Ans: Primary Key: A primary key is a set of one or more attributes that can uniquely identify tuples within the relations. The number of attributes in a relation is called Degree of a relation in relational data base.

22. What do you understand by the candidate key and cardinality of a relation in relational data base?

Candidate Key: All attribute combinations inside a relation that can serve as primary key(uniquely identifies a row in a relation) are Candidate Keys as they are candidates for the primary key position. The number of rows in a relation is known as cardinality of a relation.

23. Consider the following tables Item and Customer. Write SQL commands for the statement

(i) to (iv) and give outputs for SQL queries (v) to (viii)

Table: ITEM

S.no	I_ID	Item Name	Manufacturer Price
01	PC01	Personal Computer	ABC 35000
02	LC05	Laptop	ABC 55000
03	PC03	Personal Computer	XYZ 32000
04	PC06	Personal Computer	COMP 37000
05	LC03	Laptop	PQR 57000

Table: CUSTOMER C_ID Customer Name City I_ID

S.no	CUSTOMER C_ID	Customer Name	City	I_ID
01	01	N.Roy	Delhi	LC03
02	06	H.Singh	Mumbai	PC03
03	12	R.Pandey	Delhi	PC06
04	15	C.Sharma	Delhi	LC03
05	16	K.Agarwal	Bangalore	PC01

(i) To display the details of those Customers whose city is Delhi

.Ans: Select all from Customer Where City="Delhi"

(ii)To display the details of Item whose Price is in the range of 35000 to 55000 (Both values included).

Ans: Select all from Item Where Price>=35000 and Price <=55000

(iii)To display the Customer Name, City from table Customer, and Item Name and Price from table Item, with their corresponding matching I_ID.

Ans: Select Customer Name, City, ItemName, Price from Item, Customer where Item.I_ID=Customer.I_ID.

(iv) To increase the Price of all Items by 1000 in the table Item.

Ans: Update Item set Price=Price+1000

(v)SELECT DISTINCT City FROM Customer.

Ans: City Delhi, Mumbai, Bangalore

(vi)SELECT Item Name, MAX(Price), Count(*) FROM Item GROUP BY Item Name;

Ans: Item Name Max(Price) Count(*) Personal Computer 37000 3 Laptop 57000 2

(vii)SELECT Customer Name, Manufacturer FROM Item, Customer WHERE Item.Item_Id=Customer.Item_Id;

Ans: Customer Name Manufacturer Name

N.Roy PQR

H.Singh XYZ

R.Pandey COMP

C.Sharma PQR

K.Agarwal ABC

(viii)SELECT Item Name, Price * 100 FROM Item WHERE

Manufacturer = 'ABC';

Ans: Item Name Price*100 Personal Computer 3500000

Laptop 5500000

UNSOLVED QUESTIONS

1. Write MySQL command that will be used to show all the databases which is already created in MySql.
2. The Department column and date of joining of a table Employee is given below:

Department	Date_of_Joining
Biology	2009-07-19
Zoology	2007-02-13
Bio_Tech	2010-05-15
Psychology	2011-09-06

(i) Based on the above table write SQL

Query to display the name of those departments whose name ends with logy?

- (ii) Based on the above table write SQL Query to display the name of those departments whose name starts with Bi.
3. What is the degree and cardinality of the above given Employee table?
 4. Differentiate between Primary key and Unique Key?
 5. Consider the following tables WORKERS and DESIG. Write SQL commands for the statements (i) to (iv) and give outputs for SQL queries (v) to (viii).

WORKERS

W_ID	FIRSTNAME	LASTNAME	ADDRESS CITY
102	Sam	Tones	33 Elm St. Paris
105	Sarah	Ackerman	44 U.S.110 New York
144	Manila	Sengupta	24 Friends Street New Delhi
210	George	Smith	83 First Street Howard
255	Mary	Jones	842 Vine Ave. Losantiville
300	Robert	Samuel	9 Fifth Cross Washington
335	Henry	Williams	12 Moore Street Boston
403	Ronny	Lee	121 Harrison St. Newyork
451	Pat	Thompson	11 Red Road Pari

DESIG

W_ID	SALARY	BENEFITS	DESIGNATION
102	75000	15000	Manager
105	85000	25000	Director
144	70000	15000	Manager
210	75000	12500	Manager
255	50000	12000	Clerk
300	45000	10000	Clerk
335	40000	10000	Clerk
400	32000	7500	Salesman
451	28000	7500	Salesman

(i) To display W_ID First name, address and City of all employees living in New York from the Table Workers

(ii) To display the content of workers table in ascending order of LASTNAME.

(iii) To display the FIRSTNAME, LASTNAME and Total Salary of all Clerks from the tables WORKERS And DESIG, where Total alary is calculated as Salary + benefits.

(iv) To display the minimum salary among managers and Clerks From the tables DESIG.

(v) SELECT FIRSTNAME, SALARY ROM WORKERS, DESIG WHERE DESIGNATION = "MANAGER" AND WORKERS.W_ID = DESIGN.W_ID

(vi)SELECT COUNT(DISTINCT DESIGNATION) FROM DESIGN ;

- (vii) SELECT DESIGNATION, SUM(SALARY) FROM DESIG GROUP BY DESIGNATION HAVING COUNT (*) < 3;
- (viii) SELECT SUM(BENIFTS) FROM DESIG WHERE DESIGNATION = "salesman";

CHAPTER -15

DATABASE TRANSACTIONS

Brief Summary of the Chapter:

Reliability is a quality, which we seek for in everything that we get. The same is applicable to software and to database. A reliable database system is that which retains our database in a consistent state despite occurrence of many failures. Database Transaction is the field which requires utmost consistency. This chapter describes fundamentals of database transactions and its reliable implementation. A database can be called consistent when it follows ACID properties. A transaction can be called reliable when it either COMMITTED i.e. successfully all its steps are carried out and changes are permanently reflected in the database or be ROLLBACKED i.e. in case of failures, if transaction cannot be successfully completed then any data changes made by the transaction are brought back to the state that earlier was prior to the execution of this transaction.

KEY POINTS OF THE CHAPTER

TRANSACTION-A set of successive statements that succeed or fail as a group so that all effected statements of the group are retained or all are discarded are called transactions. When a transaction is done on the database is called **database transaction**.

COMMIT-This statement is used to end a transaction and make all changes permanent. Until a transaction is committed, other users cannot see the changes made to the database.

ROLLBACK- The ROLLBACK statement is used to end a transaction and undo the work done by that transaction. After ROLLBACK, it looks like that transaction had never begun.

SAVEPOINT-It is point in a transaction, up till which all changes have been saved permanently.

ACID- It is an acronym of ATOMICITY, CONSISTENCY, ISOLATION, DURABILITY

(For Details see **SOLVED QUESTIONS**.)

SOLVED QUESTIONS

1. Define a transaction.

Ans. -A transaction is a logical unit of a work that must succeed or fail in its entirety. It is an atomic operation which can be divided into smaller operations.

2. What are the two ways in which multiple transactions can be executed?

Ans. - Multiple transactions can be executed in one of the following two ways:

- (i) Serially
- (ii) Concurrently

3. What is a savepoint?

Ans. - Savepoints are special operations that allow you to divide the work of a transaction into different segments. In case of a failure, you can execute rollbacks to the savepoint only, leaving prior changes intact.

4. What do you understand by a database transaction?

Ans. - A database transaction is a logical unit of work that must succeed or fail in its entirety.

5. Why do you understand by transaction COMMIT and ROLLBACK?

Ans-COMMITting a transaction means all the steps of a transaction are carried out successfully and all data changes are made permanent in the database. Transaction ROLLBACK means transaction has not been finished completely and hence all data changes made by the transaction in the database if any, are undone and the database returns to the state as it was before this transaction execution started.

6. What do you understand by ACID properties of database transaction?

Ans. -To ensure the data-integrity, the database system maintains the following properties of transaction. The properties given below are termed as ACID properties-an acronym derived from the first letter of each of the properties.

- (i) Atomicity-This property ensures that either all operations of the transactions are reflected properly in the database, none are. Atomicity ensures either all-or-none operations of a transaction are carried out.
- (ii) Consistency-This property ensures that database remains in a consistent state before the start of transaction and after the transaction is over.
- (iii) Isolation-Isolation ensures that executing transaction execution in isolation i.e. is unaware of other transactions executing concurrently in the system.
- (iv) Durability-This property ensures that after the successful completion of a transaction i.e when a transaction COMMITs, the changes made by it to the database persist i.e remain in the database irrespective of other failures.

7. What the function is of redo and undo logs?

Ans. -Every database has a set of redo log files. It records all change in data including both committed and uncommitted changes. Undo logs stored roll backed data.

8. What TCL commands are supported by SQL?

Ans. -SQL supports following TCL commands

- **BEGIN** /**START TRANSACTION**-Marks the beginning of a transaction
- **COMMIT**-Ends the current transaction by saving database changes and starts a new transaction.
- **ROLLBACK**-Ends the current transaction by discarding changes and starts a new transaction.
- **SAVEPOINT**-Defines breakpoints for the transactions to allow partial rollbacks.
- **SET AUTOCOMMIT**-Enables or disable the default autocommit mode.

9. Which two statements complete a transaction?

- A. DELETE employees;
- B. DESCRIBE employees;
- C. ROLLBACK TO SAVEPOINT C;
- D. GRANT SELECT ON employees TO SCOTT;
- E. ALTER TABLE employees
MODIFY COLUMN sal;
- F. Select MAX(sal)
FROM employees
WHERE department_id=20;

Ans. - C, E

UNSOLVED QUESTIONS

1. What is the benefit of transaction?
2. What are the five states of the transactions?
3. What will happen when COMMIT statement is issued?
4. What will happen when ROLLBACK statement is issued?
5. How can you start a new transaction?

CHAPTER 16

More on SQL- Grouping Records and Table Joins

Brief Summary of the Chapter:

- grouping records
- table-joining using Group by clause of select statement of SQL
- Define a Transaction
- Describe reason why all the tasks in a transaction should be executed fully or not at all.
- Perform basic transactions.
- Commit a transaction.
- Add Save Points to a transaction.
- Roll back a Transaction
- Roll back a Transaction to a Savepoint.

Key Points :

Aggregate or Group functions: MySQL provides Aggregate or Group functions which work on a number of values of a column/expression and return a single value as the result. Some of the most frequently used. Aggregate functions in MySQL are : MIN(), MAX(), AVG(), SUM(), COUNT().

Data Types in aggregate functions: MIN(), MAX(), and COUNT() work on any type of values - Numeric, Date, or String. AVG(), and SUM() work on only Numeric values (INT and DECIMAL).

NULLs in aggregate functions: Aggregate functions totally ignore NULL values present in a column.

GROUP BY: GROUP BY clause is used in a SELECT statement in conjunction with aggregate functions to group the result based on distinct values in a column.

HAVING: HAVING clause is used in conjunction with GROUP BY clause in a SELECT statement to put condition on groups.

WHERE Vs HAVING: WHERE is used to put a condition on individual row of a table whereas HAVING is used to put condition on individual group formed by GROUP BY clause in a SELECT statement.

- Cartesian Product (or Cross Join): Cartesian product of two tables is a table obtained by pairing each row of one table with each row of the other. A cartesian product of two tables contains all the columns of both the tables.
- Equi-Join: An equi join of two tables is obtained by putting an equality condition on the Cartesian product of two tables. This equality condition is put on the common column of the tables. This common column is, generally, primary key of one table and foreign key of the other.
- Foreign Key: It is a column of a table which is the primary key of another table in the same database. It is used to enforce referential integrity of the data.
- Referential Integrity: The property of a relational database which ensures that no entry in a foreign key column of a table can be made unless it matches a primary key value in the corresponding column of the related table.
- Union: Union is an operation of combining the output of two SELECT statements.

- Constraints: These are the rules which are applied on the columns of tables to ensure data integrity and consistency.
- ALTER TABLE: ALTER TABLE command can be used to Add, Remove, and Modify columns of a table. It can also be used to Add and Remove constraints.

Solved Questions(MULTIPLE CHOICE QUESTIONS)

EXERCISES

1. Which of the following will give the same answer irrespective of the NULL values in the specified column:
 - a. MIN()
 - b. MAX()
 - c. SUM()
 - d. None of the above
2. An aggregate function:
 - a. Takes a column name as its arguments
 - b. May take an expression as its argument
 - c. Both (a) and (b)
 - d. None of (a) and (b)
3. HAVING is used in conjunction with
 - a. WHERE
 - b. GROUP BY clause
 - c. Aggregate functions
 - d. None of the above
4. In the FROM clause of a SELECT statement
 - a. Multiple Column Names are specified.
 - b. Multiple table names are specified.
 - c. Multiple Column Names may be specified.
 - d. Multiple table names may be specified.
5. JOIN in RDBMS refers to
 - a. Combination of multiple columns
 - b. Combination of multiple rows
 - c. Combination of multiple tables
 - d. Combination of multiple databases
6. Equi-join is formed by equating
 - a. Foreign key with Primary key
 - b. Each row with all other rows
 - c. Primary key with Primary key
 - d. Two tables
7. Referential integrity
 - a. Must be maintained
 - b. Cannot be maintained
 - c. Is automatically maintained by databases

- d.** Should not be maintained
- 8.** A Primary key column
- a. Can have NULL values b. Can have duplicate values
c. Both (a) and (b) d. Neither (a) nor (b)
- 9.** Primary Key of a table can be
- a. Defined at the time of table creation only.
b. Defined after table creation only.
c. Can be changed after table creation
d. Cannot be changed after table creation
- 10.** Two SELECT commands in a UNION
- a. Should select same number of columns.
b. Should have different number of columns
c. Both (a) and (b)
d. Neither (a) nor (b)

Answers 1-c,2-c,3-b,4-a,5-c,6-a,7-a,8-d,9-a,10-c

Very Short Question Answer

- 1.** Why is it not allowed to give String and Date type arguments for SUM() and AVG() functions? Can we give these type of arguments for other functions?
Answer : String and dates are not real numbers that we calculate so sum or avg functions are not valid for them.
- 2.** What is default, Autocommit mode in MySQL ?
Answer : By default, Autocommit mode is on in MySQL.
- 3.** Can where be added a savepoint in a transaction ?
Answer : We can add a savepoint anywhere in a transaction.
- 4.** How are NULL values treated by aggregate functions?
Answer : None of the aggregate functions takes NULL into consideration. NULL is simply ignored by all the aggregate functions.
- 5.** There is a column C1 in a table T1. The following two statements: SELECT COUNT(*) FROM T1; and SELECT COUNT(C1) from T1; are giving different outputs. What may be the possible reason?
Answer : There may be a null value.
- 6.** What is the purpose of GROUP BY clause?
Answer : GROUP BY: GROUP BY clause is used in a SELECT statement in conjunction with aggregate functions to group the result based on distinct values in a column.

7. What is the difference between HAVING and WHERE clauses? Explain with the help of an example.

Answer : WHERE Vs HAVING: WHERE is used to put a condition on individual row of a table whereas HAVING is used to put condition on individual group formed by GROUP BY clause in a SELECT statement.

8. What is a Foreign key? What is its importance?

Answer : Foreign Key: It is a column of a table which is the primary key of another table in the same database. It is used to enforce referential integrity of the data.

9. What are constraints? Are constraints useful or are they hindrances to effective management of databases?

Answer : These are the rules which are applied on the columns of tables to ensure data integrity and consistency. These play very important role for tables so are not hindrances.

10. In a database there is a table Cabinet. The data entry operator is not able to put NULL in a column of Cabinet? What may be the possible reason(s)?

Ansewr : Not NULL or Primary key constraints used.

11. In a database there is a table Cabinet. The data entry operator is not able to put duplicate values in a column of Cabinet? What may be the possible reason(s)?

12. Ansewr : Primary key constraint used.

13. Do Primary Key column(s) of a table accept NULL values?

Answer :No.

14. There is a table T1 with combination of columns C1, C2, and C3 as its primary key? Is it possible to enter:

a. NULL values in any of these columns?

b. Duplicate values in any of these columns?

Answer : No.

15. What are the differences between DELETE and DROP commands of SQL?

Answer : Delete is used for row removing while drop is used for removing complete table.

16. What are Aggregate Functions ?

Answer : A multiple row function works on multiple values. These functions are called aggregate functions or group functions.

Q. for what Data Types aggregate functions : MIN(), MAX(), and COUNT() work?

Answer : on any type of values - Numeric, Date, or String. AVG(), and SUM() work on only Numeric values (INT and DECIMAL).

Q. What is HAVING clause ?

Answer : HAVING clause is used in conjunction with GROUP BY clause in a SELECT statement to put condition on groups.

Q. What is Referential Integrity ?

Answer : The property of a relational database which ensures that no entry in a foreign key column of a table can be made unless it matches a primary key value in the corresponding column of the related table.

Q. What is Union used for ?

Answer : Union is an operation of combining the output of two SELECT statements.

Q. What is ALTER TABLE ?

Answer : ALTER TABLE command can be used to Add, Remove, and Modify columns of a table. It can also be used to Add and Remove constraints.

Q. What is DROP TABLE ?

Answer : DROP TABLE command is used to delete tables.

Q. What function is used whenever a condition involves an aggregate function ?

Answer : whenever a condition involves an aggregate function, then we use HAVING clause in conjunction with GROUP BY clause.

Q. What is Difference between GROUP BY' and Having functions ?

Answer : WHERE function is used for individual records and HAVING for groups . GROUP BY function is used for getting results based on some groups of data while a condition on groups is applied by HAVING clause.

Short Q.A.

Q. Why are aggregate functions called so? Name some aggregate functions.

Answer : A multiple row function works on multiple values. These functions are called aggregate functions or group functions. Some of the most frequently used. Aggregate functions in MySQL are : MIN(), MAX(), AVG(), SUM(), COUNT().

Q. What is ALTER TABLE command ?Write all the commands that can be applied using alter table.

Answer : a new column can be added to a table using ALTER TABLE command. ALTER TABLE can be used:

- to add a constraint
- to remove a constraint
 - to remove a column from a table
 - to modify a table column

Q. What is the Cartesian product of two table? Is it same as an Equi-join?

Answer : Cartesian Product (or Cross Join): Cartesian product of two tables is a table obtained by pairing each row of one table with each row of the other. A cartesian product of two tables contains all the columns of both the tables.

Equi-Join: An equi join of two tables is obtained by putting an equality condition on the Cartesian product of two tables. This equality condition is put on the common column of the tables. This common column is, generally, primary key of one table and foreign key of the other.

LONG QUESTION-ANSWER

Q. Does Union display any duplicate rows ?

Answer :Union does not display any duplicate rows unless ALL is specified with it.

R. Name the Aggregate Functions.

Answer : These functions are:

S. No.	Name of the Function	Purpose
1	MAX()	Returns the MAXIMUM of the values under the specified column/expression.
2	MIN()	Returns the MINIMUM of the values under the specified column/expression.
3	AVG()	Returns the AVERAGE of the values under the specified column/expression.
4	SUM()	Returns the SUM of the values under the specified column/expression.
5	COUNT()	Returns the COUNT of the number of values under the specified column/expression.

S. What is Max Function ? Give few Examples.

MAX() function is used to find the highest value of any column or any expression based on a column. MAX() takes one argument which can be any column name or a valid expression involving a column name. e.g.,

To find the highest cost of any type of shoe in the factory.

SELECT MAX(cost) FROM shoes;

```
+-----+
| MAX(cost) |
+-----+
|      843.00 |
+-----+
```

To find the highest cost of any shoe of type 'School'.

SELECT MAX(cost) FROM shoes WHERE type ='School';

```
+-----+
| MAX(cost) |
+-----+
|      320.75 |
+-----+
```

To find the highest selling price of any type of shoe.

```
SELECT MAX(cost+cost*margin/ 100) FROM shoes;
```

```
+-----+
| MAX(cost+cost*margin/100) |
+-----+
|      828.517500000 |
+-----+
```

To find the highest selling price of any type of shoe rounded to 2 decimal places.

```
SELECT ROUND(MAX(cost+cost*margin/100),2) AS "Max. SP" FROM shoes;
```

```
+-----+
| Max. SP |
+-----+
|    733.36 |
+-----+
```

To find the highest selling price of any type of shoe rounded to 2 decimal places.

```
SELECT ROUND(MAX(cost+cost*margin/100),2) AS "Max. SP" FROM shoes;
```

```
+-----+
| Max. SP |
+-----+
|    733.36 |
+-----+
```

Q. What is min() Function ? Give Some Examples.

MIN() :

MIN() function is used to find the lowest value of any column or an expression based on a column.

MIN() takes one argument which can be any column name or a valid expression involving a column name. e.g.,

To find the lowest cost of any type of shoe in the factory.

```
SELECT MIN(cost) FROM shoes;
```

```
+-----+
| MIN(cost) |
+-----+
|     843.00 |
+-----+
```

To find the lowest cost of any shoe of type 'School'.

```
SELECT MIN(cost) FROM shoes WHERE type ='School';
```

```
+-----+
| MIN(cost) |
+-----+
|    320.75 |
+-----+
```

To find the lowest selling price of any type of shoe rounded to 2 decimal places.

```
SELECT ROUND(MIN(cost+cost*margin/100),2)
```

```
AS "Min. SP" FROM shoes;
```

```
+-----+
| Min. SP |
+-----+
|    135.15 |
+-----+
```

Q . What is AVG() Function ? Give Some Examples.

Answer : AVG() function is used to find the average value of any column or an expression based on a column. AVG() takes one argument which can be any column name or a valid expression involving a column name. Here we have a limitation: the argument of AVG() function can be of numeric (int/decimal) type only. Averages of String and Date type data are not defined. E.g.,

To find the average margin from shoes table.

```
SELECT AVG(margin) FROM shoes;
```

```
+-----+
| AVG(margin) |
+-----+
|      2.600000 |
+-----+
```

To find the average cost from the shoes table.

```
SELECT AVG(cost) FROM shoes;
```

```
+-----+
| AVG(cost) |
+-----+
| 491.750000 |
+-----+
```

To find the average quantity in stock
for the shoes of type Sports.

```
SELECT AVG(qty) FROM shoes WHERE type ='Sports';
```

```
+-----+
| AVG(qty) |
+-----+
| 580.0000 |
+-----+
```

Q. What is Sum() Function ? Give Some Examples.

SUM() function is used to find the total value of any column or an expression based on a column. SUM() also takes one argument which can be any column name or a valid expression involving a column name. Like AVG(), the argument of SUM() function can be of numeric (int/decimal) type only. Sums of String and Date type data are not defined. e.g.,

To find the total quantity present in the stock

```
SELECT SUM(Qty) FROM Shoes;
```

```
+-----+
| SUM(Qty) |
+-----+
|     10020 |
+-----+
```

```
+-----+
```

To find the total order quantity

```
SELECT SUM(order_qty) FROM orders;
```

```
+-----+
```

```
| SUM(order_qty) |
```

```
+-----+
```

```
| 2475 |
```

```
+-----+
```

To find the the total value (Quanitity x Cost) of Shoes of type 'Office' present in the inventory

```
SELECT SUM(cost*qty) FROM shoes WHERE type = 'Office';
```

```
+-----+
```

```
| SUM(cost*qty) |
```

```
+-----+
```

```
| 772000.00 |
```

```
+-----+
```

Q. What is COUNT() Function ? Give Some Examples.

COUNT() function is used to count the number of values in a column. COUNT() takes one argument which can be any column name, an expression based on a column, or an asterisk (*). When the argument is a column name or an expression based on a column, COUNT() returns the number of non-NULL values in that column. If the argument is a *, then COUNT() counts the total number of rows satisfying the condition, if any, in the table. e.g.,

To count the total number of records in the table Shoes.

```
SELECT COUNT(*) FROM shoes;
```

```
+-----+
```

```
| COUNT(*) |
```

```
+-----+
```

```
| 13 |
```

```
+-----+
```

To count the different types of shoes that the factory produces

```
SELECT COUNT(distinct type) FROM shoes;
```

```
+-----+
```

```
| COUNT(distinct type) |
```

```
+-----+
```

```
| 3 |
```

```
+-----+
```

To count the records for which the margin is greater than 2.00

```
SELECT COUNT(margin) FROM shoes WHERE margin > 2;
```

```
+-----+
```

```
| COUNT(margin) |
```

```
+-----+
```

```
| 5 |
```

```
+-----+
```

To count the number of customers in 'A' category

```
SELECT COUNT(*) FROM customers WHERE category ='A';
```

```
+-----+
| COUNT(*) |
+-----+
|          2 |
+-----+
```

To count the number of orders of quantity more than 300

```
SELECT COUNT(*) FROM orders WHERE order_qty >300;
```

```
+-----+
| COUNT(*) |
+-----+
|          2 |
+-----+
```

Q. Does aggregate Functions consider Null values.Does NULLs play any role in actual calculations ?

Answer : None of the aggregate functions takes NULL into consideration. NULL is simply ignored by all the aggregate functions. For example, the statement:

```
SELECT COUNT(*) FROM shoes;
```

Produces the following output:

```
+-----+
| COUNT(*) |
+-----+
|          13 |
+-----+
```

Indicating that there are 13 records in the Shoes table. Whereas the query:

```
SELECT COUNT(margin) FROM shoes;
```

produces the output:

```
+-----+
| COUNT(margin) |
+-----+
|          10 |
+-----+
```

This output indicates that there are 10 values in the margin column of Shoes table. This means there are 3 (13-10) NULLs in the margin column.

This feature of aggregate functions ensures that NULLs don't play any role in actual calculations.
the following statement:

```
SELECT AVG(margin) FROM shoes;
```

Q. What is AVG() Function ? Give Some Examples. Does NULLs play any role in Average calculations ?

This Function is used to get the Average Value.

produces the output:

```
+-----+
| AVG(margin) |
+-----+
|      2.600000 |
+-----+
```

The average margin has been calculated by adding all the 10 non NULL values from the margin column and dividing the sum by 10 and not by 13.

Q. What is ‘GROUP BY’ ? Give Examples.

Answer : GROUP BY function is used for getting results based on some groups of data.

For example,

- The management of the shoe factory may want to know what is the total quantity of shoes of various types. i.e., what is the total quantity of shoes of type School, Office, and Sports each.
- The management may also want to know what is the maximum, minimum, and average margin of each type of shoes.
- It may also be required to find the total number of customers in each category.

There are many such requirements. SQL provides GROUP BY clause to handle all such requirements. For the above three situations, the statements with GROUP BY clause are given below:

In the first situation we want MySQL to divide all the records of shoes table into different groups based on their type (GROUP BY type) and for each group it should display the type and the corresponding total quantity (SELECT type, SUM(qty)). So the complete statement to do this is:

SELECT type, SUM(qty) FROM shoes GROUP BY type;

G1 and the corresponding output is:

type	SUM(qty)
Office	1100
School	7180
Sports	1740

Similarly, for the second situation the statement is:

SELECT type, MIN(margin), MAX(margin), AVG(margin)

FROM shoes GROUP BY type; G2 and the corresponding output is:

type	MIN(margin)	MAX(margin)	AVG(margin)
Office	3.00	3.00	3.000000
School	2.00	2.00	2.000000
Sports	3.50	3.50	3.500000

In the third situation we want MySQL to divide all the records of Customers table into different groups based on the their Category (GROUP BY Category) and for each group it should display the Category and the corresponding number of records (SELECT Category, COUNT(*)). So the complete statement to do this is:

SELECT category, COUNT(*) FROM customers GROUP BY category;

G3

category	COUNT(*)
A	2
B	2
C	1

+-----+-----+

Let us have some more examples. Consider the following statement:

```
SELECT cust_code, SUM(order_qty)
FROM orders GROUP BY cust_code;
```

This statement produces the following output. Try to explain this this output.

cust_code	SUM(order_qty)
C001	1025
C002	750
C003	150
C004	200
C005	350

Do the same for the following statement also:

```
SELECT shoe_code, SUM(order_qty) FROM orders GROUP BY shoe_code;
```

shoe_code	SUM(order_qty)
1001	200
1002	200
1011	550
1012	250
1101	300
1102	350
1103	225
1201	200
1203	200

If you carefully observe these examples, you will find that GROUP BY is always used in conjunction with some aggregate function(s). A SELECT command with GROUP BY clause has a column name and one or more aggregate functions which are applied on that column and grouping is also done on this column only.

Q. What is Role of HAVING in SQL.Give Examples. How it is related with Group by ?

Sometimes we do not want to see the whole output produced by a statement with GROUP BY clause. We want to see the output only for those groups which satisfy some condition. It means we want to put some condition on individual groups (and not on individual records). A condition on groups is applied by HAVING clause. As an example reconsider the

statement G1 discussed above. The statement produced three records in the output - one for each group. Suppose, we are interested in viewing only those groups' output for which the total quantity is more than 1500 ($\text{SUM}(\text{Qty}) > 1500$). As this condition is applicable to groups and not to individual rows, we use HAVING clause as shown below:

```
SELECT type, SUM(qty) FROM shoes GROUP BY type HAVING SUM(qty) > 1500;
```

type	SUM(qty)

School	7180
Sports	1740
+-----+-----+	

Now suppose for G2 we want the report only for those types for which the average margin is more than 2. For this, following is the statement and the corresponding output:

SELECT type, SUM(qty) FROM shoes GROUP BY type HAVING AVG(margin) >2;

+-----+-----+	
type SUM(qty)	
+-----+-----+	
Office 1100	
Sports 1740	
+-----+-----+	

In these statements if we try to put the condition using WHERE instead of HAVING, we shall get an error. Another way of remembering this is that whenever a condition involves an aggregate function, then we use HAVING clause in conjunction with GROUP BY clause.

Q. What Functions are used for conditions on individual records as well as on groups. Give Examples.

Answer : Situations may also arise when we want to put the conditions on individual records as well as on groups. In such situations we use both WHERE (for individual records) and HAVING (for groups) clauses. This can be explained with the help of the following examples:

- The management of the shoe factory may want to know what is the total quantity of shoes, of sizes other than 6, of various types. i.e., what is the total quantity of shoes (of sizes other than 6) of type School, Office, and Sports each. Moreover, the report is required only for those groups for which the total quantity is more than 1500.
- The management may also want to know what is the maximum, minimum, and average margin of each type of shoes. But in this reports shoes of sizes 6 and 7 only should be included. Report is required only for those groups for which the minimum margin is more than 2.

The statements and their outputs corresponding to above requirements are given below:

SELECT type, SUM(qty) FROM shoes

WHERE size <> 6 Checks individual row

GROUP BY type HAVING sum (qty) > 1500; Checks individual group

+-----+-----+	
type SUM(qty)	
+-----+-----+	
School 3780	
+-----+-----+	

```
SELECT type, MIN(margin), MAX(margin), AVG(margin) FROM shoes WHERE size in  
(6,7)
```

```
GROUP BY type having MIN(margin) > 2;
```

type	MIN(margin)	MAX(margin)	AVG(margin)
Office	3.00	3.00	3.000000
Sports	3.50	3.50	3.500000

Q. How Will you Display Data from Multiple Tables ?

Answer : To understand this consider the following situations:

- The management of the shoe factory wants a report of orders which lists three columns: Order_No, corresponding customer name, and phone number. - (MT-1)

In this case order number will be taken from Orders table and corresponding customer name from Customers table.

- The management wants a four-column report containing order_no, order_qty, name of the corresponding shoe and its cost. - (MT-2)

In this case order number and order quantity will be taken from Orders table and corresponding shoe name and cost from Shoes table.

- The management wants the names of customers who have placed any order of quantity more than 300. - (MT-3)

In this case Order quantity will be checked in Orders table and for each record with quantity more than 300, corresponding Customer name will be taken from Customers table.

- The management wants a report in which with each Order_No management needs name of the corresponding customer and also the total cost (Order quantity x Cost of the shoe) of the order are shown. - (MT-4)

In this case order number will be taken from Orders table and corresponding customer name from Customers table. For the cost of each order the quantity will be taken from Orders table and the Cost from Shoes table.

In all these cases, the data is to be retrieved from multiple tables. SQL allows us to write statements which retrieve data from multiple tables.

To understand how this is done, consider the following tables of a database.

Product

Code	Name
P001	Toothpaste
P002	Shampoo
P003	Conditioner

Supplier

Sup_Code	Name	Address
S001	DC & Company	Uttam Nagar
S002	SURY Traders	Model Town

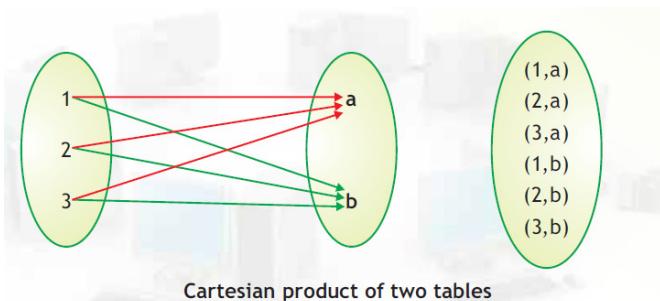
Order_table

Order_No	P_Code	Sup_Code
1	P001	S002
2	P002	S002

These tables are taken just to explain the current concept.

Q. What do you understand by Cartesian Product or Cross Join of tables .Give Example.

Cartesian product (also called Cross Join) of two tables is a table obtained by pairing up each row of one table with each row of the other table. This way if two tables contain 3 rows and 2 rows respectively, then their Cartesian product will contain 6 ($=3 \times 2$) rows. This can be illustrated as follows:



Notice that the arrows indicate the 'ordered pairing'. The number of columns in the Cartesian product is the sum of the number of columns in both the tables. In SQL, Cartesian product of two rows is obtained by giving the names of both tables in FROM clause. An example of Cartesian product is shown below:

```
SELECT * FROM order_table, product;
```

To give the output of this query, MySQL will pair the rows of the mentioned tables as follows:

Order_table			Product	
Order_No	P_Code	Sup_Code	Code	Name
1	P001	S002	P001	Toothpaste
2	P002	S002	P002	Shampoo
			P003	Conditioner

And the following output will be produced:

Order_No	P_Code	Sup_Code	Code	Name
1	P001	S002	P001	Toothpaste
2	P002	S002	P001	Toothpaste
1	P001	S002	P002	Shampoo
2	P002	S002	P002	Shampoo
1	P001	S002	P003	Conditioner
2	P002	S002	P003	Conditioner

-(CP-1)

Here we observe that the Cartesian product contains all the columns from both tables. Each row of the first table (Order_table) is paired with each row of the second table (Product).B

If we change the sequence of table names in the FROM clause, the result will remain the same but the sequence of rows and columns will change. This can be observed in the following statement and the corresponding output.

```
SELECT * FROM product, order_table;
```

Code	Name	Order_No	P_Code	Sup_Code
P001	Toothpaste	1	P001	S002
P001	Toothpaste	2	P002	S002
P002	Shampoo	1	P001	S002
P002	Shampoo	2	P002	S002
P003	Conditioner	1	P001	S002
P003	Conditioner	2	P002	S002

-(CP-2)

Q. Show the Cartesian product of three tables(more than two tables).

Ans : We can have Cartesian product of more than two tables also. Following is the Cartesian Product of three tables:

```
SELECT * FROM order_table, supplier, product; -(CP-3)
```

Order_No	P_Code	Sup_Code	Code	Name
1	P001	S002	P001	Toothpaste
2	P002	S002	P001	Toothpaste
1	P001	S002	P002	Shampoo
2	P002	S002	P002	Shampoo
1	P001	S002	P003	Conditioner
2	P002	S002	P003	Conditioner

Order_No	P_Code	Sup_Code	Sup_Code	Name	Address	Code	Name
1	P001	S002	S001	DC & Company	Uttam Nagar	P001	Toothpaste
2	P002	S002	S001	DC & Company	Uttam Nagar	P001	Toothpaste
1	P001	S002	S002	SURY Traders	Model Town	P001	Toothpaste
2	P002	S002	S002	SURY Traders	Model Town	P001	Toothpaste
1	P001	S002	S001	DC & Company	Uttam Nagar	P002	Shampoo
2	P002	S002	S001	DC & Company	Uttam Nagar	P002	Shampoo
1	P001	S002	S002	SURY Traders	Model Town	P002	Shampoo
2	P002	S002	S002	SURY Traders	Model Town	P002	Shampoo
1	P001	S002	S001	DC & Company	Uttam Nagar	P003	Conditioner
2	P002	S002	S001	DC & Company	Uttam Nagar	P003	Conditioner
1	P001	S002	S002	SURY Traders	Model Town	P003	Conditioner
2	P002	S002	S002	SURY Traders	Model Town	P003	Conditioner

The complete Cartesian product of two or more tables is, generally, not used directly. But, sometimes it is required. Suppose the company with the above database wants to send information of each of its products to each of its suppliers. For follow-up, the management wants a complete list in which each Supplier's detail is paired with each Product's detail. For this, the computer department can produce a list which is the Cartesian product of Product and Supplier tables, as follows:

SELECT *, '' AS Remarks FROM Product, Supplier;

to get the following report:

Code	Name	Sup_Code	Name	Address	Remarks
P001	Toothpaste	S001	DC & Company	Uttam Nagar	
P001	Toothpaste	S002	SURY Traders	Model Town	
P002	Shampoo	S001	DC & Company	Uttam Nagar	
P002	Shampoo	S002	SURY Traders	Model Town	
P003	Conditioner	S001	DC & Company	Uttam Nagar	
P003	Conditioner	S002	SURY Traders	Model Town	

Q. What is Equi- Join of tables .Show by examples.

The complete Cartesian product of two or more tables is, generally, not used directly. Sometimes the complete Cartesian product of two tables may give some confusing information also. For example, the first Cartesian product (CP-1) indicates that each order (Order Numbers 1 and 2) is placed for each Product (Code 'P001', 'P002', 'P003'). But this is incorrect!

Similar is the case with CP-2 and CP-3 also.

But we can extract meaningful information from the Cartesian product by placing some conditions in the statement. For example, to find out the product details corresponding to each Order details, we can enter the following statement:

```
SELECT * FROM order_table, product WHERE p_code = code;
```

Order_No	P_Code	Sup_Code	Code	Name
1	P001	S002	P001	Toothpaste
2	P002	S002	P002	Shampoo

Two table names are specified in the FROM clause of this statement, therefore MySQL creates a Cartesian product of the tables. From this Cartesian product MySQL selects only those records for which P_Code (Product code specified in the Order_table table) matches Code (Product code in the Product table). These selected records are then displayed.

It always happens that whenever we have to get the data from more than one tables, there is some common column based on which the meaningful data is extracted from the tables. We specify table names in the FROM clause of SELECT command. We also give the condition specifying the matching of common column. (When we say common column, it does not mean that the column names have to be the same. It means that the columns should represent the same data with the same data types.) Corresponding to this statement, internally the Cartesian product of the tables is made. Then based on the specified condition the meaningful data is extracted from this Cartesian product and displayed.

Let us take another example of producing a report which displays the supplier name and address corresponding to each order.

```
SELECT Order_No, Order_table.Sup_Code, Name, Address FROM
```

```
order_table, supplier
```

```
WHERE order_table.sup_code = supplier.sup_code;
```

Order_No	Sup_Code	Name	Address
1	S002	SURY Traders	Model Town
2	S002	SURY Traders	Model Town

In this statement the tables referred are Order_table and Supplier. In these tables sup_code is the common column. This column exists with same name in both the tables. Therefore whenever we mention it, we have to specify the table from which we want to extract this column. This is known as qualifying the column name. If we don't qualify the common column name, the statement would result into an error due to the ambiguous the column names.

Following is another example of equi-join. This time with three tables.

```
Select Order_no, Product.name as Product, Supplier.Name as Supplier From order_table, Product,
```

```
Supplier
```

```
WHERE order_table.Sup_Code = Supplier.Sup_Code and P_Code = Code;
```

The output produced by this statement is:

Order_no	Product	Supplier
1	Toothpaste	SURY Traders
2	Shampoo	SURY Traders

Let us now get back to our original Shoe database and see how Ms. Akhtar uses the concept of joins to extract data from multiple tables.

For the situation MT-1, she writes the query:

```
SELECT order_no , name, phone FROM orders, customers WHERE orders.cust_code =
customers.cust_code;
```

and get the following required output:

order_no	name	phone
1	Novelty Shoes	4543556, 97878989
2	Novelty Shoes	4543556, 97878989
5	Novelty Shoes	4543556, 97878989
9	Novelty Shoes	4543556, 97878989
4	Aaram Footwear	NULL
6	Aaram Footwear	NULL
10	Aaram Footwear	NULL
3	Foot Comfort	51917142, 76877888
7	Pooja Shoes	61345432, 98178989
8	Dev Shoes	NULL

Following are the queries and corresponding outputs for the situations MT-2, MT-3, and MT-4 respectively:

```
SELECT order_no , Order_Qty, name, cost
FROM orders, shoes WHERE Shoe_Code = code;
```

order_no	Order_Qty	name	cost
1	200	School Canvas	132.50
2	200	School Canvas	135.50
3	150	School Leather	1232.50
4	250	School Leather	1270.00
5	400	School Leather	1232.50
6	300	Galaxy	1640.00
7	200	Tracker	1700.00
8	350	Galaxy	1712.00
9	225	Galaxy	1720.00
10	200	Tracker	1800.50

```
SELECT name, address FROM orders, customers WHERE
orders.cust_code = customers.cust_code and order_qty > 300;
```

name	address
Novelty Shoes	Raja Nagar, Bhopal
Dev Shoes	Mohan Nagar, Ghaziabad

```
SELECT order_no, Order_Qty, customers.name, cost*order_qty as 'Order Cost' FROM orders, shoes,
Customers WHERE Shoe_Code = code and Orders.Cust_Code = Customers.Cust_Code order by
order_no;
```

order_no	Order_Qty	name	Order Cost
1	200	Novelty Shoes	26500.00
2	200	Novelty Shoes	27100.00
3	150	Foot Comfort	34875.00
4	250	Aaram Footwear	67500.00
5	400	Novelty Shoes	93000.00
6	300	Aaram Footwear	192000.00
7	200	Pooja Shoes	140000.00
8	350	Dev Shoes	249200.00
9	225	Novelty Shoes	162000.00
10	200	Aaram Footwear	160100.00

Here is another statement extracting data from multiple tables. Try to find out what will be its output and then try this statement on computer and check whether you thought of the correct output.

```
SELECT order_no , Order_Qty, name, cost FROM orders, shoes WHERE Shoe_Code = code
and order_qty > 200;
```

Q. Explain the Foreign Key .

As we have just seen, in a join the data is retrieved from the Cartesian product of two tables by giving a condition of equality of two corresponding columns - one from each table. Generally, this column is the Primary Key of one table. In the other table this column is the Foreign key. Such a join which is obtained by putting a condition of equality on cross join is called an 'equi-join'. As an example, once again consider the Product, Supplier, and Order tables referenced earlier. For quick reference these tables are shown once again:

Product	
Code	Name

P001 Toothpaste	
P002 Shampoo	
P003 Conditioner	
+-----+	
Supplier	
+-----+-----+	
Sup_Code Name	Address
+-----+-----+	+-----+
S001 DC & Company	Uttam Nagar
S002 SURY Traders	Model Town
+-----+-----+	+-----+
Order_table	
+-----+-----+	
Order_No P_Code Sup_Code	
+-----+-----+	
1 P001 S002	
2 P002 S002	
+-----+-----+	

In these tables there is a common column between Product and Order_table tables (Code and P_Code respectively) which is used to get the Equi-Join of these two tables. Code is the Primary Key of Product table and in Order_table table it is not so (we can place more than one orders for the same product). In the order_table, P_Code is a Foreign Key. Similarly, Sup_Code is the primary key in Supplier table whereas it is a Foreign Key in Order_table table. A foreign key in a table is used to ensure referential integrity and to get Equi-Join of two tables.

Q. What do you understand by Referential Integrity ?

Answer : Suppose while entering data in Order_table we enter a P_Code that does not exist in the Product table. It means we have placed an order for an item that does not exist! We should and can always avoid such human errors. Such errors are avoided by explicitly making P_Code a foreign key of Order_table table which always references the Product table to make sure that a non-existing product code is not entered in the Order table table. Similarly, we can also make Sup_Code a Foreign key in Order_table table which always references Customer table to check validity of Cust_code. This property of a relational database which ensures that no entry in a foreign key column of a table can be made unless it matches a primary key value in the corresponding related table is called Referential Integrity.

Q. Describe Union operation by giving examples.

Union is an operation of combining the output of two SELECT statements. Union of two SELECT statements can be performed only if their outputs contain same number of columns and data types of corresponding columns are also the same. The syntax of UNION in its simplest form is:

SELECT <select_list> FROM

<tablename> [WHERE

<condition>]

UNION [ALL]

```
SELECT <select_list> FROM  
<tablename> [WHERE  
<condition>];
```

Union does not display any duplicate rows unless ALL is specified with it.

Example:

Suppose a company deals in two different categories of items. Each category contains a number of items and for each category there are different customers. In the database there are two customer tables: Customer_Cat_1 and Customer_Cat_2. If it is required to produce a combined list of all the customers, then it can be done as follows:

```
SELECT Cust_Code from Customer_Cat_1  
UNION  
SELECT Cust_Code from Customer_Cat_2;
```

If a customer exists with same customer code in both the tables, its code will be displayed only once - because Union does display duplicate rows. If we explicitly want the duplicate rows, then we can enter the statement:

```
SELECT Cust_Code from Customer_Cat_1  
UNION ALL  
SELECT Cust_Code from Customer_Cat_2;
```

Q. What are Constraints for a table ? List all the constraints with their purpose. How these are applied?

Many times it is not possible to keep a manual check on the data that is going into the tables using INSERT or UPDATE commands. The data entered may be invalid. MySQL provides some rules, called Constraints, which help us, to some extent, ensure validity of the data. These constraints are:

S.No.	Constraint	Purpose
2.	PRIMARY KEY	Sets a column or a group of columns as the Primary Key of a table. Therefore, NULLs and Duplicate values in this column are not accepted.
3.	NOT NULL	Makes sure that NULLs are not accepted in the specified column.
4.	FOREIGN KEY	Data will be accepted in this column, if same data value exists in a column in another related table. This other related table name and column name are specified while creating the foreign key constraint.

- 5. UNIQUE Makes sure that duplicate values in the specified column are not accepted.
- 6. ENUM Defines a set of values as the column domain. So any value in this column will be from the specified values only.
- 7. SET Defines a set of values as the column domain. Any value in this column will be a subset of the specified set only.

We shall discuss only the PRIMARY KEY and NOT NULL constraints in this book. Other constraints are beyond the scope of this book.

Q . What is PRIMARY KEY ? Give Examples.

Answer : Primary key of a table is a column or a group of columns that uniquely identifies a row of the table. Therefore no two rows of a table can have the same primary key value. Now suppose that the table Shoes is created with the following statement:

```
CREATE TABLE Shoes
  (Code CHAR(4), Name VARCHAR(20), type VARCHAR(10), size INT(2),
   cost DECIMAL(6,2), margin DECIMAL(4,2), Qty INT(4));
```

We know that in this table Code is the Primary key. But, MySQL does not know that. Therefore it is possible to enter duplicate values in this column or to enter NULLs in this column. Both these situations are unacceptable.

To make sure that such data is not accepted by MySQL, we can set Code as the primary key of Shoes table. It can be done by using the PRIMARY KEY clause at the time of table creation as follows:

```
CREATE TABLE Shoes
  (Code CHAR(4) PRIMARY KEY, Name VARCHAR(20), type VARCHAR(10), size
   INT(2), cost DECIMAL(6,2), margin DECIMAL(4,2), Qty INT(4));
```

or as follows:

```
CREATE TABLE Shoes
  (Code CHAR(4), Name VARCHAR(20), type VARCHAR(10), size INT(2),
   cost DECIMAL(6,2), margin DECIMAL(4,2), Qty INT(4), PRIMARY
   KEY (Code));
```

To create a table Bills with the combination of columns Order_No and Cust_Code as the primary key, we enter the statement:

```
CREATE TABLE bills
  (Order_Num INT(4) PRIMARY KEY, cust_code
   VARCHAR(4) PRIMARY KEY, bill_Date DATE,
   Bill_Amt DECIMAL(8,2));
```

Contrary to our expectation, we get an error (Multiple primary key defined) with this statement. The reason is that MySQL interprets this statement as if we are trying to create two primary keys of the table - Order_Num, and Cust_code. But a table can have at most one primary key. To set this combination of columns a primary key we have to enter the statement as follows:

```
CREATE TABLE bills
```

```
(Order_Num INT(4), cust_code VARCHAR(4), bill_Date  
date, Bill_Amt DECIMAL(8,2), PRIMARY  
KEY(Order_Num, cust_code));
```

Q. How ‘Dese’ is used for showing structure of the table ?

Answer : We may check the table structure with the command: DESC bills;

The table structure is as shown below:

Field	Type	Null	Key	Default	Extra
Order_Num	INT(4)	NO	PRI	0	
cust_code	VARCHAR(4)	NO	PRI		
bill_Date	date	YES		NULL	
Bill_Amt	DECIMAL(8,2)	YES		NULL	

These columns constitute the primary key of the table. NULLs cannot be accepted in these columns.

Q. How will you create a table in which NULL values should not be accepted ?

Answer : Many times there are some columns of a table in which NULL values should not be accepted. We always want some known valid data values in these columns. For example, we cannot have an order for which the customer code is not known. It means whenever we enter a row in the orders table, corresponding customer code cannot be NULL. Similarly while entering records in the Shoes table, we have to mention the Shoe size, it cannot be set NULL. There may be any number of such situations. While creating a table we can specify in which columns NULLs should not be accepted as follows:

```
CREATE TABLE Shoes
```

```
(Code CHAR(4) PRIMARY KEY, Name VARCHAR(20), type  
VARCHAR(10), size INT(2) NOT NULL,  
cost DECIMAL(6,2), margin DECIMAL(4,2), Qty INT(4)); CREATE TABLE bills  
(Order_Num INT(4), cust_code VARCHAR(4), bill_Date DATE,  
Bill_Amt DECIMAL(8,2) NOT NULL, PRIMARY KEY  
(Order_Num, cust_code));
```

Now if we try to enter a NULL in the specified column, MySQL will reject the entry and give an error.

Q. How can we view the Columns Associated with Constraints ?

After creating a table, we can view its structure using DESC command. The table structure also includes the constraints, if any. Therefore, when we use DESC command, we are shown the table structure as well as constraints, if any. A constraint is shown beside the column name on which it is applicable. E.g., the statement:

```
DESC Shoes;
```

displays the table structure as follows:

Field	Type	Null	Key	Default	Extra
Code	CHAR(4)	NO	PRI	NULL	
Name	VARCHAR(20)	YES			
type	VARCHAR(10)	YES		NULL	
size	INT(2)	NO		0	
cost	DECIMAL(6,2)	YES		NULL	
margin	DECIMAL(4,2)	YES		NULL	
Qty	INT(4)	YES		NULL	

Q. Show Add, Modify, and Remove constraints for altering a table.

If we create a table without specifying any primary key, we can still specify its primary key by ALTER TABLE command. Suppose we have created the Shoes table without specifying any Primary key, then later we can enter the statement as follows:

```
ALTER TABLE Shoe ADD PRIMARY KEY(code);
```

This will set Code as the primary key of the table. But if the Code column already contains some duplicate values, then this statement will give an error.

In MySQL, it is also possible to change the primary key column(s) of a table. Suppose, in the Shoes table, instead of Code, we want to set the combination of 'Name' and 'Size' as the primary key. For this first we have to DROP the already existing primary key (i.e., Code) and then add the new primary key (i.e., Name and Size). The corresponding statements are as follows:

```
ALTER TABLE Shoes DROP PRIMARY KEY;
```

After this statement, there is no primary key of Shoe table. Now we can add the new primary key as follows:

```
ALTER TABLE Shoe ADD PRIMARY KEY (Name, Size);
```

Now if we see the table structure by DESC Shoes; statement, it will be shown as follows:

Field	Type	Null	Key	Default	Extra		
Code	CHAR(4)	NO		NULL			
Name	VARCHAR(20)	NO	PRI				
type	VARCHAR(10)	YES		NULL			
size	INT(2)	NO	PRI	0			
cost	DECIMAL(6,2)	YES		NULL			
margin	DECIMAL(4,2)	YES		NULL			
Qty	INT(4)	YES		NULL			

In MySQL, it is not possible to add or drop NOT NULL constraint explicitly after the table creation. But it can be done using MODIFY clause of ALTER TABLE command. As an example, suppose we don't want to accept NULL values in bill_date column of bills table, we can issue the statement:

```
ALTER TABLE bills MODIFY bill_date DATE NOT NULL;
```

Later on if we wish to change this status again, we can do so by entering the command:

```
ALTER TABLE bills MODIFY bill_date DATE NULL;
```

Remove and Modify columns :

ALTER TABLE can be used to remove a column from a table. This is done using DROP clause in ALTER TABLE command. The syntax is as follows:

```
ALTER TABLE <tablename> DROP <columnname>
[ , DROP <columnname> [ , DROP <columnname> [ , . . . ] ]];
```

Following are some self-explanatory examples of SQL statements to remove columns from tables:

```
ALTER TABLE Shoes DROP Qty;
```

```
ALTER TABLE Orders DROP Cust_Code;
```

```
ALTER TABLE Student DROP Class, DROP RNo, DROP Section;
```

Although any column of a table can be removed, MySQL puts the restriction that a primary key column can be removed only if the remaining, primary key columns, if any, do not contain any duplicate entry. This can be understood more clearly with the help of following example:

The Name and Size columns of the Shoe table constitute its primary key. Now if we drop the Name column from the table, Size will be the remaining Primary Key column of the table. Therefore, duplicate entries in the Size column should not be allowed. To ensure this, before removing Name column from the table, MySQL checks that there are no duplicate entries present in the Size column of the table. If there are any, then the statement trying to remove Name column from the table will result in an error and the Name column will not be removed. If there are no duplicate entries in the Size column, then Name column will be removed. Similar will be the case with the Name column, if we try to remove Size column. But there won't be any problem if we try to remove both the primary key columns simultaneously with one ALTER TABLE statement as follows:

`ALTER TABLE Shoes DROP name, DROP size;`

ALTER TABLE can also be used to change the data type of a table column. For this the syntax is as follows:

```
ALTER TABLE <tablename> MODIFY <col_name> <new datatype> [,MODIFY  
<col_name> <new datatype>  
[,MODIFY <col_name> <new data type> [,...]]];
```

e.g., the statement:

```
ALTER TABLE shoes modify code CHAR(5), modify type VARCHAR(20);
```

changes the data type of column Code to CHAR(5) and that of type to VARCHAR(20).

When we give a statement to chage the data type of a column, MySQL executes that statement correctly only if the change in data type does not lead to any data loss. E.g., if we try to change the data type of order_date column of orders table from date to int, we'll get an error. This is because the data already stored in this column cannot be converted into int type. Similarly, if a column of VARCHAR(10) type conatins some data value which is 10 characters long, then the data type of this column cannot be converted to VARCHAR(n), where n is an integer less than 10.

Q. What is DROPPING a TABLE ?

Sometimes there is a requirement to remove a table from the database. In such cases we don't want merely to delete the data from the table, but we want to delete the table itself. `DROP TABLE` command is used for this purpose. The syntax of `DROP TABLE` command is as follows:

```
DROP TABLE <tablename>;
```

e.g. to remove the table Orders from the database we enter the statement:

```
DROP TABLE Orders;
```

And after this statement orders table is no longer available in the database. It has been removed.

Aggregate or Group functions: MySQL provides Aggregate or Group functions which work on a number of values of a column/expression and return a single value as the result.

CHAPTER 17

More RDBMS(Relational Database Management System)

Summary

Till now we have studied about various SQL statements manipulating data stored in a MySQL database. We executed SQL statements without concern about inconsistencies arising due to group of statements not being executed in entirety. In this lesson, we will study the basic concepts of Transaction processing and how MySQL ensures consistency of data when a group of statements is executed.

Key Pionts

- Work done during a transaction is a series of operations.

- If one of the operations of a transaction is not executed successfully, then the entire transaction should be cancelled. If all the operations are executed successfully, the transaction should be saved to a database.
- START TRANSACTION statement is used to start a transaction.
- The process of cancelling a transaction is called Rolling back.
- ROLLBACK statement is used to terminate a transaction and roll back the database to its original state before the transaction.
- COMMIT statement is used to save changes to the database.
- When AutoCommit is ON, each SQL statement is a transaction. The changes resulting from each statement are automatically committed.

Q. What do you mean by DBMS and Transaction Management ?

Suppose Raunak's account number is 3246 and his aunt's account number is 5135. In order to process the cheque presented by Raunak, the following two SQL commands need to be executed on the database maintained by the bank:

UPDATE Savings SET balance = balance - 2000 WHERE account_no = 5135; For Aunt's account

UPDATE Savings SET balance = balance + 2000 WHERE account_no = 3246; For Raunak's account

The above two Updates should both take place. If the first Update takes place and there is a system failure, the first updation should be undone. Either both the updations should be done and if it is not possible for both the updations to be done, then no updation should be done.

Q. What is a Transaction?

A Transaction is a unit of work that must be done in logical order and successfully as a group or not done at all. Unit of work means that a Transaction consists of different tasks - but together they are considered as one unit. Each transaction has a beginning and an end. If anything goes wrong in between the execution of transaction, the entire transaction (No matter to what extent has been done) should be cancelled. If it is successful, then the entire transaction should be saved to the database.

A transaction is a unit of work that must be done in logical order and successfully as a group or not done at all.

In Raunak's case, both the updation statements constitute a transaction. Both are together treated as a single unit.

Q. how transactions are managed ?

Answer : let us study the following 3 statements of SQL:

- START TRANSACTION statement
- COMMIT statement
- ROLLBACK statement
-

START TRANSACTION Statement :

START TRANSACTION statement commits the current transaction and starts a new transaction. It tells MySQL that the transaction is beginning and the statements that follow should be treated as a unit, until the transaction ends. It is written like this:

```
START  
TRANSACTION;  
The START TRANSACTION statement has no clauses.
```

COMMIT Statement :

The **COMMIT** statement is used to save all changes made to the database during the transaction to the database. Commit statement is issued at a time when the transaction is complete- all the changes have been successful and the changes should be saved to the database. **COMMIT** ends the current transaction.

COMMIT statement is used like this:

```
COMMIT;  
Or  
COMMIT WORK;
```

Here **WORK** is a keyword and is optional.

In the following example, the table named **savings** has 2 rows. A transaction is started and balance in Siddharth's account (with account number 1004) is increased by Rs. 2000.00 and the balance in Akriti's account (with account number 1006) is decreased by Rs. 2000.00. **COMMIT** statement makes the changes made by the transaction permanent.

Example 1:

```
mysql> select * from savings;
```

account_no	name	balance
1004	Siddharth Sehgal	87000.00
1006	Akriti Malik	87000.00

```
mysql> START TRANSACTION;
```

```
mysql> UPDATE Savings
```

```
-> SET balance = balance + 2000  
-> WHERE account_no = 1004; mysql>
```

```
UPDATE Savings
```

```
-> SET balance = balance - 2000
```

```
-> WHERE account_no = 1006; mysql>
```

```
SELECT * FROM Savings;
```

```
+-----+-----+-----+
| account_no | name           | balance   |
+-----+-----+-----+
|       1004 | Siddharth Sehgal | 89000.00 |
|       1006 | Akriti Malik     | 85000.00 |
+-----+-----+-----+
```

```
2 rows in set (0.00 sec)
```

```
mysql> COMMIT;
```

ROLLBACK Statement :

When a transaction is being executed, some type of error checking is usually performed to check whether it is executing successfully or not. If not, the entire transaction is undone using the ROLLBACK statement. The ROLLBACK statement cancels the entire transaction i.e. It rolls the transaction to the beginning. It aborts any changes made during the transaction and the state of database is returned to what it was before the transaction began to execute and does not save any of the changes made to the database during the transaction.

ROLLBACK statement is used like this:

```
ROLLBACK;
```

Or

```
ROLLBACK WORK;
```

Here WORK is a keyword and is optional.

If in Example 1 shown above ROLLBACK was used instead of COMMIT, the updation of incrementing Siddharth's account by ` 2000.00 and decrementing Akriti's account by 2000 wouldn't have taken place. Let us now initiate a transaction, increase Akriti's account by ` 3000.00, then Rollback the transaction and see what happens to the updation done on Akriti's account.

```
mysql> SELECT * FROM Savings;
```

```
+-----+-----+-----+
| account_no | name           | balance   |
+-----+-----+-----+
|       1004 | Siddharth Sehgal | 89000.00 |
|       1006 | Akriti Malik     | 85000.00 |
+-----+-----+-----+
```

Before the transaction starts, Siddharth's balance is Rs. 89000 and Akriti's balance is Rs. 85000.00

```
mysql> START TRANSACTION;
```

```
mysql> UPDATE Savings
```

```
--> SET balance = balance + 3000
--> WHERE account_no = 1006;
Akriti's balance is
increased by Rs.
3000.00

mysql> ROLLBACK;

mysql> SELECT * FROM Savings;
+-----+-----+-----+
| account_no | name           | balance |
+-----+-----+-----+
|      1004 | Siddharth Sehgal | 89000.00 |
|      1006 | Akriti Malik     | 85000.00 |
+-----+-----+-----+
```

Because of the Rollback, Akriti's balance is not updated and is displayed as it was before the transaction started.

- After the ROLLBACK command is issued to the database, the database itself starts a new transaction; though no explicit command of starting a transaction like START TRANSACTION is issued.

Example 2:

Let us try out some more SQL statements on Savings table to understand transactions well.

```
mysql> SELECT * FROM savings;
```

account_no	name	balance
1004	Siddharth Sehgal	84000.00
1006	Akriti Malik	92000.00
1008	Chavi Mehra	67000.00
1009	Raunak Singh	56000.00

```
+-----+-----+-----+
```

account_no	name	balance
1004	Siddharth Sehgal	84000.00
1006	Akriti Malik	92000.00
1008	Chavi Mehra	67000.00
1009	Raunak Singh	56000.00

```
+-----+-----+-----+
```

```
mysql> INSERT INTO Savings VALUES
        (1010, 'Lakshmi Swamy', 34000);
mysql> START TRANSACTION;
mysql> UPDATE Savings SET balance =
        balance +2000 WHERE account_no = 1010;
mysql> ROLLBACK;
mysql> SELECT * FROM Savings;
```

Start transaction statement starts a transaction and commits the previous INSERT INTO statement.

Rollback cancels the effect of Update statement.

account_no	name	balance
1004	Siddharth Sehgal	84000.00
1006	Akriti Malik	92000.00
1008	Chavi Mehra	67000.00
1009	Raunak Singh	56000.00
1010	Lakshmi Swamy	34000.00

SELECT statement displays Lakshmi Swamy's row with balance of 34000.00

```
5 rows in set (0.00 sec)
```

Q. What are SavePoints. What is benefit for inserting save points in a transaction ? Give Examples.

The SAVEPOINT statement defines a marker in a transaction. These markers are useful in rolling back a transaction till the marker.

We can add a savepoint anywhere in a transaction. When you roll back to that savepoint, any changes made to the database after the savepoint are discarded, and any changes made prior to the savepoint are saved. It is like semicommitting a transaction.

To define a savepoint, we enter the SAVEPOINT statement like this:

```
SAVEPOINT <savepoint-name>;
```

Example : SAVEPOINT Mark1;

In the above statement a marker (savepoint) with the name Mark1 is defined. It becomes a

bookmark in the transaction. Now we can write the following statement:

Q. How we can rollback any transaction upto a save point ?

Ans : to rollback the transaction till the bookmark named Mark1.

```
ROLLBACK TO SAVEPOINT Mark1;
```

Q. What is Autocommit ?How can it be set ?

Answer : By default, Autocommit mode is on in MySQL. It means that MySQL does a COMMIT after every SQL statement that does not return an error. If it returns an error then either Rollback or Commit happens depending on the type of error. If we do not want individual statements of SQL to be automatically committed, we should set the autocommit mode to off. When Autocommit is off then we have to issue COMMIT statement explicitly to save changes made to the database. The following statement sets the autocommit mode to off. It also starts a new transaction

```
SET AUTOCOMMIT=0;
```

The following statement sets the autocommit mode to ON. It also commits and terminates the current transaction.

```
SET AUTOCOMMIT=1;
```

If autocommit is set to ON, we can still perform a multiple-statement transaction by starting it with an explicit START TRANSACTION statement and ending it with COMMIT or ROLLBACK.

Let us look at the following example to understand it:

The screenshot shows a series of MySQL commands and their results. Annotations explain the behavior of Autocommit and Savepoints.

```
Example
mysql> SET AUTOCOMMIT = 0; → Autocommit is disabled.
mysql> SELECT * FROM Savings;
+-----+-----+-----+
| account_no | name          | balance |
+-----+-----+-----+
| 1004      | Siddharth Sehgal | 84000.00 |
| 1006      | Akriti Malik    | 92000.00 |
| 1008      | Chavi Mehra     | 67000.00 |
+-----+-----+-----+
Table Savings has 3 rows.

mysql> INSERT INTO Savings values
(1009,'Raunak Singh', 56000); → Another row for Raunak Singh added.

mysql> ROLLBACK; → Insert statement was not committed so it is undone by Rollback

mysql> SELECT * FROM Savings;
+-----+-----+-----+
| account_no | name          | balance |
+-----+-----+-----+
| 1004      | Siddharth Sehgal | 84000.00 |
| 1006      | Akriti Malik    | 92000.00 |
| 1008      | Chavi Mehra     | 67000.00 |
+-----+-----+-----+
Table does not show Raunak Singh's row.

mysql> SET AUTOCOMMIT = 1; → Autocommit is enabled.

mysql> INSERT INTO Savings VALUES
(1009,'Raunak Singh', 56000); → Raunak's row is added and is committed too.
```

```
mysql> ROLLBACK;
```

Rollback cannot undo insertion of Raunak's row.

```
mysql> SELECT * FROM Savings;
```

account_no	name	balance
1004	Siddharth Sehgal	84000.00
1006	Akriti Malik	92000.00
1008	Chavi Mehra	67000.00
1009	Raunak Singh	56000.00

If the autocommit mode has been set to off in a session and you end that session, the autocommit mode is automatically set to on when you start a new session.

Let us try out some more SQL statements :

Example

```
mysql> SET AUTOCOMMIT = 1;
```

Autocommit is enabled

```
Query OK, 0 rows affected (0.00 sec)
```

```
mysql> START TRANSACTION;
```

Start transaction sets autocommit off.

```
Query OK, 0 rows affected (0.00 sec)
```

```
mysql> DELETE FROM Savings WHERE account_no = 1006;
```

```
Query OK, 1 row affected (0.00 sec)
```

Row with account_no 1006 deleted but is not committed.

```
mysql> ROLLBACK WORK;
```

Deletion of Row with account_no 1006 is cancelled.

```
Query OK, 0 rows affected (0.03 sec)
```

```
mysql> ROLLBACK WORK;
```

Query OK, 0 rows affected (0.03 sec)

Row with account_no 1006 deleted but is not committed. Deletion of Row with account_no 1006 is cancelled. An implicit COMMIT takes place, even if AUTOCOMMIT is set OFF, on the database when the user issues a Data Definition language command like CREATE TABLE, ALTER TABLE etc

CHAPTER 18 IT- Applications

Brief Summary

- Three major groups of IT applications covered in this chapter are: egovernance, e-business, and e-learning.
- e-Governance involves applications which are used by government agencies/organizations to provide better governance.

- e-Business applications use technology to effectively access and deliver business related services and perform various kinds of business transactions.
- e-Learning applications use technology to effectively deliver and monitor learning and teaching processes. They help the trainer to organize and manage his/her lesson plans, present them to students/learners, evaluate and take the feedback to enhance & fine-tune this process in future.
- An IT application has two major parts: Front-end (The user interface) and back-end (The database).
- The front-end of an IT application is usually a group of one or more forms through which the user enters the input values and is shown the corresponding output. A good front-end ensures the acceptance of the application in the first go.
- The back-end of an IT application is the database in which all the data is stored. This database resides in the server. All the data which is requested by the front-end is supplied by back-end. A good back-end ensures sustainability, efficiency and easy modification of the application.
- Development of an IT application involves creation of front-end, back-end, and connecting these two. It also involves testing the application and then implementing it.
- Use of ICT has its social and economic impacts. Society is impacted as due to ICT people change their way of conducting the transactions and thus save their time, money, and energy. Economy is impacted as ICT leads to fast completion of data transfer and data processing jobs. ICT also brings transparency in the administration.

Key Points

- Differentiate between front-end and back-end of an application.
 - Identify various components of the front-end of an application.
 - Design and develop simple IT applications.
 - List the impacts of ICT(Information & Communication Technology) on society
-
- ##

Solved Questions(MULTIPLE CHOICE QUESTIONS)

1. A web site to provide online information and services to the citizens is an example of

a. e-Business	b. e-Mail
c. e-Governance	d. e-Learning
2. The web-site of an electricity supply company which allows its customers to pay bills online is an example of

a. e-Business	b. e-Mail
c. e-Governance	d. e-Learning
3. The web-site of a school which allows the students to go through various lessons in their subjects is an example of

a. e-Business	b. e-Mail
c. e-Governance	d. e-Learning
4. Web address of national portal of India is:

Answers : 1. c 2. a 3. d 4. a 5. b 6. d 7. c 8. d

VERY SHORT QUESTIONS ANSWERS

1. Give some examples of input values, where Radio Button and Check Boxes should be used for efficiency in the application.
Answer : for selection criteria applying, Providing optional choices.
 2. What are the important guidelines we should keep in mind while developing an efficient application?
Answer : It should be user friendly, reliable and should be maintained database with consistency and integrity with GUI.
 3. Is it a good practice to take in the inputs using TextFields only? Justify your answer
Answer : TextField is used to get small textual information like Name, RollNo, email address, quantity, etc. Disabled/Uneditable TextFields are also used to display such information so it is a good practice to take in the inputs using TextFields. But we may also use Dialog to take input.

Short Question-Answers

O. Write Short Notes on : e-Governance, e-Business, e-Learning.

Answer : e-Governance involves applications which are used by government agencies/organizations to provide better governance.

e-Business applications use technology to effectively access and deliver business related services and perform various kinds of business transactions.

e-Learning applications use technology to effectively deliver and monitor learning and teaching processes. They help the trainer to organize and manage his/her lesson plans, present them to students/learners, evaluate and take the feedback to enhance & fine-tune this process in future.

Q. What are Front-end (The user interface) and back-end (The database) ?

Answer : An IT application has two major parts: Front-end (The user interface) and back-end (The database). The front-end of an IT application is usually a group of one or more forms through which the user enters the input values and is shown the corresponding output. A good front-end ensures the acceptance of the application in the first go. The back-end of an IT application is the database in which all the data is stored. This database resides in the server. All the data which is requested by the front-end is supplied by back-end. A good back-end ensures sustainability, efficiency and easy modification of the application.

Q.What are the terms involved in Development of an IT application ?

Development of an IT application involves creation of front-end, back-end, and connecting these two. It also involves testing the application and then implementing it.

Q. What social and economic impacts are found of ICT. ?

Answer : Society is impacted as due to ICT people change their way of conducting the transactions and thus save their time, money, and energy. Economy is impacted as ICT leads to fast completion of data transfer and data processing jobs. ICT also brings transparency in the administration.

Q. What do you mean by Infomania ?

Answer : Infomania is the condition of reduced concentration caused by continually responding to electronic communications such as e-mail, SMSs, MMSs etc. ICT is making more and more people infomaniac. This is making some people waste their productive time in the office, neglect their families and duties. Some people are also in a habit of frequently checking their e-mails even when they are on vacation with their families. We have to be careful in the use of ICT so that we use it constructively and not get obsessed with it and become infomaniacs.

Q. What OS and fonts are used for Indic Language Support ?

Answer : Mac OS 10.5 supports Devanagari, Gujarati, Gurmukhi and Tamil. Linux based desktops support Bengali, Devnagari, Gujarati, Kannada, Malayalam, Oriya, Tamil, Telugu and Gurmukhi,

Q. Write the steps for enabling Indic Language Support in Windows.

Answer : Windows 7 and Windows Vista include all the necessary files to support Indic languages Complex(Indic) text support is automatically enabled. Therefore you just need to enable the keyboard for the language that you want to use by following the steps in the Enable a keyboard layout section. For Windows XP, some additional setup may be required to support Indic languages. Therefore you first follow the steps given under Enabling International Language Support in Windows and then proceed with the steps given under the Enable a keyboard layout section.

Q. Write the steps for turning on the language bar .

If you do not see the language bar in the task bar (at the bottom of the desktop) or floating on the desktop please do the following:

Step 1: Click Start, click Control Panel, and then double-click Regional and Language Options.

Step 2: On the Languages tab, under Text services and input languages, click Details as shown in Figure 8.

Step 3: Under Preferences, click Language Bar.

Step 4: Select the Show the Language bar on the desktop check box.

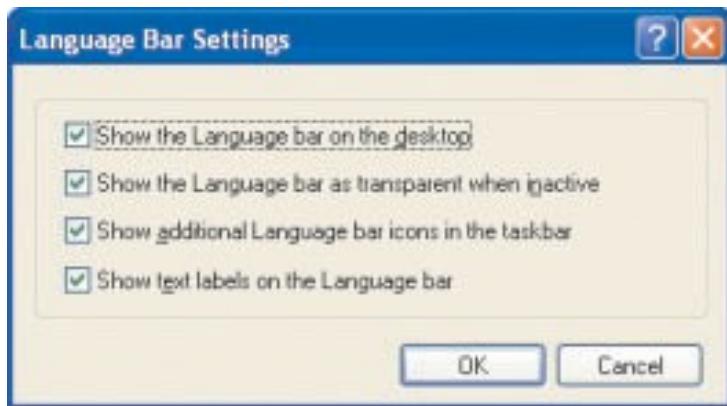


Figure 3 Language Bar Settings in Windows XP

Note: You can switch between different languages by clicking on the language bar and changing the language or by pressing the left ALT+SHIFT keys.

Q. How Fonts in Windows are Installed ?

Step 1: Go to Windows Fonts folder e.g. C:\Windows\Fonts. (The path may differ on some computers.)

Step 2: Copy-paste the font file into this folder. Windows will now install the font file.

Step 3: Once installed the font will be available in your text-based applications.

Q. How can be established Front-End and Database Connectivity ?

A database application consists of Front-End and Database (Back-end). These two entities cannot work in isolation. Whatever data is entered by the user has to go to the database and whatever relevant data is extracted from the database is to be shown to the user through the Front-End. Therefore, the Front-End and the Database of an IT application must be connected. This connectivity is achieved as learnt in Chapter 6 (Database Connectivity). If the application is web based then the connectivity is achieved using some scripting language (like vbScript or JavaScript).

Q. Are there Websites in Indian languages ? Write about them ?

Answer : Yes, these days multiple Government and private organizations are providing their websites in Hindi and other regional languages also. The aim is to provide their services even to the common people in remote areas. Small towns where computers and internet have reached, information on the net should also be available in regional languages so that people not knowing English can also have access to the information. Language should not be a hinderance but a support to learning. Understanding the importance of regional languages, many websites have also provided translation services so that the same page can be viewed in any language of user's choice.

Long Question-Answers

Q. What is IT Application ? Give details on it.

1) In information technology, an application is the use of a technology, system, or product. 2) The term application is a shorter form of application program. An application program is a program designed to perform a specific function directly for the user or, in some cases, for another application program. Examples of applications include word processors, database programs, Web browsers, development tools, drawing, paint, image editing programs, and communication programs. Applications use the services of the computer's operating system and other supporting applications. The formal requests and means of communicating with other programs that an application program uses is called the application program interface (API).

We have already seen that IT applications are essential requirement of every individual and organization to simplify their day-to-day work, efficiently manage and execute projects. These applications save

time and efforts both. Now, it is the time to get into the real world of IT applications by first exploring the existing applications and then developing new applications to solve real life problems.

We have already learnt about broad categories of IT application as e-Gaming, e-Business, e-Governance, e-Learning etc. e-Business involves applications dealing with buying and selling of products and services. e-Governance involves applications which are used by government agencies/organizations to provide better governance. e-Learning involves applications which are developed to help learning of any concept/skill. Similar applications are also possible in other sectors of economy and social service.

You must have used or seen others using many such applications several times. Whenever you perform an activity online, like register for a new email account, apply for a Visa while going abroad, reserve a seat on a flight/train, buy a book online - you are actually using IT applications only. So, you can see how these applications save us time and efforts in getting various jobs done. These applications have become an integral part of our modern society.

Q. What do mean by Front-End Interface ?

Front-end and back-end are terms used to characterize program interfaces and services relative to the initial user of these interfaces and services. (The "user" may be a human being or a program.) A "front-end" [application](#) is one that application users interact with directly. A "back-end" application or program serves indirectly in support of the front-end services, usually by being closer to the required resource or having the capability to communicate with the required resource. The back-end application may interact directly with the front-end or, perhaps more typically, is a program called from an intermediate program that mediates front-end and back-end activities.

For example, the Telephony Application Program Interface ([TAPI](#)) is sometimes referred to as a front-end interface for telephone services. A program's TAPI requests are mapped by Microsoft's TAPI Dynamic Link Library programs (an intermediate set of programs) to a "back-end" program or [driver](#) that makes the more detailed series of requests to the telephone hardware in the computer.

As another example, a front-end application might interface directly with users and forward requests to a remotely-located back-end program in another computer to get requested data or perform a requested service. Relative to the [client/server](#) computing model, a front-end is likely to be a client and a back-end to be a server.

All IT applications process some data entered by the user. For example, when an examinee has to see his result on the net, he has to enter his roll number. When a person has to deposit his house tax online, he has to enter information about his house and his credit/debit card using which the house tax has to be deposited. To place an order online for some purchase, the buyer has to enter some information about himself and the item to be purchased. Similarly for any IT application the user has to enter some data which may be just a number or a lot of data like buyer's details. Every IT application provides some sort of form using which users enter the data. This form is called the Front End Interface (or just Front-End or Interface or user-interface) of the application.

Q. What Components are used for creating Front-end of any software ?Give details about those components.

Answer : To create a front-end various components, like those studied in Java GUI application development, are used. Some of the most commonly used components are discussed below.

TextField: TextField is used to get small textual information like Name, RollNo, email address, quantity, etc. Disabled/Uneditable TextFields are also used to display such information.

TextArea: TextArea is used to get long textual information which may span multiple lines of text. E.g. to get Address, Complaint, Suggestion etc. Disabled/ Uneditable TextAreas are also used to display such information.

Radio Button: Radio buttons are used to get an option out of several mutually exclusive (out of which only one can be selected) options. Examples of such options are Gender (Male or Female or Other), Type of Credit Card (Master or Visa or Other), Type of internet connection (DialUp or Braodband), etc.

CheckBox: Check boxes are used to get one or more options out of several given options which are not mutually exclusive. These are the cases where multiple options are given to the user and the user can select zero or more out of the given options. Examples of such options are Hobbies (a user may have zero or more hobbies), Magazines to subscribe for (a user may subscribe to zero or more of the given magazines) etc.

List: A list is used to get one or more options out of several given options which may or may not be mutually exclusive. This may seem to be the case where CheckBoxes are to be used, but the difference is in the number of options available. If the number of options is small, then CheckBoxes can be used. In case of large number of options, using CheckBoxes may take up a lot of space on the form and it may also be inconvenient for the user to select the desired options. In such cases Lists are preferred over checkboxes. Examples of such cases are: To select cities out of a given list of cities, to select magazines out of a given list of magazines, etc.

ComboBox: A ComboBox is used to get an option out of several given options which are mutually exclusive. This may seem to be the case where RadioButtons are to be used, but the difference is in the number of options available. If the number of options is small, then RadioButtons can be used. In case of large number of options, using RadioButtons may take up a lot of space on the form and it may also be inconvenient for the user to select the desired option. In such cases ComboBoxes are preferred over radio buttons. Examples of such cases are: To select a city out of a given list of cities, to select a train out of a given list of trains, etc.

When the options are mutually exclusive, then a List can also be used instead of a ComboBox. It all depends on the space available on the form (a ComboBox consumes less space as compared to a List) and the look of the form (which the form designer has to decide).

PasswordField: A PasswordField is used to get some secret textual information like Password, CVV number of a credit card etc.

Front-end interface is the face of any application. In most of the cases, the front-end decides whether the application will be easily accepted or not. If the front-end is convenient and unambiguous for the user, then the user will like to use it and hence the application will be given positive reviews. If the front-end interface is inconvenient for the user, then the user will not like to use the application. Therefore, front-end of an

application must be user-friendly. Following are a few tips to make the front-end more and more user friendly:

1. **Consistency:** Consistency in looks and operations plays a major role in front-end design. If in one window the buttons are placed at the bottom, then in all the other windows also they should be placed at the bottom. If double-clicking an item pops- up a short-cut menu, then double-clicking any other item should pop-up the relevant short-cut menu. Labels, color-scheme etc. should also be consistent through-out the application. Consistency enables users to make an idea of how the application works, and this idea leads to fast acceptance of the application.
2. **Make it convenient for the user:**

- a) Place the most important items at the top-left position of the form. When a user looks at a window, top-left is the first position where user attention goes. So an item placed at top-left position has least chances of getting skipped.
 - b) Don't use such bright colors which put pressure on users' eyes. The colors which look very fantastic are not necessarily convenient for the user when it comes to entering data or viewing reports.
3. Help the user enter correct data in the first go: Ask for minimum textual data to be entered by the user. If you have to ask for class and section, provide a list to choose the class, provide radio buttons to choose the section. This way user has the options only to enter the valid data. If you ask the user to enter the class and section in a text box, then the user has all the options to enter the data and hence more chances of entering invalid data.
4. Listen to all: Before creating the user interface, you should speak to the potential users and get their ideas to decide the design of user interface. You should put a limit there only. You must get the ideas but you are not bound to use these ideas. Use your skill and commonsense to decide which of these should be incorporated and which one should not be. The aim is to create a consistent, convenient, and logically correct user interface.
5. Smooth shifting from one window to the next (or the previous): Make the sequence of moving from one window to another exactly same as the flow of work the application is made to do.

Q. What is Back-End Database ? Give detailed information about it.

A back-end database is a [database](#) that is accessed by users indirectly through an external [application](#) rather than by application programming stored within the database itself or by low level manipulation of the data (e.g. through [SQL](#) commands). A back-end database stores data but does not include [end-user](#) application elements such as stored queries, forms, [macros](#) or reports.

Front-End is just one part of an IT application. Any IT application usually stores a lot of data in the form of a database which is not visible to the user. This database is used by the application to give suitable responses to the user. This database is called Back-End Database (or just Back-End or Database). For Example, the database of train reservation system stores all the data about trains and passengers, the database of an online shopping system stores the data of all the items available in the store, and so on. If the front-end interface makes the user like or dislike the application in the first go, then the back-end decides whether the user will keep liking the application or not. A good back-end improves the speed of the application. A good back-end also ensures easy modification of the application whenever required.

Q. What are features of a good back-end database ?

Answer : Following are the features of a good back-end database:

- It should use multiple tables for storing data to avoid data redundancy.
- Tables in the database should be created using constraints wherever applicable.
- Keys (Primary and Foreign) of tables must be defined.

To make the application efficient and effective, you should also follow the guidelines given below:

1. It should meet all the requirements of the problem, for which the application was created.
2. It should have user-friendly interface to make the user comfortable while using.
3. Code should have sufficient number of comments to help the programmer/yourself to modify/update the code in future.
4. Keep the navigation of input in a standard order as much as possible. Most significant information should be entered first.
5. There should not be any ambiguity in data and information and it should avoid inputting duplicate information anywhere in any form.

Q. Give some Examples of IT Applications.Give some examples.

There are numerous IT applications. We consider herein IT applications for e-Governance, e-Business, and e-Learning. Web addresses of a few of these are given below:

e-Governance: To reach the citizens in an effective and transparent manner ICT enabled counters have been setup by government where several services like Birth/Death certificate registration, Railway enquiry and ticket booking, submission of RTI application etc. are provided. These centres are accessible to anyone and people can use these to get guidance, information, and services without paying any money to touts or middle men.

india.gov.in (The National Portal of India) -This portal not only gives the information about Government of India, but also allows the users to apply online for various services provided by the government.

1. goidirectory.nic.in (Government of India Web Directory) - Through this portal one can access various government web sites. These sites include sites of various states and union territories, and sites of central government departments etc. All these sites are examples of e-Governance applications of IT. Some of these sites are:

a) mcchandigarh.gov.in:
Portal of Municipal Corporation of Chandigarh

b) Jammukashmir.nic.in:
Portal of Municipal Government of Jammu and Kashmir

Bhoomi (meaning land) is the project of on-line delivery and management of land records in Karnataka. It provides transparency in land records management with better citizen services and takes discretion away from civil servants at operating levels.

The Revenue Department in Karnataka, with the technical assistance from National Informatics Centre (NIC), Bangalore, has built and operationalised the BHOOMI system throughout the state. The BHOOMI has computerized 20 million records of land ownership of 6.7 million farmers in the state.

National Informatics Centre (NIC) is a premiere Science & Technology institution of the Government of India, established in 1976, for providing e- Government / e- Governance Solutions adopting best practices, integrated services and global solutions in Government Sector.

Hindi version of Government of India portal is <http://bharat.gov.in/>.

Q. What do you understand by e-Business ? Give Examples.

To reach the customers and business associates in an effective and fast manner business houses (now a days many small shops like snacks corners and paan shops also) provide their services on the net. These ICT enabled counters are used to get orders and feedbacks from the customers and also for inter-business transactions. This helps the businesses to widen their customer base. nafed-india.com/ebusiness.asp (e-business site of NAFED) -Through this URL NAFD (National Agricultural Cooperative Marketing Federation of India Ltd.) offers its e-business services to various corporates and customers.

1. Amazon.com (e-Business site of Amazon.com) - Amazon is the world's largest online store. Through this URL Amazon does its online business

e-Learning :

e-Learning has multiple goals. It is much more than having a net connection and/or CDs through which people learn. E-Learning is about giving freedom to people to learn whatever they want to learn and whenever they want to learn. This is irrespective of (except in exceptional cases) age, caste, gender, economical background, or qualification of the learner. The only requirement is the will to learn. E-learning is available on almost all the topics imaginable.

1. w3schools.com (Website Developers e-Learning site) - At w3schools.com you will learn how to make a website. It offers free tutorials in all web development technologies.
2. www.gcflearnfree.org - It is an educational part of the GCF mission. GCF creates and provides quality, innovative online learning opportunities to anyone who wants to improve the technology, literacy, and math skills necessary for them to be successful in both work and life.

GCF believes that there's freedom in the ability to learn what you want, when you want, regardless of your circumstances.

3. educationportal.mp.gov.in/public/multimedia.aspx - This government of Madhya Pradesh portal provides multimedia tutorials on various topics of different subjects like maths, science, social sciences etc.
4. ncert.nic.in/html/learning_basket.htm - This NCERT portal provides interactive modules for students to learn various topics.

Q. Give some guidelines for Multilingual websites.

NIC has developed guidelines for Indian Government websites. These guidelines are accessible at <http://www.pon.nic.in/homeinfo/govt-website-guidelines.pdf>. Article 5.7 of this document lays guidelines for Multilingual versions of Government websites. The main points of this article are:

- a) Ideally all the pages on the website should be translated in Hindi and other regional languages. In case it becomes difficult to do so, corresponding Departments should identify the content which is widely accessed by the public and put up such content in regional languages.
- b) It MUST be ensured that the documents/pages in multiple languages are updated simultaneously so that there are no inconsistencies, at any point, between the various language versions.
- c) In case it is practically difficult to update the versions in all the languages simultaneously due to delays on account of translation etc., the obsolete information should be removed from the site till the latest information is uploaded. In any case, a time stamp indicating the date of uploading the information and its validity should be put along with all the time sensitive documents.

Q. How IT applications are created ? Write notes on Development of IT applications.

For developing such application, one needs to follow the following steps:

- Step 1: Identify the problem for which the application is to be developed and discuss about its feasibility. If the application is technically and economically feasible (possible and profitable to carry out), then steps are taken for its development, otherwise the project is scrapped.
- Step 2: Identify and decide, which database tables and table structures will be required in the application. Make sure that the data types and sizes of the columns in the tables are carefully planned and used. Create database and tables as per the requirement of the application.
- Step 3: Identify and decide, which all inputs are required to be taken from the user in the Front-End of the application. Find out, where you can minimize the typing efforts of user by introducing known options using RadioButton/CheckBox/ List/ComboBox etc. Develop the front-end of the application as per the requirement and ease of use.
- Step 4: Establish the data connectivity between the Front-End interface and Back-End Database.
- Step 5: Test the full application (Front-End and Back-End) with multiple sample sets of data. It is always better if the sample data are collected from potential users of the application randomly. Now, the application is ready for implementation.

Q. Give examples to understand the process of IT application development.

Example 1 - e-Business : To expand its business, XYZ Mall plans to go online. Anyone who shops at the Mall will be given a membership number and Password which can be used for online shopping. With this membership number and password, customers can place their orders online. The mall will maintain the customers' data and orders' data. A person is put on duty to keep constantly checking the Orders data. Whenever an order is received, its processing has to start at the earliest possible. The Orders' data will be analyzed periodically (monthly, quarterly, annually - whatever is suitable) to further improve business and customer satisfaction.

Example 2 - e-Governance : The state administration wants to make vehicles' data (RegNo, RegDate, Owner, OwnerShipNumber, Address, HP) easily available to citizens. Each registration authority in-charge will regularly update the data. Citizens will be given read only access to this data.

Example 3 - e-Learning :

An organization of dedicated teachers, 'Meticulous Teachers Consortium', decides to invite computer aided teaching modules from individuals and organizations so that these can be put on the internet for students' use free of cost. No money will be charged from users and no money will be paid to the developers. Once the modules start pouring in, a front-end is created for the students where the students can select any of the available modules to learn any topic.

Q. What is ICT ? Write Impact of ICT on society.

Answer : ICT stands for Information and Communication Technology. Like everything else that is used by common man, ICT (Information and Communication Technology) also has impacted the society. ICT has impacted the society in a much wider way than any other technology. Most of these impacts are positive, though there are some negative impacts also.

Social and Economic benefits of ICT:

- Social networking sites help people remain in touch with their nears and dears even when they are staying on opposite sides of the globe.
- Social networking sites help like-minded people come together and work for some cause.
- e-Governance sites help people save their productive time by performing various government related jobs like getting some forms, depositing bills online.
- ICT helps economy grow at a faster rate as it provides transparency in the processes and helps the government to keep check on defaulters.
- Due to e-Banking and use of plastic money more money is put in circulation leading to faster growth of GDP.
- e-Learning sites make quality study material available even to the students staying at remote places.

Q. Write the steps for enabling International Language Support in Windows .

Step 1: Click Start and then go to Control Panel.

Step 2: Click on Date, Time, Language, and Regional Options and choose Add Other Languages from the task list.

Step 3: In the Regional and Language Options dialog box Highlight the Languages tab.

Step 4: In the Regional and Language Options dialog box, under Supplemental Language Support, select the Install files for complex script and right-to-left languages check box. Click OK or Apply.

Step 5: You will be prompted to insert the Windows CD-ROM or point to a network location where the files are located. After the files are installed, you must restart your computer.

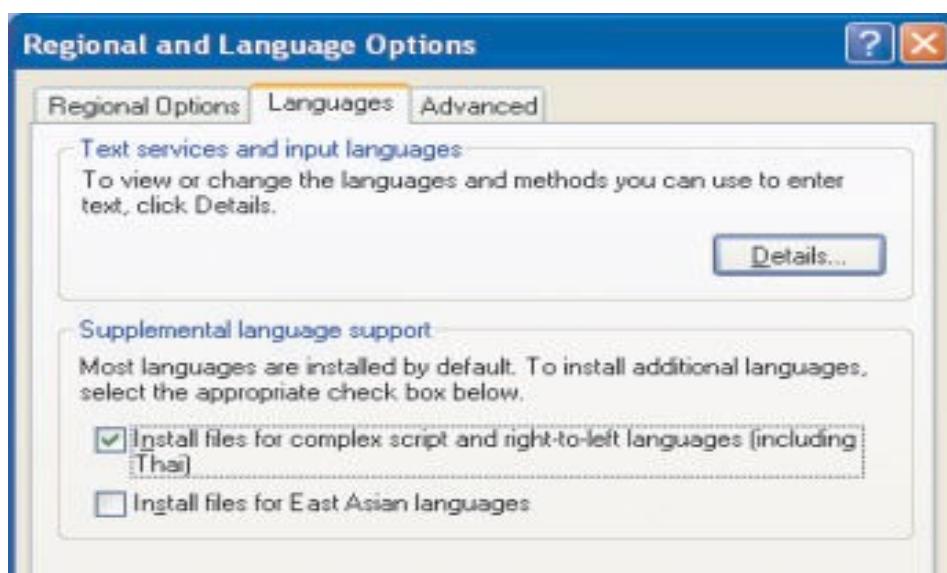


Figure 1 Languages tab in Regional and languages option in Windows XP

Q. Write steps for enabling a Keyboard Layout in Windows.

- Step 1: Under "Text services and input languages," click on the "Details..." button.
- Step 2: Under Installed Services, click "Add..."
- Step 3: In the Text Services and Input Languages dialog box, on the Settings tab, click Add.
- Step 4: In the Add Input Language dialog box, click the Input language list and select your preferred language and dialect. If you want to change the standard keyboard layout, click the Keyboard layout/IME list and select a new keyboard layout. Then, click OK.
- Step 5: In the Text Services and Input Languages dialog box, on the Settings tab, click the Default input language list, and select the language you will use most often. The language you select as the default will display when you first start your computer. If you have finished adding languages, click OK.
- Step 6: Click the Regional Options tab. Click the Standards and formats list, and then select your region.
- Step 7: Click the Location list, and then select your location.
- Step 8: Once done, click OK to exit. On the Text Services and Input Languages page, click OK again to close Regional Options. You should now see a language indicator in the System Tray (located at bottom right hand corner of the desktop by default)

CLOUD COMPUTING(Future trends)

Q. What is cloud computing ?

Answer : This means that cloud computing is a type of Internet-based computing, and it consists of every situation where the use of IT resources by an entity, including a person or an organization.

Q. What are the properties of cloud computing ?

Answer :Properties of cloud computing are :

Access to the resources is:

- Controlled by the entity, and restricted by them to their authorised users.
- Delivered via the Internet to all of these users.
- The resources are:
 - Hosted by a service provider on behalf of the entity.
 - Dedicated to their exclusive use.
- Data processed by the resources is:
 - Private to the entity and its associates.
 - Entered or collected by them, or automatically produced for them.

CBSE SAMPLE PAPER

INFORMATICS PRACTICES

Class-XII

TIME : 3 Hrs

MM : 70

1.
 - (a) Which protocol is used for the transfer of hyper text documents on the internet?
 - (b) Which transmission medium should be used to transfer data across two continents at very high speed.
 - (c) Two neighbourhood schools, at a distance of 120 metres from each other, decide to join their LANs using UTP cable so that they can share their e-learning resources. But after joining their LANs they are not able to share the resources due to loss of signal in-between. Which device should they use so that signal is amplified in-between?
 - (d) Which of the following softwares are Open Source:
Linux, MS Windows 7, Photoshop, MySql.
 - (e) Distinguish between Open Source software and Proprietary software with reference to customizability of the software.
 - (f) Name any four Indian scripts included in Unicode.
 - (g) Sujata says that the following numbers indicate an address:
208.77.188.166
What is the above address called? To which object/device is it assigned?
2.
 - (a) Ms. Samhita has developed a Java application through which the students of her school can view their marks by entering their admission number. The marks are displayed in various text fields. What should she do so that the students are able to view but not change their marks in text fields?
 - (b) What is the purpose of break statement in a loop?
 - (c) What is the use of <H1> tag in an HTML document?
 - (d) What is XML?
 - (e) What will be the values of x and y after execution of the following code:

```
int x, y=0;
for (x = 1; x<=5; ++x)
    y = x++;
    -y;
```
 - (f) Write code in Java that takes principal, rate, and time as input from textfields and displays simple interest.

- (g) Mention the purpose of each of the following HTML tags.
**
, , <HR>, <TABLE>**
3. (a) Which command is used in MySQL to make the changes in database permanent?
(b) While creating a table 'Customer' Simrita forgot to set the primary key for the table. Give the statement which she should write now to set the column 'CustID' as the primary key of the table?
(c) What is the purpose of following SQL query:
SELECT MAX(salary) FROM Emp;
(d) Can a table have multiple primary keys? Can it have multiple foreign keys?
(e) In a Student table, out of RollNumber, Name, Address which column can be set as Primary key and why?
(f) The Item_No and Cost columns of a table "ITEMS" are given below:

IITEM_NO	COST
101	5000
102	NULL
103	4000
104	6000
105	NULL

Based on this information, find the output of the following queries:

- a) **SELECT AVG(COST) FROM ITEMS;**
b) **SELECT COST+100 FROM ITEMS WHERE ITEM_NO > 103;**
(g) A table 'Customers' in a database has 5 columns and no rows in it. What is its cardinality. What will be its cardinality if 4 rows are added in the table?
- 4 (a) Define inheritance with reference to object oriented programming.
(b) A phone number, consisting of 10 digits, is stored in a string variable strPhone. Now it is required to store this phone number in a Long type variable lngPhone. Write a Java statement to do this.
(c) Write the purpose of the following statement:
jTextField1.setText("Informatics".substring(3));
(d) Rewrite the following program code using a for loop:

```
int i = 1, sum = 0;
while (i<10)
{ sum += i;
i += 2;
}
```

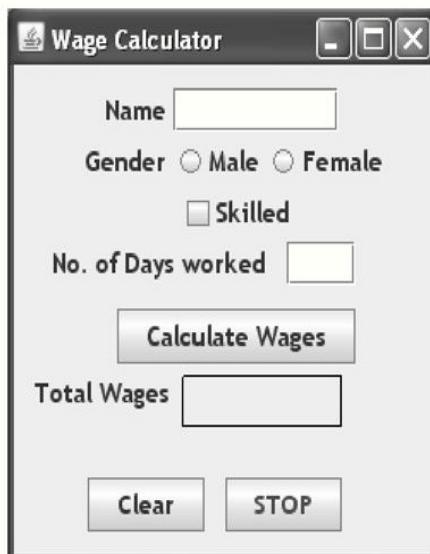
- (e) The following code has some error(s). Rewrite the correct code underlining all the corrections made:

```
int i, j=5;  
i == j+5;  
if (i = j)  
{    jTextField1.setText("i and j are unequal");  
    jTextField2.setText("they are not equal"); break;  
}  
else jTextField1.setText("i and j are equal")
```

- (f) What will be the contents of jTextField1 and jTextField2 after executing the following code:

```
jTextField1.setText(Math.round(2.3)+"");  
jTextField2.setText(Math.pow(2,3)+"");
```

- (g) Richika is a programmer at Alpha Builders. To calculate wages to be paid to labourers she has developed the following GUI in Netbeans.



Male and Female labourers are respectively paid at the rate of Rs.140/- per day and Rs. 160/- per day. Skilled labourers are paid extra at the rate of Rs.50/- per day.

- (i) What should be done so that only one of the radio buttons (Male and Female) can be selected at a time?
- (ii) Write code to do the following:
- Calculate and display the Total wages in the corresponding label when the "Calculate Wages" button is pressed.
 - Clear the Name and No. of days worked text fields.
 - Close the application when the "STOP" button is pressed.

(You can assume any suitable names for various controls on the form.)

- 5 (a) What is the purpose of DROP TABLE command in SQL? How is it different from DELETE command? 2
- (b) "PrincipalName" is a column in a table "Schools". The SQL queries
- ```
SELECT count(*) FROM Schools;
```
- and
- ```
SELECT count(Principal) FROM schools;
```
- Give the result 28 and 27 respectively. What may be the possible reason for this? How many records are present in the table - 27 or 28? 2
- (c) Consider the table Projects given below. Write commands in SQL for i) to iv) and output for v) to viii)

PROJECTS

ID	ProjName	ProjSize	StartDate	EndDate	Cost
1	Payroll-MMS	Medium	2006-03-17	2006-09-16	60000
2	Payroll-ITC	Large	2008-02-12	2008-01-11	500000
3	IDMgmt-LITL	Large	2008-06-13	2009-05-21	300000
4	Recruit-LITL	Medium	2008-03-18	2008-06-01	50000
5	IDMgmt-MTC	Small	2007-01-15	2007-01-29	20000
6	Recruit-ITC	Medium	2007-03-01	2007-06-28	50000

- i. To display all information about projects of Medium ProjSize.
- ii. To list the ProjSize of projects whose ProjName ends with LITL. 1
- iii. To list ID, name, size and Cost of all the projects in descending order of StartDate.
- iv. To count the number of projects of cost less than 100000.
- v.

```
SELECT sum(Cost) FROM projects;
```

- 6 (a) Write an SQL query to create a table 'TEAMS' with the following structure:

Field	Type	Constraint
TeamCode	Varchar(5)	Primary Key
TeamName	Varchar(20)	
TeamLeader	Varchar(20)	
NoOfMembers	Integer	
Team_Symbol	Char(1)	Not Null

- (b) In a database there are two tables 'Company' and 'Model' as shown below:

Company

CompID	CompName	CompHO	ContPerson
1	Titan	Okhla	C.B.Ajit
2	Maxima	Shahdara	V.P.Kohli
3	Ajanta	Najafgarh	R. Mehta

Model

ModelID	CompID	ModelCost
T020	1	2000
M032	4	2500
M059	2	7000
A167	3	800
T024	1	1200

- (i) Identify the foreign key column in the table model.
 - (ii) Check every value in CompID column of both the tables. Do you find any discrepancy?
- (c) Consider the tables DOCTORS and PATIENTS given below:

DOCTORS

DocID	DocName	Department	OPD_Days
101	M. Panday	ENT	TTS
102	G. P. Gupta	Paed	MWF
201	C.K. Sharma	Ortho	MWF

PATIENTS

PatNo	PatName	Department	DocID
1	Neeraj	ENT	101
2	Mohit	Ortho	201
3	Ragini	ENT	101
4	Mohit	Paed	102
5	Nandini	Ortho	201

With reference to these tables, write commands in SQL for (i) and (ii) and output for (iii) below:

- (i) Display the PatNo, PatName and corresponding DocName for each patient.

(ii) Display the list of all patients whose OPD_Days are MWF.

(iii) select OPD_Days, Count(*)

from Doctors, Patients

where Patients.Department = Doctors.Department

Group by OPD_Days;

7. (a) How is e-learning beneficial to students. Write one point
(b) List two features of a good interface.
(c) Prikshit works for a school. She wishes to create controls on a form for the following functions. Choose appropriate controls from Text box, Label, radio button, Check box, List box, Combo box, Command button and write in the third column.

S.No	Control used to:	Control
1	Enter Admission Number	
2	Select Stream	
3	Select Subjects	
4	Clear the Form	

Marking Scheme
INFORMATICS PRACTICES
CBSE SAMPLE PAPER

- 1 (a) HTTP (or Hyper Text Transfer Protocol).
(1 Mark for Abbreviation and/or Full Form)
- (b) Satellite
(1 Mark for correct answer)
- (c) Repeater
(1 Mark for correct answer)
- (d) Linux and MySql
(½ Mark each for correct software)
- (e) Source code of Open Source software is available to the user and therefore the user can customize it according to his/her own requirements and capability. Whereas the source code of a proprietary software is available only with its vendor/developer. Therefore, it cannot be customized by the user as per his/her requirements.
(2 marks for correct distinction)
- (f) Devnagari, Bengali, Gurmukhi, gujarati, Oriya, Tamil, Telugu, Kannada, Malayalam (Any4)
(½ mark for each script)
- (g) The above address is called an IP Address or Internet Protocol Address. It is a numerical label that is assigned to devices participating in a network.
(1 mark for each part)
- 2 (a) She should make the text boxes showing marks non-editable.
- OR
- She should deselect the editable property of corresponding text boxes.
(1 mark for correct answer)
- (b) Break statement is used to terminate the loop.
(1 mark for correct answer)
- (c) <H1> tag is used to display heading with largest font size.
(1 mark for correct answer)
- (d) XML stands for extensible Markup Language. It is used to store and transport data.
(1 mark for correct answer)
- (e) X = 7, y = 4
(1 mark for each correct value)

(f) double Principal, Rate, SIinterest;
 byte Time;
 Principal=Double.parseDouble(jTextField1.getText());
 Rate=Double.parseDouble(jTextField2.getText());
 Time=Byte.parseByte(jTextField3.getText());
 SIinterest=(Principal*Rate*Time)/100;
 jTextField4.setText(Double.toString(SIinterest));

(2 marks for correct answer)

- (g)
 To insert a line break
 To define a List Item in an Ordered or Unordered List
 <HR> To place a horizontal line in an HTML document
 <TABLE> To create a table in an HTML document.

(½ mark for purpose of each tag)

- 3 (a) COMMIT

(1 mark for correct answer)

- (b) ALTER TABLE Customer

ADD PRIMARY KEY (CustID);

(½ mark for ALTER TABLE; ½ mark for ADD PRIMARY KEY)

- (c) This query displays the maximum value from the salary column of Emp table.

(1 mark for correct answer)

- (d) Multiple Primary Keys - NO

Multiple foreign keys - Yes

(½ Mark for each correct answer)

- (e) RollNo can be set as primary key.

Reason:

In a class roll number of a student is always unique for every student. Therefore it can be used to identify a row uniquely in the table.

(1 mark suggesting RollNo)

(1 mark for the reason)

(f) a)
$$\left(\begin{array}{c} \text{AVG(COST)} \\ \hline 5000 \\ \hline \text{COST} + 100 \\ \hline 6100 \end{array} \right)$$

NULL

(1 mark for each correct answer)

- b) (½ mark for 6100, ½ mark for NULL)**
- (g) In the first case cardinality is 0.
 In the second case cardinality will be 4.
(1 mark for each case)
4. (a) Inheritance is the capability of a class (called derived Class) to inherit the properties of another existing class (called Base Class).
(1 mark for correct definition)
- (b) LongPhone = Long.parseLong(strPhone);
(1 mark for correct answer)
- (c) This statement places the substring of "Informatics" starting from third character in the text field jTextField1. So, this statement will place "ormatics" in the text field jTextField1.
(1 mark for correct explanation)
- (d) int i, sum = 0;
 for (i=1; i<10; i+=2)
 sum += i;
- (2 marks for correct answer)**
- (e) int i, j=5;
 i = j+5;
 if (i = j)
{ jTextField1.setText("i and j are unequal");
 jTextField2.setText("they are not equal");
breaks,
}
else jTextField1.setText("i and j are equal");
- (½ mark each for identifying and correcting 4 errors)**
- (f) jTextField1: 2
 jTextField2: 8.0
- (1 Mark for each correct answer)**
- (g) (i) Both the radio buttons should be put in a button group.
(1 mark for correct answer)

```

(ii) (a) int WageRate, NoOfDays, TotalPay;
      if (radMale.isSelected())
          WageRate = 140;
      else WageRate = 160;
      if (chkSkilled.isSelected())
          WageRate += 50;
      NoOfDays = Integer.parseInt(txtDays.getText());
      TotalPay = NoOfDays * WageRate;
      lblWages.setText(TotalPay + "");

```

(½ Mark for variable declaration with appropriate data types)

(½ Mark for calculating wage rate based on gender)

(½ Mark for recalculating wage rate based on skill)

(½ Mark for extracting no. of days from the corresponding text field)

(½ Mark for calculating total pay)

(½ Mark for displaying total pay in the corresponding label)

```

(b) txtName.setText("");
    txtDays.setText("");

```

(½ Mark for each statement)

```

(c) System.exit(0);

```

(1 Mark for correct answer)

- 5 (a) The DROP TABLE command removes the entire table from the database. When we drop a table, all the rows in the table are deleted and the table structure is removed from the database. The DELETE command removes rows from a table. If no WHERE condition is specified, all rows are removed- the table structure remains intact.

(1 Mark for explaining DROP TABLE)

(1 Mark for difference between DROP and DELETE)

- (b) The possible reason for this is that one record in the table has NULL in the PrincipalName column.

Number of records present in the table is 28.

(1 Mark each for each correct part)

- (c) i. SELECT * FROM projects WHERE ProjSize = 'Medium';
- ii. SELECT ProjSize FROM projects WHERE ProjName LIKE '%LITL';
- iii. SELECT ID,ProjName,ProjSize,Cost FROM projects ORDER BY startdate DESC;
- iv. SELECT count(*) FROM projects WHERE cost < 100000;

(1 Mark each for each correct query)

- v. 980000
- vi. Medium
- Large
- Small
- vii. 2
- viii. Large 2
- Medium 3
- Small 1

(½ Mark each for each correct output)

- 6 (a) CREATE TABLE Teams
 (TeamCode varchar(5) primary key,
 TeamName varchar(20),
 TeamLeader varchar(20),
 NoOfMembers Integer,
 Team_Symbol Char(1) Not NULL
);
- (½ Mark for CREATE TABLE Teams)**
(½ Mark for appropriately putting constraints)
(½ Mark for correct data types)
(½ Mark for correct syntax of the query)
- (b) (i) ComplID.
 (ii) In the 2nd row of Model table the value of ComplID is 4. This ComplID does not exist in the table Company.

(1 Mark each for each part)

- (c) (i) SELECT PatNo, PatName, DocName
 FROM patients, doctors
 WHERE Patients.DocID = Doctors.DocID;

(1 mark for correct use of SELECT and FROM)

(1 mark for correct use of WHERE clause)

- (ii) SELECT Patients.*
 FROM Patients, Doctors
 WHERE Patients.DocID = Doctors.DocID
 AND OPD_Days = 'MWF';

(1 mark for correct use of SELECT and FROM)

(1 mark for correct use of WHERE clause)

(iii)	<u>OPD -Days</u>	<u>count(*)</u>
	MWF	3
	TTS	2

(1 mark for each correct line of output)

- 7 (a) • Students can learn at their own pace.
• A lesson can be revised any number of times at students' convenience.
• Students can learn lessons at their homes at their convenient time.

(1 Mark for any one correct point)

- (b) 1. It should have pleasant color combination so that the user likes to use it.
2. It should have all the relevant options for all the required fields so that the user is at ease while entering the data.

(1 Mark each for any 2 correct points)

(c)	SNo	Control used to:	Control
	1	Enter Admission Number	Text Field
	2	Select Stream	List Box/Combo Box/Radio Button
	3	Select Subjects	Check Boxes
	4	Clear the Form	Button

(½ Mark each for each correct answer)

Candidates must write the Code on the title page of the answer-book.

Roll No.

--	--	--	--	--	--	--

- Please check that this question paper contains 8 printed pages.
- Code number given on the right hand side of the question paper should be written on the title page of the answer-book by the candidate.
- Please check that this question paper contains 7 questions.
- **Please write down the Serial Number of the question before attempting it.**
- 15 minutes time has been allotted to read this question paper. The question paper will be distributed at 10.15 a.m. From 10.15 a.m. to 10.30 a.m., the students will read the question paper only and will not write any answer on the answer-book during this period.

INFORMATICS PRACTICES

*Time allowed : 3 hours**Maximum Marks : 70***Note :**

- (i) **All questions are compulsory.**
 - (ii) **Answer the questions after carefully reading the text.**
1. (a) Raj Kamal International School is planning to connect all computers, each spread over distance within 45 meters. Suggest an economical cable type having high-speed data transfer, which can be used to connect these computers. 1
- (b) Name two Indian Scripts included in UNICODE. 1
- (c) Write examples of one Proprietary and one Open Source Software. 1

- (d) Name any two most popularly used internet browsers. 1
- (e) Ms. Rani Sen, General Manager of Global Nations Corporate recently discovered that the communication between her company's accounts office and HR office is extremely slow and signals drop quite frequently. These offices are 125 metres away from each other and connected by an ethernet cable. 2
- (i) Suggest her a device, which can be installed in between the offices for smooth communication.
 - (ii) What type of network is formed by having this kind of connectivity out of LAN, MAN and WAN ?
- (f) Give an advantage of using Star topology over Bus topology. Show a network layout of Star topology to connect 5 computers. 2
- (g) Give suitable example of URL and Domain name. 2
- 2.**
- (a) While making a Form in Netbeans, Mr. Harihar Jha wants to display a list of countries to allow the users to select their own country. Suggest him to choose most appropriate control out of ListBox and ComboBox. 1
 - (b) What is the purpose of break keyword while using Switch Case Statement ? Illustrate with the help of an example. 1
 - (c) Write the name of HTML tag used to include numbered list in a HTML Web Page. 1
 - (d) Write HTML code for the following :
To provide hyperlink to a website “<http://www.cbse.nic.in>” 1
 - (e) What will be the content of the jTextArea1 after executing the following code (Assuming that the jTextArea1 had no content before executing this code) ?

```
for (int C=1; C=4; C++)
{
    jTextArea1. setText(
        jTextArea1.getText() + " " +
        Integer.toString(C*C));
}
```

 2

- (f) Which of the following units measures the speed with which data can be transmitted from one node to another node of a network ? Also give the expansion of the suggested unit. 2
- (i) KMph
 - (ii) KMpl
 - (iii) Mbps
- (g) Write Java code that takes value for a number (n) in jTextField1 and cube ($n \times n \times n$) of it to be displayed in jTextField2. 2
3. (a) Write MySql command to open an existing database. 1
- (b) Ms. Mirana wants to remove the entire content of a table "BACKUP" alongwith its structure to release the storage space. What MySql statement should she use ? 1
- (c) Give one difference between ROLLBACK and COMMIT commands used in MySql. 1
- (d) A table STUDENT has 4 rows and 2 columns and another table TEACHER has 3 rows and 4 columns. How many rows and columns will be there if we obtain the Cartesian product of these two tables ? 1
- (e) Mr. Sanghi created two tables with CITY as Primary Key in Table1 and Foreign Key in Table2. While inserting a row in Table2, Mr. Sanghi is not able to enter a value in the column CITY. What could be the possible reason for it ? 2
- (f) Item code consisting of 5 digits is stored in an integer type variable intItemCode. Mr. Srikant wants to store this Item code in a String type variable called strItemCode. 2
 Write appropriate Java statement(s) to help her in performing the same.
- (g) Mr. Janak is using a table with following columns : 2
 Name, Class, Course_Id, Course_name
 He needs to display names of students, who have not been assigned any stream or have been assigned Course_name that ends with "economics".

He wrote the following command, which did not give the desired result.

```
SELECT Name, Class FROM Students  
WHERE Course_name = NULL OR Course_name = "%economics";  
Help Mr. Janak to run the query by removing the error and write  
the correct query.
```

4. (a) What message will be displayed after the execution of the following code ? 2

```
int Age=64, Relaxation=4;  
int ModiAge=Age-Relaxation;  
if (ModiAge<60)  
    JOptionPane.showMessageDialog(null, "NOT eligible");  
else  
    JOptionPane.showMessageDialog(null, "Eligible");
```

- (b) Rewrite the following program code using a If statement : 1

```
int C=jComboBox1.getSelectedIndex();  
switch(C)  
{  
    case 0 : Amount=Bill;break;  
    case 1 : Amount=0.9*Bill;break;  
    case 2 : Amount=0.8*Bill;break;  
    default : Amount=Bill;  
}
```

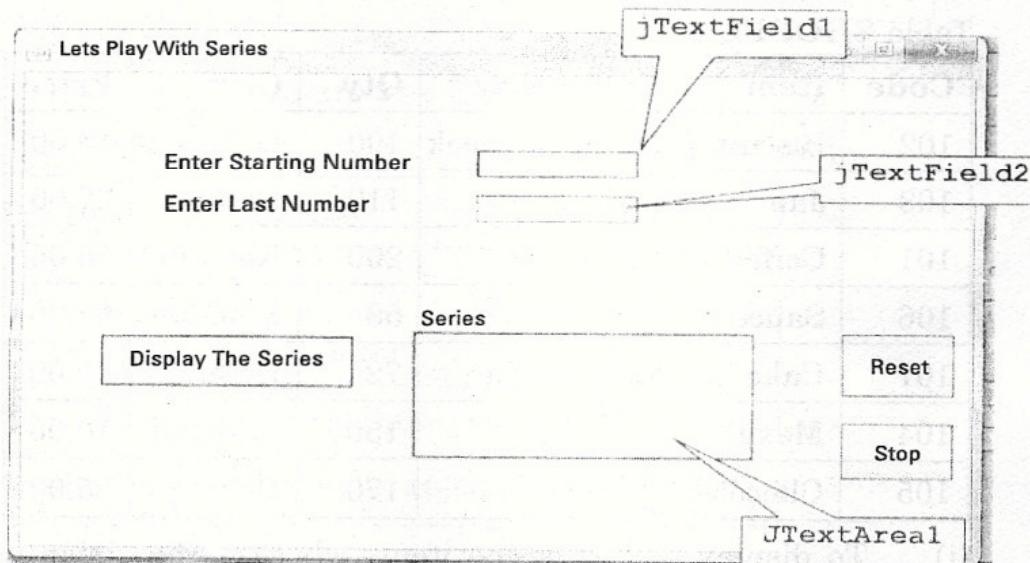
- (c) How many times does the following while loop get executed ? 1

```
int K=5;  
int L=36;  
while (K<=L)  
{  
    K+=6;  
}
```

- (d) What will be displayed in jTextArea1 after executing the following statement ? 1

```
jTextArea1.setText("GREAT\nCOUNTRY\tINDIA");
```

- (e) What will be the values of variables 'm' and 'n' after the execution of the following code ? 2
- ```
int P, Q=0;
for(P=1; P<=4; P++)
{
 Q+=P;
 Q--;
}
```
- (f) Given a string object named **Pay** having value as "68000" stored in it. Obtain the output of the following : 2
- ```
JOptionPane.showMessageDialog(null,
" "+Salary.length()+Integer.parseInt(Salary));
```
- (g) Janav Raj is a programmer at Path Educo Enterprises. He created the following GUI in NetBeans. Help him to write code for the following :



- (i) To display series of odd or even numbers (depending on Starting Number – jTextField1 is even or odd) in the jTextArea on the click of command button [Display The Series]. 2

For example :

If the Start Number is 5 and Last Number is 11
Text Area Content will be

5 7 9 11

If the Start Number is 2 and Last Number is 10

Text Area Content will be

2 4 6 8 10

- (ii) To clear both the text fields and text area, on clicking [Reset] button. 2
- (iii) To terminate the application on the click of [Stop] button. (Assume Suitable names for the various controls on the Form) 1
5. (a) What is the purpose of ORDER BY clause in MySql ? How is it different from GROUP BY clause ? 2
- (b) Table SCHOOL has 4 rows and 5 columns. What is the Cardinality and Degree of this table ? 1
- (c) Consider the Table SHOPPE given below. Write command in MySql for (i) to (iv) and output for (v) to (vii).

Table **SHOPPE** :

Code	Item	Company	Qty	City	Price
102	Biscuit	Hide & Seek	100	Delhi	10.00
103	Jam	Kissan	110	Kolkata	25.00
101	Coffee	Nestle	200	Kolkata	55.00
106	Sauce	Maggi	56	Mumbai	55.00
107	Cake	Britannia	72	Delhi	10.00
104	Maggi	Nestle	150	Mumbai	10.00
105	Chocolate	Cadbury	170	Delhi	25.00

- (i) To display names of the items whose name starts with 'C' in ascending order of Price. 1
- (ii) To display Code, Item name and City of the products whose quantity is less than 100. 1
- (iii) To count distinct Company from the table. 1
- (iv) To insert a new row in the table Shoppe
'110', 'Pizza', 'Papa Jones', 120, "Kolkata", 50.0 1
- (v) Select Item from Shoppe where Item
IN("Jam", "Coffee"); 1

(vi) Select Count(DISTINCT(City)) from Shoppe; 1

(vii) Select MIN(Qty) from Shoppe where
City="Mumbai"; 1

6. (a) Write MySQL command to create the Table STOCK including its Constraints. 2

Table **STOCK** :

Name of Column	Type	Size	Constraint
Id	Decimal	4	Primary Key
Name	Varchar	20	
Company	Varchar	20	
Price	Decimal	8	Not Null

- (b) In a Database there are two tables :

Table **ITEM** :

ICode	Iname	Price
101	Television	75000
202	Computer	42000
303	Refrigerator	90000
404	Washing Machine	27000

Table **BRAND** :

ICode	Brand
101	Sony
202	HP
303	LG
404	IFB

Write MySQL queries for the following :

- (i) To display ICode, IName and corresponding Brand of those Items, whose Price is between 20000 and 45000 (both values inclusive). 2
- (ii) To display ICode, Price and BName, of the item which has IName as "Television". 2
- (iii) To increase the price of all the Items by 15%. 2

(c) Given below is a Table Patient.

Name	P_No	Date_Admn	Doc_No
Vimla Jain	P0001	2011-10-11	D201
Ishita Kohli	P0012	2011-10-11	D506
Vijay Verma	P1002	2011-10-17	D201
Vijay Verma	P1567	2011-11-22	D233

- (i) Identify Primary key in the table given above. 1
- (ii) Write MySQL query to add a column Department with data type varchar and size 30 in the table Patient. 1

7. (a) What social impact does e-Governance have on society ? 1
- (b) Write two important features of e-Business. Give two most commonly used e-Business sites. 2
- (c) Mr. Anurag Das working as Manager in Vivian Enterprises wants to create a form in NetBeans to take various inputs from user. Choose appropriate controls from Label, TextBox, Radio Button, CheckBox, ListBox, ComboBox & Command Button and write them in the third column : 2

SNo	Control used to	Control
1.	Enter Name, Address and Salary	
2.	Select Gender (Male/Female)	
3.	Select Department from available List	
4.	Choose Hobby of Employee (Singing/Dancing/Skating/ Swimming)	

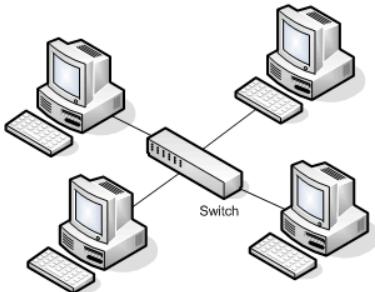
CBSE Board AISSCE 2012 Marking Scheme for Informatics Practices

Sub Code:065

Paper Code 90

Outside Delhi

1	(a)	Raj Kamal International School is planning to connect all computers, each spread over distance within 45 meters. Suggest an economical cable type having high speed data transfer, which can be used to connect these computers.	1
	Ans	UTP (unshielded Twisted Pair) OR Coaxial Cable OR STP (Shielded Pair Cable)	
		(1 mark for correct answer)	
	(b)	Name two Indian script included in UNICODE	1
	Ans	Devanagari, Telegu OR Any 2 Indian scripts	
		(1/2 mark for each correct answer)	
	(c)	Write examples of one Proprietary and One Open Source Software	1
	Ans	Proprietary: MS OFFICE Open Source: Open Office OR Any other correct answer for each type of software	
		(1/2 mark for each correct answer)	
	(d)	Name any 2 most popularly used Internet Browsers	
	Ans	Google Chrome Mozilla Firefox OR Any 2 Correct browser names	
		(1/2 mark for each correct answer)	
	(e)	Ms. Rani Sen, Gen. Manager of Global Nations Corporate recently discovered that the communication between her company's accounts office and HR Office is extremely slow and signals drop quite frequently. These offices are 125 metres away from each other and connected by an Ethernet cable.	1
	(i)	Sugest her a device, which can be installed in between the offices for smooth communication.	
	Ans	Repeater OR Switch Note: Router also to be accepted	
		(1 mark for answer)	
	(ii)	What type of network is formed by having this type of connectivity out of LAN, MAN and WAN?	
	Ans	LAN OR Local area Network	
		(1 mark for answer)	
	(f)	Give an advantage of using Star Topology over Bus Topology. Show a network layout of Star Topology to connect 5 Computers.	

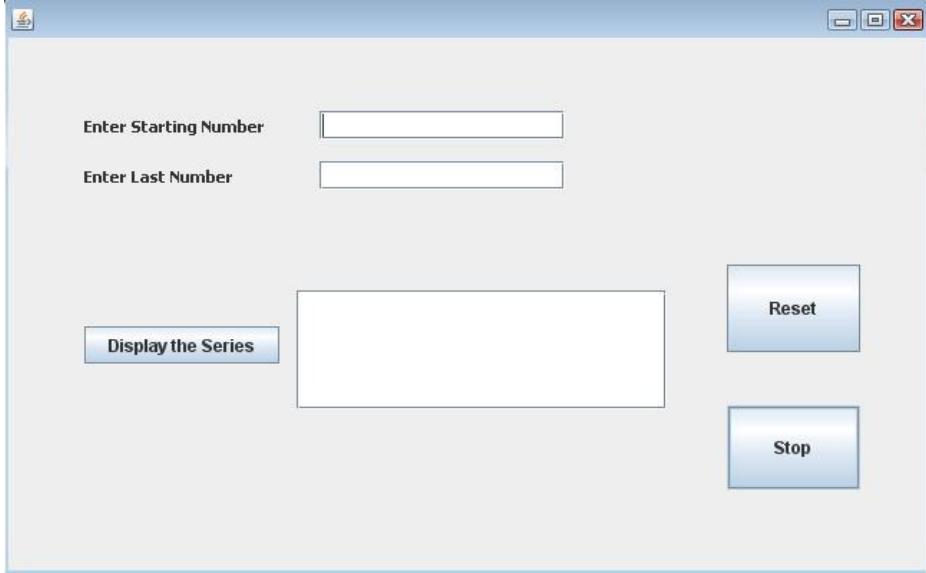
	Ans	 <p>Advantages More Efficient OR Faults can be diagnosed easily OR Any other advantage</p>	
		<p>(1 mark for advantage) (1 mark for any star topology layout)</p>	
	(g)	Give Suitable example of URL and Domain name	2
	Ans	URL : http://www.cbse.nic.in/welcome.htm Domain Name: www.cbse.nic.in OR Any other example of URL and Domain Name Note: 1. Answers where domain name is not a part of the URL also to be accepted 2. Absense of http:// may be ignored	
		<p>(1 mark for URL) (1 mark for Domain Name)</p>	
2	(a)	While making a form in NetBeans, Mr. Harihar Jha wants to Display a list of countries to allow the users to select their own country. Sugest him to choose most appropriate control out of ListBox and Combo Box.	1
	Ans	ListBox OR ComboBox	
		<p>(1 mark for any correct answer)</p>	
	(b)	What is the purpose of Break keyword while using switch Case Statement? Illustrate with the help of an example.	1
	Ans	Break stops the flow of logic within the switch statement and the statement immediately following the switch is executed. OR Break statement prevents “fall through” in the switch statement. Example: <pre>Switch(n) { case 10: System.out.println("Ten"); break; case 20: System.out.println("Twenty"); break; default: System.out.println("Not Ten or Twenty"); }</pre> OR Any other example of switch statement.	
		<p>(1/2 mark for purpose of break)(1/2 mark for correct switch statement example)</p>	

	(c)	Write the name HTML tag used to include numbered list in a HTML Web Page.	1
	Ans	 OR Mentioning ORDERED LIST Tag (1 mark for correct answer)	
	(d)	Write HTML code for the following: To provide hyperlink to a website http://www.cbse.nic.in	1
	Ans	 CLICK HERE TO GO CBSE SITE	
		(1 mark for correct HTML tag) OR (1 mark if any part of Q2 has been attempted correctly) OR (1 mark for attempting the question)	
	(e)	What will be the content of the jTextArea1 after executing the following code (Assuming that the jTextArea1 had no content before executing this code)? for (int =C=1; C=4; C++) { jTextArea1.setText(jTextArea1.getText() + " " + Integer.toString (C*C)); }	2
	Ans	Refer Note	
		Note: (2 marks to be awarded for any one of the following answers: 1. <i>Syntax Error</i> 2. <i>Program will not Compile</i> 3. <i>No output</i>) OR (2 marks to be awarded if operator is changed and any output is written)	
	(f)	Which of the following units measures the speed with which data can be Transmitted from one node to another node of a network? Also give the expansion of the suggested unit. (i) KMph (ii) KMpl (iii) Mbps	2
	Ans	Mega Bits per second (Note: Mega Bytes per second may also be accepted)	
		(1 mark for identifying unit of measure) (1 mark for expansion)	
	(g)	Write java code that takes value for a number (n) in jTextField1 and cube (n*n*n) of it to be displayed in jTextField2.	2
	Ans	double n=Double.parseDouble(jTextField1.getText()); double m=n*n*n; jTextField2.setText(" "+m); OR Any other equivalent code Note: n can be taken as int or float	
		(1 mark for getting the value from jTextField1) (1/2 mark for calculating cube) (1/2 mark for displaying in jTextField2) Note: Do not deduct marks for error in Formula	
3	(a)	Write MySQL command to open an existing database.	1
	Ans	USE (Any Database Name) OR	

		USE (1 mark for correct answer)	
	(b)	Ms. Mirana wants to remove the entire content of a table “BACKUP” alongwith its structure to release the storage place. What MySQL statement should she use?	1
	Ans	DROP TABLE BACKUP OR DROP TABLE	
		(1 mark for the answer) (1/2 mark for mentioning only DROP)	
	(c)	Give one difference between ROLLBACK and COMMIT commands used in MySQL.	1
	Ans	ROLLBACK aborts transaction and does not save any of the changes made to the database during the transaction. COMMIT statement saves all changes made during the transaction to the database. OR Any other equivalent answer/example	
		(1/2 mark for ROLLBACK) (1/2 mark for COMMIT)	
	(d)	A table STUDENTS has 4 rows and 2 columns and another table TEACHER has 3 rows and 4 columns. How many rows and columns will be there if we obtain the Cartesian product of these two tables?	1
	Ans	12 rows, 6 columns OR 12, 6 OR 12 6	
		(1/2 mark for rows) (1/2 mark for columns)	
	(e)	Mr. Sanghi created two tables with CITY as Primary Key in Table1 and Foreign key in table2. While inserting a row in table Table2, Mr. Sanghi is not able to enter a value in the column CITY. What could be the possible reason for it?	2
	Ans	Referential Integrity enforcement ensures that value must exist in referred table for successful insertion in the dependent table. OR Mentioning Primary Key - Foreign Key Relationship OR Any other answer that illustrates the Primary Key–Foreign Key relationship concept	
		(2 mark for correct answer)	
	(f)	Item code consisting of 5 digits is stored in an integer type variable intItemCode. Mr. Srikant wants to store this item code in a String type variable called strItemCode.	2
	Ans	String strItemCode=Integer.toString(intItemCode); OR Any other equivalent statement. NOTE: String object need to be declared.	
		(2 marks for correct answer) (1 mark if the variable names has been changed)	
	(g)	Mr. Janak is using a table with following columns: Name, Class, Course_Id, Course_name He needs to display names of students, who have not been assigned any stream or have been assigned Course_name that ends with ‘economics’ He wrote the following command, which did not give the desired result. SELECT Name, Class FROM Students WHERE Course_name=NULL OR Course_name= “%economics”; Help Mr. Janak to run the query by removing the error and write the correct query.	2
	Ans	SELECT Name, Class	

	<pre>FROM Students WHERE Course_name IS NULL</pre> <p>OR</p> <pre>SELECT Name, Class FROM Students WHERE Course_name LIKE "%economics";</pre>	
	<p>(2 marks for correct query)</p> <p>OR</p> <p>(1 mark for IS NULL)</p> <p>(1 mark for LIKE)</p> <p>OR</p> <p>(Award ½ mark if only errors are identified)</p>	
4	<p>(a) What message will be displayed after the executing of the following code?</p> <pre>Int Age=64, Relaxation=4; Int ModiAge=Age-Relaxation; If (ModiAge<60) JOptionPane.showMessagwDialog(Null, "NOT Eligible") else JOptionPane.showMessagwDialog(Null, "Eligible")</pre>	2
	<p>Ans Eligible</p> <p>OR</p> <p>Syntax Error</p> <p>OR</p> <p>Error</p> <p>OR</p> <p>No Output</p>	
	<p>(2 marks for any answer mentioned above)</p>	
	<p>(b) Rewrite the following program code using a If Statement:</p> <pre>Int C=jComboBox1.getSelectedIndex(); Switch (C) { case 0 : Amount=Bill;break; case 1 : Amount=0.9*Bill;break; case 2 : Amount=0.8*Bill;break; default : Amount=Bill; }</pre>	2
	<p>Ans</p> <pre>if(C==0) Amount=Bill; else if (C==1) Amount=0.9*Bill; else if (C==2) Amount=0.8*Bill; else Amount=Bill;</pre> <p>OR</p> <pre>if(C==0) Amount=Bill; if(C==1) Amount=0.9*Bill; if(C==2) Amount=0.8*Bill; if ((C>2) (C<0)) Amount=Bill;</pre>	
	<p>(1/2 mark for each statement)</p> <p>NOTE: Award 1 ½ mark if '=' is used instead of '=='</p>	
	<p>(c) How many times does the following while loop get executed?</p> <pre>int K=5; int L=36;</pre>	1

		<pre>while (K<=L) { K+=6; }</pre>	
	Ans	6 times OR 6	
		(1 mark for correct answer)	
	(d)	What will be displayed in jTextArea1 after executing the following statement? jTextArea1.setText ("GREAT\nCOUNTRY\tINDIA");	1
	Ans	GREAT COUNTRY INDIA OR Syntax Error OR Error OR No Output	
		(1 mark for correct answer) OR (1 mark for writing the output as GREAT COUNTRY INDIA) OR (1/2 mark for writing the output in one line as GREAT COUNTRY INDIA) OR (1/2 mark for writing the output as GREAT COUNTRY\tINDIA) OR (1/2 mark for writing the output in one line as GREAT\nCOUNTRY\tINDIA)	
	(e)	What will be the values of variables 'm' and 'n' after executing of the following code? Int P, Q=Q For (P=1;P<=4;P++) { Q+=P; Q--; }	2
	Ans	5 6 OR m = 5 n = 6 OR P = 5 Q = 6 OR 5 6 OR Variables not found OR No Output/values OR Error in question	
		(2 marks for correct output) OR (1 mark for mentioning only 1 value)	

	OR <i>(2 marks for attempting the question)</i>	
(f)	Given a string object named Pay having value as “68000” stored in it. Obtain the output of the following: JOptionPane.showMessageDialog ‘null, “ “+Salary.length () + Integer.parseInt(Salary));	2
Ans	568000 OR Variables Not Found OR No Output Note: award 1 ½ mark if length and pay value are stated separately i.e 5 && 68000 <i>(2 marks for any the answers mentioned above)</i> <i>(1 mark for writing only 5 in Output)</i>	
(g)	Janav Raj is programmer at Path Educo Enterprises. He created the following GUI in NetBeans. Help him to write code for the following: 	
(i)	To display series of od or even numbers (depending on Starting Number – jTextField1 is even or odd) in the jTextArea on the click of command button [Display the Series]. For example: If the start number is 5 and last number is 11 TextArea content will be 57911 If the start number is 2 and last number is 10 TextArea content will be 246810	2
Ans	<pre>int s = Integer.parseInt(jTextField1.getText().trim()); int e = Integer.parseInt(jTextField2.getText().trim()); while (s <= e) { jTextArea1.append(" " +s+ " "); s+=2; }</pre> <p>OR</p>	

		Any other equivalent code NOTE: Marks not to be deducted if Trim() method is not used																																																	
		(1 mark for correct Loop) (1 mark for transferring values from textboxes) (1 ½ mark if setText() is used in place of append()) (1 mark if any other output statement is used)																																																	
	(ii)	To clear both the text fields and text area, on clicking [reset button.]	2																																																
	Ans	jTextField1.setText(" "); jTextField2.setText(" "); jTextField3.setText(" "); Note: award 1 ½ mark if null is used instead of " "																																																	
		(1 mark for clearing any one textField) (1 mark for clearing textArea)																																																	
	(iii)	To terminate the application on the click [Stop] button. (assume suitable name for the various controls on the form)	1																																																
		System.exit(0); Or System.exit(); (1 mark for correct statement)																																																	
5	(a)	What is the purpose of ORDER BY clause in MySql? How is it different from GROUP BY clause?	2																																																
	Ans	ORDER BY clause sorts only the projection by the specified group attribute(s). GROUP BY clause groups tuples together based on the specified group attribute(s). OR Any other equivalent explanation only																																																	
		(1 mark for ORDER BY) (1 mark for GROUP BY)																																																	
	(b)	Table SCHOOL has 4 rows and 5 columns. What is the Cardinality and degree of this table?	1																																																
		Cardinality: 4 Degree: 5 OR 4 , 5 OR 4 5																																																	
		(½ marks for cardinality) (½ marks for degree)																																																	
	(c)	Consider the table SHOPPE given below. Write command in MySql for (i) to (iv) and output for (v) to (vii).																																																	
		<p style="text-align: center;">Table SHOPPE:</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Code</th> <th>Item</th> <th>company</th> <th>Qty</th> <th>City</th> <th>Price</th> </tr> </thead> <tbody> <tr> <td>102</td> <td>Biscuit</td> <td>Hide & Seek</td> <td>100</td> <td>Delhi</td> <td>10.00</td> </tr> <tr> <td>103</td> <td>Jam</td> <td>Kissan</td> <td>110</td> <td>Kolkata</td> <td>25.00</td> </tr> <tr> <td>101</td> <td>Coffee</td> <td>Nestle</td> <td>200</td> <td>Kolkata</td> <td>55.00</td> </tr> <tr> <td>106</td> <td>Sauce</td> <td>Maggi</td> <td>56</td> <td>Mumbai</td> <td>55.00</td> </tr> <tr> <td>107</td> <td>Cake</td> <td>Britannia</td> <td>72</td> <td>Delhi</td> <td>10.00</td> </tr> <tr> <td>104</td> <td>Maggi</td> <td>Nestle</td> <td>150</td> <td>Mumbai</td> <td>25.00</td> </tr> <tr> <td>105</td> <td>Chocolate</td> <td>Cadbury</td> <td>170</td> <td>Delhi</td> <td>25.00</td> </tr> </tbody> </table>	Code	Item	company	Qty	City	Price	102	Biscuit	Hide & Seek	100	Delhi	10.00	103	Jam	Kissan	110	Kolkata	25.00	101	Coffee	Nestle	200	Kolkata	55.00	106	Sauce	Maggi	56	Mumbai	55.00	107	Cake	Britannia	72	Delhi	10.00	104	Maggi	Nestle	150	Mumbai	25.00	105	Chocolate	Cadbury	170	Delhi	25.00	
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	(i)	To display names of the items whose name starts with 'C' in ascending order of price	1																																																
	Ans	SELECT ITEM FROM SHOPEE WHERE ITEM LIKE 'C%' ORDER BY PRICE ASC;																																																	

	NOTE: 1. Writing ASC keyword is optional 2. Accept orderby without space also i.e. ORDERBY	
	(1 mark for correct query) (½ mark for writing only LIKE clause) (½ mark for writing only ORDERBy clause) (½ mark for writing only ‘SELECT ITEM FROM SHOPEE’)	
(ii)	To display Code, Item name and City of the products whose quantity is less than 100.	1
Ans	SELECT code, Item, City FROM Shoppe WHERE Qty <100;	
	(1 mark for correct query) (½ mark for writing select query without the WHERE Clause)	
(iii)	To count distinct company from the table.	1
Ans	SELECT COUNT (DISTINCT COMPANY) FROM Shoppe;	
	(1 mark for correct query) (1/2 mark for writing select querry without DISTINCT)	
(iv)	To insert a new row in the table Shoppe ‘110’ , ‘pizza’ , ‘Papa Jones’ , 120 , “Kolkata” , 50.0	1
Ans	INSERT INTO SHOPPE VALUES (‘110’ , ‘pizza’ , ‘Papa Jones’ , 120 , “Kolkata” , 50.0); Note: 1. If columns are mentioned in the insert statement, it should be accepted. 2. No marks should be deducted for omission of quotes. 3. No marks should be deducted for writing VALUE keywords instead of VALUES.	
	(1 mark for correct query) (award ½ if TABLE Keyword is also mentioned in the query i.e. insert into the table shopee) (Award ½ mark for writing only INSERT Keyword)	
(v)	Select Item from Shoppe where Item IN (“Jam” , “Coffee”);	1
Ans	----- Item ----- Jam Coffee ----- Note: 1. If the values are written in one row and in any other order do not deduct marks. 2. No marks to be deducted for not mentioning column Title 3. Ignore case of output values.	
	(1 mark for correct output) (½ mark for each correct value)	
(vi)	Select Count (distinct (City) from shoppe;	1
Ans	Count (distinct(city)) ----- 3 ----- Note: No marks to be deducted for not mentioning column title.	
	(1 mark for correct output)	
(vii)	Select MIN (Qty) from Shoppe where City =”Mumbai”;	1
	MIN(Qty) -----	

		56																										
<hr/>																												
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6	(a)	Write MySQL command to create the Table STOCK including its Constraints. Table STOCK																										
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	Ans	CREATE TABLE Stock (Id DECIMAL(4) PRIMARY KEY, Name VARCHAR(20), Company VARCHAR(20), Price DECIMAL(8) NOT NULL); NOTE: Ignore absence of ',' after each column detail																										
		<i>(1/2 mark for Create Table Stock)</i> <i>(1/2 mark for column names with data types)</i> <i>(1/2 mark for each constraint)</i>																										
	(b)	In a database there are two tables: Table ITEM: <table border="1"> <thead> <tr> <th>ICode</th><th>Iname</th><th>Price</th></tr> </thead> <tbody> <tr> <td>101</td><td>Television</td><td>75000</td></tr> <tr> <td>202</td><td>Computer</td><td>42000</td></tr> <tr> <td>303</td><td>Refrigerator</td><td>90000</td></tr> <tr> <td>404</td><td>Washing Machine</td><td>27000</td></tr> </tbody> </table> Table BRAND: <table border="1"> <thead> <tr> <th>ICode</th><th>Brand</th></tr> </thead> <tbody> <tr> <td>101</td><td>Sony</td></tr> <tr> <td>202</td><td>HP</td></tr> <tr> <td>303</td><td>LG</td></tr> <tr> <td>404</td><td>IFB</td></tr> </tbody> </table>	ICode	Iname	Price	101	Television	75000	202	Computer	42000	303	Refrigerator	90000	404	Washing Machine	27000	ICode	Brand	101	Sony	202	HP	303	LG	404	IFB	
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	(i)	To Display ICode, IName and Corresponding Brand of those Items, whose price is between 20000 and 45000 (both values inclusive)	2																									
	Ans	SELECT Item.ICode, IName, Brand From Item, Brand WHERE Item.ICode=Brand.ICode AND Price BETWEEN 20000 AND 4500; OR SELECT Item.ICode, IName, Brand From Item, Brand WHERE Item.ICode=Brand.ICode AND Price >=20000 AND Price<=45000; Note; Use of Alias names for tables Optional																										
		<i>(2 marks for correct query)</i> <i>(1 mark for mentioning only the range condition)</i> <i>(1 mark for mentioning only equi join condition)</i>																										

		(1 mark if “AND” is mentioned in the FORM clause or SELECT clause)																					
	(ii)	To Display ICode, Price and BName of the item which has IName as “Television”	2																				
	Ans	<pre>SELECT ITEM.Icode, Price, Brand FROM Item, Brand WHERE ITEM.Icode=Brand.Icode AND IName='Television';</pre> <p>Note:</p> <ol style="list-style-type: none"> Accept any other column name instead of BName Award 2 marks for ‘Error in query’/‘Column not found’ is mentioned’ 																					
		<p>(2 marks for correct querry)</p> <p>(1 mark for mentioning only equi join condition)</p> <p>(1 mark for mentioning only the condition IName='Television')</p> <p>(1 mark if “AND” is mentioned in the FORM clause or SELECT clause)</p>																					
	(iii)	To increase the price of all items by 15%	2																				
	Ans	<pre>UPDATE Item SET Price = Price*1.15; OR UPDATE Item SET Price = Price + Price*.15; OR UPDATE Item SET Price = Price + Price*15/100; OR SELECT Price*1.15 FROM Item;</pre>																					
		<p>(2 marks for correct UPDATE/SELECT query)</p> <p>(1 ½ marks if keyword TABLE is mentioned in the UPDATE statement)</p> <p>(1 mark if only UPDATE keyword is used)</p> <p>(Award 1 mark if there is an error in UPDATE expression)</p>																					
	(c)	<p>Given below is a Table Patient</p> <table border="1"> <thead> <tr> <th>Name</th> <th>P_No</th> <th>Date_Admn</th> <th>Doc_No</th> </tr> </thead> <tbody> <tr> <td>Vimla Jain</td> <td>P0001</td> <td>2011-10-11</td> <td>D201</td> </tr> <tr> <td>Ishita Kohli</td> <td>P0012</td> <td>2011-10-11</td> <td>D506</td> </tr> <tr> <td>Vijay Verma</td> <td>P1002</td> <td>2011-10-17</td> <td>D201</td> </tr> <tr> <td>Vijay Verma</td> <td>P1567</td> <td>2011-11-22</td> <td>D233</td> </tr> </tbody> </table>	Name	P_No	Date_Admn	Doc_No	Vimla Jain	P0001	2011-10-11	D201	Ishita Kohli	P0012	2011-10-11	D506	Vijay Verma	P1002	2011-10-17	D201	Vijay Verma	P1567	2011-11-22	D233	
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	(i)	Identify Primary Key in the table given above	1																				
	Ans	P_No																					
		<p>(1 mark for correct querry)</p> <p>(1 mark if Patient Number is given as the answer)</p>																					
	(ii)	Write MySql querry to add a column Department with data type varchar and size 30 in the table Patient.	1																				
	Ans	<pre>ALTER TABLE Patient ADD Department Varchr(30);</pre> <p>Note: Column Keyword in ALTER TABLE is optional</p>																					
		<p>(1 mark for correct querry)</p> <p>(1/2 mrk for writing ALTER TABLE only)</p> <p>(1/2 mark if size is omitted</p> <p>(1/2 mark if type is CHAR)</p>																					
7	(a)	What Social impact does e-Governance have on society?	1																				
	Ans	<p>e-Governance ensures:</p> <p>Transparecy of governance</p> <p>OR</p> <p>Efficiency of governance</p> <p>OR</p> <p>Any other equivalent point bringing out social impact of e-governance</p>																					
		<p>(1 mark for writing any one impact)</p>																					
	(b)	Write two important features of e-Business. Give two most commonly used e-Business sites.	2																				

	Ans	<p>Features of e-Business:</p> <ul style="list-style-type: none"> (i) Helps reach customers effectively and speedily (ii) Helps customers to order online (iii) Helps in getting feedback from customers (iv) Helps Inter-Business transactions <p>Commonly used e-Business sites</p> <p>www.e-Bay.com www.amazon.com OR Any two features of e-Business and any two e-Business websites</p>																
		<p><i>(1/2 mark each for any two feature)</i> <i>(1/2 mark each for any two websites)</i></p>																
	(c)	<p>Mr. Anurag Das working as manager in Vivian Enterprises wants to create a form in NetBeans to take various inputs from user. Choose appropriate control from Label, TextBox, Radio Button, CheckBox, ListBox, ComboBox and Command button and write them in the Third column.</p> <table border="1"> <thead> <tr> <th>S.No.</th> <th>Control used to</th> <th>Control</th> </tr> </thead> <tbody> <tr> <td>1.</td> <td>Enter Name, Address and Salary</td> <td></td> </tr> <tr> <td>2.</td> <td>Select Gender (Male/Female)</td> <td></td> </tr> <tr> <td>3.</td> <td>Select Department from available list</td> <td></td> </tr> <tr> <td>4.</td> <td>Choose Hobby of employee (Singing/Dancing/Skating/ Swimming)</td> <td></td> </tr> </tbody> </table>	S.No.	Control used to	Control	1.	Enter Name, Address and Salary		2.	Select Gender (Male/Female)		3.	Select Department from available list		4.	Choose Hobby of employee (Singing/Dancing/Skating/ Swimming)		2
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		<i>(1/2 mark for each answer)</i>																

* * * * * **GOOD LUCK** * * * * *