

Biyani's Think Tank

Concept based notes

Information Practice

Class XII

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Preface

I am glad to present this book, especially designed to serve the needs of the students. The book has been written keeping in mind the general weakness in understanding the fundamental concepts of the topics. The book is self-explanatory and adopts the “Teach Yourself” style. It is based on question-answer pattern. The language of book is quite easy and understandable based on scientific approach.

Any further improvement in the contents of the book by making corrections, omission and inclusion is keen to be achieved based on suggestions from the readers for which the author shall be obliged.

I acknowledge special thanks to Mr. Rajeev Biyani, *Chairman* & Dr. Sanjay Biyani, *Director (Acad.)* Biyani Group of Colleges, who are the backbones and main concept provider and also have been constant source of motivation throughout this Endeavour. They played an active role in coordinating the various stages of this Endeavour and spearheaded the publishing work.

I look forward to receiving valuable suggestions from professors of various educational institutions, other faculty members and students for improvement of the quality of the book. The reader may feel free to send in their comments and suggestions to the under mentioned address.

Author

Chapter 1

Networking

Ques 1: What is topology? Or Definition of Topology

Ans: Topology is a method of which the other work stations are connected manually. The most popular topologies are the bus, ring and star topology. Network topology explains the way in which the nodes are connected between each other.

Ques 2: What are the different topologies of network?

Ans: The different topologies of network are:

- ❖ **Bus topology:** All devices are connected to a central cable, called the bus or backbone. Bus networks are relatively inexpensive and easy to install for small networks. Ethernet systems use a bus topology.
- ❖ **Ring topology :** All devices are connected to one another in the shape of a closed loop, so that each device is connected directly to two other devices, one on either side of it. Ring topologies are relatively expensive and difficult to install, but they offer high bandwidth and can span large distances.
- ❖ **Mesh Topology** Mesh Network is a network where all the nodes are connected to each other and is a complete network. In a Mesh Network every node is connected to other nodes on the network through hops. Some are connected through single hops and some may be connected with more than one hope.
- ❖ **Star topology:** All devices are connected to a central hub. Star networks are relatively easy to install and manage, but bottlenecks can occur because all data must pass through the hub.
- ❖ **Tree topology:** A tree topology combines characteristics of linear bus and star topologies. It consists of groups of star-configured workstations connected to a linear bus backbone cable.

Ques 3: What are the advantages and disadvantages of different network topologies?

Ans: The advantages and disadvantages of different network topologies

Bus Topology

Advantages of Bus Topology

It is easy to handle and implement.

It is best suited for small networks.

Disadvantages of Bus Topology

The cable length is limited. This limits the number of stations that can be connected.

This network topology can perform well only for a limited number of nodes.

Ring Topology

Advantage of Ring Topology

The data being transmitted between two nodes passes through all the intermediate nodes. A central server is not required for the management of this topology.

Disadvantages of Ring Topology

The failure of a single node of the network can cause the entire network to fail.

The movement or changes made to network nodes affects the performance of the entire network.

Mesh Topology

Advantage of Mesh Topology

The arrangement of the network nodes is such that it is possible to transmit data from one node to many other nodes at the same time.

Disadvantage of Mesh Topology

The arrangement wherein every network node is connected to every other node of the network, many of the connections serve no major purpose.

This leads to the redundancy of many of the network connections.

Star Topology

Advantages of Star Topology

Due to its centralized nature, the topology offers simplicity of operation.

It also achieves an isolation of each device in the network.

Disadvantage of Star Topology

The network operation depends on the functioning of the central hub. Hence, the failure of the central hub leads to the failure of the entire network.

Tree Topology

Advantages:

Central hub (repeater) increases the distance a signal can travel between devices.

Disadvantages:

More cabling is required in a tree than in other topologies (except mesh). Entire network collapse if central Hub fails.

Ques 4: What is the difference between wired and wireless transmission?

Ans: **Wired Transmission Media** uses a "cabling" system that guides the data signals along a specific path. The data signals are bound by the "cabling" system. Guided Media is also known as Bound Media. Cabling is meant in a generic sense in the previous sentences and is not meant to be interpreted as copper wire cabling only.

Wireless Transmission Media consists of a means for the data signals to travel but nothing to guide them along a specific path. The data signals are not bound to a cabling media and as such are often called Unbound Media.

Ques 5: What are the communication technologies used in network?

Ans: The communication technologies used in network are:

Twisted pair

Coaxial cable

Optical Fibre

Microwave

Radiowave

Infrared

Bluetooth

Ques 6: What is Twisted Pair?

Ans.

Twisted Pair : Twisted pair cable consists of a pair of insulated wires twisted together. It is a cable type used in telecommunication for very long time. Cable twisting helps to reduce noise pickup from outside sources and crosstalk on multi-pair cables.



The most commonly used form of twisted pair is unshielded twisted pair (UTP). It is just two insulated wires twisted together. any data communication cables and normal telephone cables are this type. Shielded twisted pair(STP) differs from UTP in that it has a foil jacket that helps prevent crosstalk and noise from outside source. In data communications there is a cable type called FTP (foil shielded pairs) which consists of four twisted pair inside one common shield (made of aluminium foil).

Ques 7: What is Coaxial Cable?

Ans.

Coaxial Cable : Coaxial cable is called "coaxial" because it includes one physical channel that carries the signal surrounded (after a layer of insulation) by another concentric physical channel, both running along the same axis. The outer channel serves as a ground. Many of these cables or pairs of coaxial tubes can be placed in a single outer sheathing and, with repeaters, can carry information for a great distance.

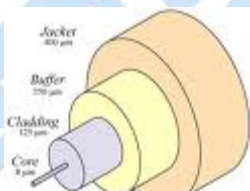


Coaxial cable is the kind of copper cable used by cable TV companies between the community antenna and user homes and businesses. Coaxial cable is sometimes used by telephone companies from their central office to the telephone poles near users. It is also widely installed for use in business and corporation Ethernet and other types of local area network.

Ques8: What is Optical Fibre?

Ans.

Optical Fibre : An **optical fiber** is made up of the core (carries the light pulses), the cladding (reflects the light pulses back into the core) and the buffer coating (protects the core and cladding from moisture, damage, etc.). Together, all of this creates a fiber optic which can carry up to 10 million messages at any time using light pulses.



Optical fibers are widely used in fiber-optic communications, which permits transmission over longer distances and at higher bandwidths (data rates) than other forms of communications. Fibers are used instead of metal wires because signals travel along them with less loss and are also immune to electromagnetic interference.

Ques 9: What is Microwaves?

Ans.

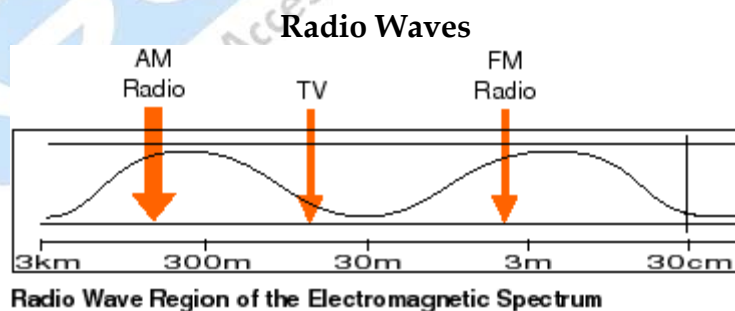
Microwave : Microwaves are electromagnetic waves with wavelengths ranging from as long as one meter to as short as one millimeter, or equivalently, with frequencies between 300 MHz (0.3 GHz) and 300 GHz.

An increasing rate of mobile customers, new IP-based services, and growing demands for greater coverage areas have created constant challenges for mobile operators. To effectively meet customer demands while protecting investments and delivering a rapid profit requires a flexible, cost-effective, and reliable core transport network. Microwave Networks offers a complete line of point-to-point microwave radios to help meet existing network demands while easing the transition to new 3G networks and beyond.

Ques10: What is Radiowaves?

Ans.

Radiowave : Radio waves have the longest wavelengths in the electromagnetic spectrum. These waves can be longer than a football field or as short as a football. Radio waves do more than just bring music to your radio. They also carry signals for your television and cellular phones.

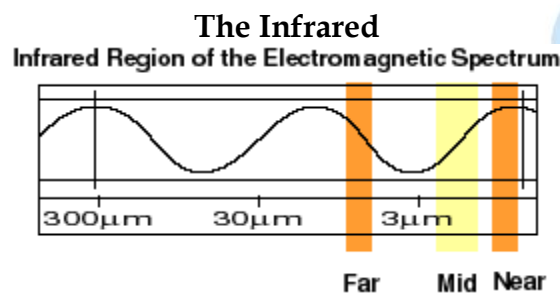


Cellular phones also use radio waves to transmit information. These waves are much smaller than TV and FM radio waves.

Ques11: What is Infrared?

Ans.

Infrared: Infrared light lies between the visible and microwave portions of the electromagnetic spectrum. Infrared light has a range of wavelengths, just like visible light has wavelengths that range from red light to violet. "Near infrared" light is closest in wavelength to visible light and "far infrared" is closer to the microwave region of the electromagnetic spectrum. The longer, far infrared wavelengths are about the size of a pin head and the shorter, near infrared ones are the size of cells, or are microscopic.



Satellites like GOES 6 and Landsat 7 look at the Earth. Special sensors, like those aboard the Landsat 7 satellite, record data about the amount of infrared light reflected or emitted from the Earth's surface.

Ques12: What is Bluetooth?

Ans.

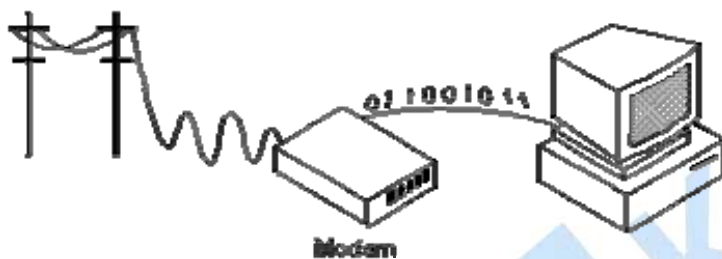
Bluetooth : Bluetooth is an open wireless technology standard for exchanging data over short distances (using short length radio waves) from fixed and mobile devices, creating personal area networks (PANs) with high levels of security.

Bluetooth uses a radio technology called frequency-hopping spread spectrum, which chops up the data being sent and transmits chunks of it on up to 79 bands of 1 MHz width in the range 2402-2480 MHz. This is in the globally unlicensed Industrial, Scientific and Medical (ISM) 2.4 GHz short-range radio frequency band.

Ques 13 . Name and describe some devices used in network.

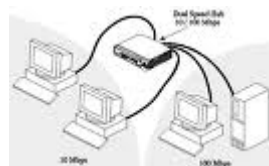
Ans :

Modem: A modem is a device or program that enables a computer to transmit data over, for example, telephone or cable lines. Computer information is stored digitally, whereas information transmitted over telephone lines is transmitted in the form of analog waves. A modem converts between these two forms.



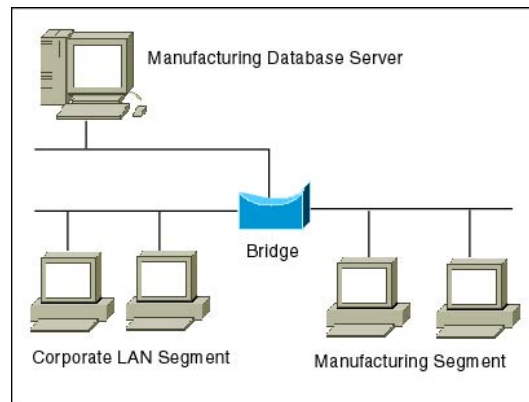
Hub: A common connection point for devices in a network. Hubs are commonly used to connect segments of a LAN. A hub contains multiple ports. When a packet arrives at one port, it is copied to the other ports so that all segments of the LAN can see all packets.

A *passive hub* serves simply as a conduit for the data, enabling it to go from one device (or segment) to another. So-called *intelligent hubs* include additional features that enables an administrator to monitor the traffic passing through the hub and to configure each port in the hub. Intelligent hubs are also called *manageable hubs*.



A third type of hub, called a *switching hub*, actually reads the destination address of each packet and then forwards the packet to the correct port.

Bridges : A **bridge** device filters data traffic at a network boundary. Bridges reduce the amount of traffic on a LAN by dividing it into two segments. For example, suppose that your network includes both 10BaseT Ethernet and



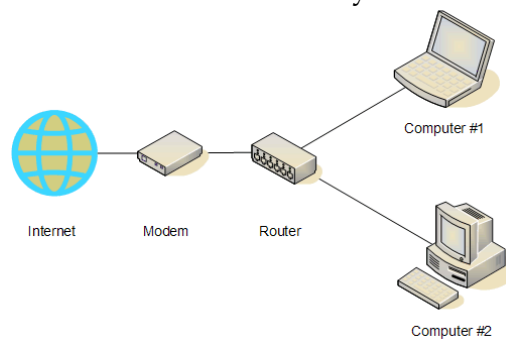
Local Talk connections. You can use a bridge to connect these two networks so that they can share information with each other.

In addition to connecting networks, bridges perform an additional, important function. They filter information so that network traffic intended for one portion of the network does not congest therest of the network.

Routers: Like bridges, routers connect two or more networks. However, routers are much more powerful than bridges. Routers can filter traffic so that only authorized personnel can enter restricted areas.

They can permit or deny network communications with a particular Web site. They can recommend the best route for information to travel. As network traffic changes during the day, routers can redirect information to take less congested routes.

If your school is connected to the Internet, then you will most likely use a router to make that connection. Routers ensure that your local area



network traffic

remains local, while passing onto the Internet all your electronic mail, Web surfing connections, and other requests for Internet resources.

Routers are generally expensive to purchase and difficult to configure and maintain

Repeater : Network **repeaters** regenerate incoming electrical, wireless or optical signals. With physical media like Ethernet or Wi-Fi, data transmissions can only span a limited distance before the quality of the signal degrades. Repeaters attempt to preserve signal integrity and extend the distance over which data can safely travel. Example : In satellite wireless, a repeater (more frequently called a transponder) receives uplink signals and retransmits them, often on different frequencies, to destination locations. And In a cellular telephone system, a repeater is one of a group of transceivers in a geographic area that collectively serve a system user.

Gateway :A **network gateway** is an *internetworking* system capable of joining together two networks that use different base protocols. A network gateway can be implemented completely in software, completely in hardware, or as a combination of both. Depending on the types of protocols they support, network gateways can operate at any level of the OSI model.

Because a network gateway, by definition, appears at the edge of a network, related capabilities like firewalls tend to be integrated with it. On home networks, a broadband router typically serves as the network gateway although ordinary computers can also be configured to perform equivalent functions.

Ethernet card : An **Ethernet card** is one kind of network adapter. These adapters support the Ethernet standard for high-speed network connections via cables. Ethernet cards are sometimes known as *network interface cards (NICs)*.A **network**

Interface card (NIC) is a hardware device that handles an interface to a computer network and allows a network-capable device to access that network.

Ques 14. What are the different types of addresses for a host in a network?

Ans: **The MAC address** : MAC ADDRESS is a unique value associated with a network adapter. MAC addresses are also known as **hardware** addresses or **physical** addresses. They uniquely identify a adapter on a LAN. MAC addresses are 12-digit hexadecimal numbers (48 bits in length). By convention,

MAC addresses are usually written in one of the following two formats:

MM:MM:MM:SS:SS:SS

MM-MM-MM-SS-SS-SS

The first half of a MAC address contains the ID number of the adapter manufacturer. These IDs are regulated by an Internet standards body (see sidebar). The second half of a MAC address represents the serial number assigned to the adapter by the manufacturer. In the example,

00:A0:C9:14:C8:29

The prefix 00A0C9 indicates the manufacturer is Intel Corporation.

IP Address (Internet Protocol): An IP address is a 32-bit number that identifies each sender or receiver of information that is sent in packets across the Internet. When you request an HTML page or send e-mail, the Internet Protocol part of TCP/IP includes your IP address in the message (actually, in each of the packets if more than one is required) and sends it to the IP address that is obtained by looking up the domain name in the Uniform Resource Locator you requested or in the e-mail address you're sending a note to. At the other end, the recipient can see the IP address of the Web page requestor or the e-mail sender and can respond by sending another message using the IP address it received.

Domain Name Server(DNS): A DNS server is any computer registered to join the Domain Name System. A DNS server runs special-purpose networking software, features a public IP address, and contains a database of network names and addresses for other Internet hosts.

The Domain Name System (DNS) is a standard technology for managing the names of Web sites and other Internet domains. DNS technology allows you to type names into your Web browser like *compnetworking.about.com* and your computer to automatically find that address on the Internet.

Ques 15: What do you mean by Domain Name Resolution?

Ans: Domain Name Resolution is the task of converting domain names to their corresponding IP address. This is all done behind the scenes and is rarely noticed by the user. When you enter a domain name in an application that uses the Internet, the application will issue a command to have the operating system convert the domain name into its IP address, and then connect to that IP address to perform whatever operation it is trying to do.

The way the operating system resolves the domain name is based upon its configuration. For almost all operating systems the default order for Domain Name resolution is as follows:

1. **Hosts File** - There is a file called the HOSTS file that you can use to convert domain names to IP addresses. Entries in the HOSTS file override any mappings that would be resolved via a DNS server.
2. **Domain Name System** - This is the system used on the Internet for converting domain names to their corresponding IP addresses. Your operating system will connect to the DNS server configured on your computer and have that server return to you the IP address for the domain name you queried it with.
3. **Netbios** - This only applies to Windows machines and will only be used to map names to IP addresses if all previous methods failed. This method will attempt to map the netbios name you are trying to connect to with an IP address.

Ques 16: How do you secure your computer system?

Or

Define

- a) **DOS(Denial of Service)**
- b) **Intrusion detection system**
- c) **Snooping**

Ans:a) DOS(Denial of Service) : A denial of service (DoS) attack is an incident in which a user or organization is deprived of the services of a resource they would normally expect to have. In a distributed denial-of-service, large numbers of compromised systems attack a single target.

"denial-of-service" attack is characterized by an explicit attempt by attackers to prevent legitimate users of a service from using that service. Attacks can be directed at any network device, including attacks on routing devices and web, electronic mail, or Domain Name System servers.

A DoS attack can be perpetrated in a number of ways. The five basic types of attack are:

1. Consumption of computational resources, such as bandwidth, disk space, or processor time
2. Disruption of configuration information, such as routing information.
3. Disruption of state information, such as unsolicited resetting of TCP sessions.
4. Disruption of physical network components.
5. Obstructing the communication media between the intended users and the victim so that they can no longer communicate adequately.

b) **Intrusion detection system** : Intrusion detection (ID) is a type of security management system for computers and networks. An ID system gathers and analyzes information from various areas within a computer or a network to identify possible security breaches, which include both intrusions (attacks from outside the organization) and misuse (attacks from within the organization). ID uses *vulnerability assessment* (sometimes referred to as *scanning*), which is a technology developed to assess the security of a computer system or network.

Intrusion detection functions include:

- Monitoring and analyzing both user and system activities
- Analyzing system configurations and vulnerabilities
- Assessing system and file integrity
- Ability to recognize patterns typical of attacks
- Analysis of abnormal activity patterns
- Tracking user policy violations

c) **Snooping** : Snooping, in a security context, is unauthorized access to another person's or company's data. The practice is similar to eavesdropping but is not necessarily limited to gaining access to data during its transmission. Snooping can include casual observance of an e-mail that appears on another's computer screen or watching what someone else is typing. More sophisticated snooping uses software programs to remotely monitor activity on a computer or network device.

Malicious hackers (crackers) frequently use snooping techniques and equipment such as key loggers to monitor keystrokes, capture passwords and login information, and to intercept e-mail and other private communications and data transmissions. Corporations sometimes snoop

on employees legitimately to monitor their use of business computers and track Internet usage; governments may snoop on individuals to collect information and avert crime and terrorism.

Chapter 2

Open Source Technology

Ques 1: What is GNU Operating System?

Ans : GNU is an operating system that offers a set of free open source programs licensed under UNIX. It has many applications and tools that are also provided with the operating system. This allows users online to share all kinds of files with the intention of upgrading and changing the programs by other networked software developers.

However, being an open source program does not mean that the program is free of charge but is free to modify and publish again.

Ques2: What is an OSI?

Ans: Open source is a development method for software that harnesses the power of distributed peer review and transparency of process. The promise of open source is better quality, higher reliability, more flexibility, lower cost, and an end to predatory vendor lock-in.

The Open Source Initiative (OSI) is a non-profit corporation formed to educate about and advocate for the benefits of open source and to build bridges among different constituencies in the open-source community.

Ques3: What do you mean by the term "Open Source"?

Ans: The *Open Source Definition* is a bill of rights for the computer user. It defines certain rights that a software license must grant you to be certified as *Open Source*.

Those same programmers feel comfortable contributing to Open Source because they are assured of these rights:

- The right to make copies of the program, and distribute those copies.
- The right to have access to the software's source code, a necessary preliminary before you can change it.
- The right to make improvements to the program.

Ques4: What is Freeware?

Ans:

Freeware is software developed created by volunteers, and distributed for free. Most of the time, freeware is developed by a single programmer. Freeware email clients include Mozilla Mail, Mozilla Thunderbird, Opera Mail (Opera M2), Outlook Express, Apple Mail. (Although the only way to get Outlook Express Windows or Apple Mail is to purchase Microsoft Windows or Mac OS X)

Freeware is software offered free of charge, downloadable off of the Internet. If the software requires the user to view ads while using the program, it is technically not freeware but adware. Freeware is also different from shareware in that shareware requires a payment if the software is to be used past a trial date.

Ques5: What is Linux?

Ans:

Linux is a Unix-like operating system that was designed to provide Personal computer users a free or very low-cost operating system comparable to traditional and usually more expensive Unix systems. Linux has a reputation as a very efficient and fast-performing system. Linux's kernel (the central part of the operating system) was developed by Linus Torvalds at the University of Helsinki in Finland. To complete the operating system, Torvalds and other team members made use of system components developed by members of the Free Software Foundation for the GNU Project.

Ques6: What is Mozilla web browser?

Ans:

A web browser is a software application for viewing webpages. Microsoft Internet Explorer, Mozilla FireFox, Opera, and Apple Safari are the most common web browsers.

Mozilla Firefox is a free and open source web browser descended from the Mozilla Application Suite and managed by Mozilla Corporation. A Net Applications statistic put Firefox at 24.41% of the recorded usage share of web browsers as of January 2010, making it the second most popular browser in terms of current use worldwide after Microsoft's Internet Explorer, and the most used browser independent of any one operating system. Other sources

put Firefox's usage share at between 21% and 32% and generally trending upward.

Ques7. What is Apache Server?

Ans:

1. The Apache http server
 - is a powerful, flexible, HTTP/1.1 compliant web server
 - implements the latest protocols, including HTTP/1.1 (RFC2616)
 - is highly configurable and extensible with third-party modules
 - can be customized by writing 'modules' using the Apache module API
 - provides full source code and comes with an unrestrictive license
 - runs on Windows NT/9x, Netware 5.x and above, OS/2, and most versions of Unix, as well as several other operating systems
 - is actively being developed
 - encourages user feedback through new ideas, bug reports and patches
 - implements many frequently requested features, including:
 1. DBM databases for authentication
 2. Customized responses to errors and problems
 3. Multiple Directory Index directives
 4. Unlimited flexible URL rewriting and aliasing
 5. Content negotiation
 6. Virtual Hosts
 7. Configurable Reliable Piped Logs

Ques8. What is Postgres?

Ans:

This is regarded as one of the most successful open source database in the world. This is also used to create advanced applications. This relies on Object relational database management system. Familiarity with UNIX and Linux can be an added advantage while using Postgre

These are the following features which are present in PostgreSQL they are

- 1) Object relational database
- 2) Extensibility and support for SQL
- 3) Database validation and flexible API
- 4) Procedural languages and MVCC
- 5) Client server and WAL.

Ques9. What is MySQL?

Ans:

MySQL is a relational database management system (RDBMS) based on SQL (Structured Query Language). First released in January, 1998.

MySQL as an alternative to the proprietary database systems from Oracle, IBM, and Informix. MySQL is currently available under two different licensing agreements: free of charge, under the GNU General Public License (GPL) open source system or through subscription to MySQL Network for business applications.

MySQL is used in a wide range of applications, including data warehousing, e-commerce, Web databases, logging applications and distributed applications.

Ques10. What is Pango?

Ans: *Pan* is a Greek word meaning "all" and *go* is a Japanese word meaning "languages." Indeed, that is what Pango hopes to support -- all languages. Pango is open source software that seeks to create a software framework so that international text characters can be electronically rendered. Though most of those who speak English may not realize it, many languages are not represented or are underrepresented on the Internet and in other software applications. Mostly, that is due to software applications not supporting characters in those languages.

Ques11. What is Open office Tomact?

Ans: Tomcat is a Java Servlet container and web server from Jakarta project of Apache software foundation. A web server sends web pages as response to the requests sent by the browser client. In addition to the static web pages, dynamic web pages are also sent to the web browsers by the web server. Tomcat is sophisticated in this respect, as it provides both Servlet and JSP technologies. Tomcat provides a good choice as a web server for many web applications and also a free Servlet and JSP engine. Tomcat can be used standalone as well as behind other web servers such as Apache httpd.

Ques12. What is PHP?

Ans :

PHP stands for PHP: Hypertext Preprocessor, with that PHP standing for Personal HomePage [Tools]. This type of acronym is known as a retronym. Originally, in 1994, the language was designed as a small set of binaries used to collect some basic site traffic data. In 1997 the parser was rewritten by two Israelis and the name was changed to the current acronym – it being determined that hypertext preprocessor was a decidedly more acceptable name in the business world.

The PHP allows web developers to create dynamic content that interacts with databases. PHP is basically used for developing web based software applications.

PHP is a server-side scripting language for creating dynamic Web pages. You create pages with PHP and HTML. PHP is Open Source and cross-platform.

Ques13. What is Python?

Ans : Python is an interpreted, interactive, object-oriented programming language". Python, although similar in some ways to Perl and Java, is its own creature. Python is great for both shell and web scripting and is making it's way into every facet of computing from Google to video games.

Python is a programming language that is freely available and that makes solving a computer problem almost as easy as writing out one's thoughts about the solution. It can be written once and run on almost any computer without needing to change the program.

Ques14.What is proprietary software?Explain with examples.

Ans: Many of the systems and applications programs used today are proprietary software

This means that someone owns the rights to the program, and the owner expects users to buy their own copies. Microsoft Office is a typical example. If you want to acquire this software to write letters or produce graphics, you must purchase a registered copy in a store, through a mail order house, or over the internet. In buying the software, you pay not to own it, but to acquire a license that makes you an authorized user.

Organizations such as businesses and schools, which may need software for use by several people, generally acquire site licenses that allow access

by multiple users.

If you buy a copy of Microsoft Office for your own use, you cannot legally make copies of it for your friends, nor can you reproduce parts of the packages 's code to build your own suite program. You cannot even rent or lease the software to others. You have bought only the right to operate the software yourself and for its intended use creating documents. Parts of the price that you pay for the program becomes profit for the software publisher Microsoft Cooperation for its effort in bringing the product to the marketplace.

Ques15. What is W3C?

Ans: In 1994, five years after inventing the World Wide Web, Tim Berners-Lee founded the World Wide Web Consortium (W3C) at the Massachusetts Institute of Technology (MIT).

The mission of W3C is "To lead the World Wide Web to its full potential by developing protocols and guidelines that ensure long-term growth for the Web." Though W3C has its detractors, most agree that the W3C today enjoys the respect and support of a wide range of key industries, organizations and individuals. In the early days however, support for W3C was very guarded or not forthcoming at all.

The W3C is an industry consortium which seeks to promote standards for the evolution of the Web and interoperability between WWW products by producing specifications and reference software. Although W3C is funded by industrial members, it is vendor-neutral, and its products are freely available to all.

Ques16. What is FSF?

Ans: "The free software foundation is dedicated to eliminating restrictions on peoples' right to use, copy, modify, and redistribute computer programs" A nonprofit organisation, based in Massachusetts, that is devoted to the ideal of the free sharing of useful software for noncommercial purposes. To promote this goal, FSF supports a UNIX compatible operating system (called GNU) and system utilities, which are freely redistributable under FSF' GPL (General Public License). The major project of FSF is the GNU.

Ques17. What is Apache Tomcat?

Ans: Apache Tomcat is an open source software implementation of the Java Servlet and JavaServer Pages technologies. The Java Servlet and JavaServer Pages specifications are developed under the Java Community Process.

Apache Tomcat is developed in an open and participatory environment and released under the Apache License version 2. Apache Tomcat is intended to be a collaboration of the best-of-breed developers from around the world. We invite you to participate in this open development project. To learn more about getting involved, click here.

Apache Tomcat powers numerous large-scale, mission-critical web applications across a diverse range of industries and organizations.

Ques18. What is the basic difference between Unicode and ISCII code?

Ans:

Unicode uses a 16 bit encoding that provides code point for more than 65000 characters (65536). Unicode Standards assigns each character a unique numeric value and name. Unicode standard provides the capacity to encode all of the characters used for the written languages of the world.

ISCII uses 8 bit code which is an extension of the 7 bit ASCII code containing the basic alphabet required for the 10 Indian scripts which have originated from the Brahmi script. There are 15 officially recognized languages in India. Apart from Perso-Arabic scripts, all the other 10 scripts used for Indian languages have evolved from the ancient Brahmi script and have a common phonetic structure, making a common character set possible. The ISCII Code table is a super set of all the characters required in the Brahmi based Indian scripts. For convenience, the alphabet of the official script Devnagari has been used in the standard.

Ques19. What is Freeware?

Ans. Freeware is software offered free of charge, downloadable off of the Internet. If the software requires the user to view ads while using the program, it is technically not freeware but adware. Freeware is also different from shareware in that shareware requires a payment if the software is to be used past a trial date.

Though freeware does not require financial compensation, it does have a user license or EULA (End User License Agreement). Each license is specific to the freeware it is bundled with, but some restrictions are common to most programs. For example, most freeware forbids the user to alter the program, repackage it, or sell it. It might allow redistribution, however, as long as the program is unchanged and the license agreement intact.

Ques20: What is Linux?

Ans: Linux is a Unix-like operating system that was designed to provide personal computer users a free or very low-cost operating system comparable to traditional and usually more expensive Unix systems. Linux has a reputation as a very efficient and fast-performing system. Linux's kernel (the central part of the operating system) was developed by Linus Torvalds at the University of Helsinki in Finland. To complete the operating system, Torvalds and other team members made use of system components developed by members of the Free Software Foundation for the GNU Project.

Ques21

What do the terms 'internationalization' and 'localization' mean, and how are they related?

Ans: **Localization** refers to the **adaptation** of a product, application or document content to meet the language, cultural and other requirements of a specific target market (a "locale").

Localization is sometimes written as "l10n", where 10 is the number of letters between 'l' and 'n'.

Often thought of only as a synonym for translation of the user interface and documentation, localization is often a substantially more complex issue. It can entail customization related to:

1. Numeric, date and time formats
2. Use of currency
3. Keyboard usage
4. Collation and sorting
5. Symbols, icons and colors
6. Text and graphics containing references to objects, actions or ideas which, in a given culture, may be subject to misinterpretation or viewed as insensitive.
7. Varying legal requirements
8. and many more things.

Localization may even necessitate a comprehensive rethinking of logic, visual design, or presentation if the way of doing business (eg., accounting) or the accepted paradigm for learning (eg., focus on individual vs. group) in a given locale differs substantially from the originating culture.

Internationalization

Definitions of internationalization vary. This is a high-level working definition for use with W3C Internationalization Activity material. Some people use other terms, such as 'globalization' to refer to the same concept.

Internationalization is the design and development of a product, application or document content that **enables** easy localization for target audiences that vary in culture, region, or language.

Internationalization is often written "i18n", where 18 is the number of letters between 'i' and 'n' in the English word.

Internationalization typically entails:

1. Designing and developing in a way that removes barriers to localization or international deployment. This includes such things as enabling the use of Unicode, or ensuring the proper handling of legacy character encodings where appropriate, taking care over the concatenation of strings, avoiding dependance in code of user-interface string values, etc.
2. Providing support for features that may not be used until localization occurs. For example, adding markup in your DTD to support bidirectional text, or for identifying language. Or adding to CSS support for vertical text or other non-Latin typographic features.
3. Enabling code to support local, regional, language, or culturally related preferences. Typically this involves incorporating predefined localization data and features derived from existing libraries or user preferences. Examples include date and time

formats, local calendars, number formats and numeral systems, sorting and presentation of lists, handling of personal names and forms of address, etc.

4. Separating localizable elements from source code or content, such that localized alternatives can be loaded or selected based on the user's international preferences as needed.

Ques.22 : Describe in brief about websites that supports Open Source software.

Ans:

1. **www.sourceforge.net** : SourceForge.net is the world's largest open source software development web site. We provide free services that help people build cool stuff and share it with a global audience.

As of February, 2009, more than 230,000 software projects have been registered to use our services by more than 2 million registered users, making SourceForge.net the largest collection of open source tools and applications on the net. SourceForge.net is owned and operated by Geeknet, Inc., a publicly traded US-based company.

2. **www.openRDF.org** : The openRDF.org site is a community site that is the center for all Sesame-related development. Here, developers and users can meet and discuss, ask questions and submit problem reports. The latest news about Sesame will be posted here. Sesame is an open source RDF framework with support for RDF Schema inferencing and querying. Originally, it was developed by Aduna (then known as Administrator) as a research prototype for the EU research project On-To-Knowledge. Now, it is further developed and maintained by Aduna in cooperation with NLnet Foundation, developers from Ontotext, and a number of volunteer developers who contribute ideas, bug reports and fixes.

Sesame has been designed with flexibility in mind. It can be deployed on top of a variety of storage systems (relational databases, in-memory, filesystems, keyword indexers, etc.), and offers a large scala of tools to developers to leverage the power of RDF and RDF Schema, such as a flexible access API, which supports both local and remote (through HTTP or RMI) access, and several query languages, of which SeRQL is the most powerful one.

3. **www.linux.org** : Linux is a free Unix-type operating system originally created by Linus Torvalds with the assistance of developers around the world. Developed under the GNU General Public License , the source code for Linux is freely available to everyone. Click on the link below to find out more about the operating system that is causing a revolution in the world of computers.

4. **www.gnu.org** : GNU was launched in 1984 to develop a complete Unix-like operating system which is free software— software which respects your freedom. Unix-like operating systems are built from a collection of libraries, applications and developer tools – plus a program to allocate resources and talk to the hardware, known as a kernel.

Hurd, GNU's kernel is actively developed, but is still some way from being ready for daily use, so GNU is often used with a kernel called Linux. The combination of GNU and Linux is the **GNU/Linux operating system**, now used by millions and sometimes incorrectly called simply 'Linux'

Chapter 3

Java Programming

Q.1 Define Netbeans JAVA IDE environment.

Ans: Using an Integrated Development Environment (IDE) for developing applications saves you time by managing windows, settings, and data. In addition, an IDE can store repetitive tasks through macros and abbreviations. Drag-and-drop features make creating graphical user interface (GUI) components or accessing databases easy, and highlighted code and debugging features alert you to errors in your code.

The netbeans IDE is open source and is written in the Java programming language. It provides the services common to creating desktop applications -- such as window and menu management, settings storage -- and is also the first IDE to fully support JDK 6.0 features. The netbeans platform and IDE are free for commercial and noncommercial use, and they are supported by Sun Microsystems.

Q 2 Define GUI , with JAVA GUI toolkit OR Define Swing in JAVA.

Ans: GUI stand for Graphical User Interface, in GUI application windows , buttons, dialogs, menus and everything visual in a modern application. It also involves properties of its components, actions and events.

Swing is the "built-in" GUI component technology of the Java platform. Swing is the successor to the AWT technology that was provided with the early releases of the Java platform.? In one sense, Swing replaces AWT.

To create a Java program with a graphical user interface (GUI), you'll want to learn about Swing. The Swing toolkit includes a rich set of components for building guis and adding interactivity to Java applications. Swing includes all the components you would expect from a modern toolkit: table controls, list controls, tree controls, buttons, and labels.

Swing is part of the Java Foundation Classes (JFC). The JFC also include other features important to a GUI program, such as the ability to add rich graphics functionality and the ability to create a program that can work in different languages and by users with different input devices.

Q.3 Define Data types in JAVA.

Ans: There are 8 *primitive data types*. he 8 primitive data types are numeric types. The names of the eight primitive data types are:

- int, long, float, double, char, Boolean.

There are both *integer* and *floating point* primitive types. Integer types have no fractional part; floating point types have a fractional part. On paper, integers have no decimal point, and floating point types do. But in main memory, there are no decimal points: even floating point values are represented with bit patterns. There is a fundamental difference between the method used to represent integers and the method used to represent floating point numbers.

Integer Primitive Data Types

Type	Size	Range
<i>byte</i>	8 bits	-128 to +127
<i>short</i>	16 bits	-32,768 to +32,767
<i>int</i>	32 bits	(about)-2 billion to +2 billion
<i>long</i>	64 bits	(about)-10E18 to +10E18

Floating Point Primitive Data Types

Type	Size	Range
float	32 bits	-3.4E+38 to +3.4E+38
double	64 bits	-1.7E+308 to 1.7E+308

Examples

```
int yr = 2006;  
double rats = 8912 ;
```

For each primitive type, there is a corresponding *wrapper class*. A wrapper class can be used to convert a primitive data value into an object, and some type of objects into primitive data. The table shows primitive types and their wrapper classes:

Q. 4 Define Object Oriented Language with Class and Methods.
Or Difference Between Procedural Programming language and OOP language.

Ans: Procedural programming you try to make the real world problem you're attempting to solve fit a few, predetermined data types: integers, floats, Strings, and arrays perhaps. In object oriented programming you create a model for a real world system. Classes are programmer-defined types that model the parts of the system.

A *class* is a programmer defined type that serves as a blueprint for instances of the class. You can still have ints, floats, Strings, and arrays; but you can also have cars, motorcycles, people, buildings, clouds, dogs, angles, students, courses, bank accounts, and any other type that's important to your problem.

Classes specify the data and behavior possessed both by themselves and by the objects built from them. A class has two parts: the fields and the methods. Fields describe what the class is. Methods describe what the class does.

Q. 5 Define Java Basics.

- 1. Java statements and expressions**
- 2. Variables and data types**
- 3. Comments**
- 4. Literals**
- 5. Arithmetic**
- 6. Comparisons**
- 7. Logical operators**

Ans:

1. Java statements and expressions

1. A statement is the simplest thing you can do in Java; a statement forms a single Java operation.

Examples : `int i = 1;`

Statements sometimes return values – for example, when you add two numbers together or test to see whether one value is equal to another. The most important thing to remember about Java statements is that each one ends with a semicolon. Forget the semicolon and your Java program won't compile.

Java also has compound statements, or blocks, which can be placed wherever a single statement can. Block statements are surrounded by braces ({}).

2. Variables and data types

Variables are locations in memory in which values can be stored. They have a name, a type, and a value. Before you can use a variable, you have to declare it. After it is declared, you can then assign values to it.

Java actually has three kinds of variables: instance variables, class variables, and local variables.

1. Instance variables, are used to define attributes or the state for a particular object.
2. Class variables are similar to instance variables, except their values apply to all that class's instances (and to the class itself) rather than having different values for each object.
3. Local variables are declared and used inside method definitions, for example, for index counters in loops, as temporary variables, or to hold values that you need only inside the method definition itself. Unlike other languages, Java does not have global variables – that is, variables that are global to all parts of a program.

Declaring Variables

To use any variable in a Java program, you must first declare it. Variable declarations consist of a type and a variable name:

```
int myAge;  
String myName;  
boolean isTired;
```

Variable definitions can go anywhere in a method definition (that is, anywhere a regular Java statement can go), although they are most commonly declared at the beginning of the definition before they are used:

```
public static void main (String args[]) {  
    int count;  
    String title;  
    boolean isAsleep;  
    ...  
}
```

You can string together variable names with the same type:

```
int x, y, z;  
String firstName, LastName;
```

You can also give each variable an initial value when you declare it:

```
int myAge, mySize, numShoes = 28;  
String myName = "Laura";  
boolean isTired = true;  
int a = 4, b = 5, c = 6;
```

If there are multiple variables on the same line with only one initializer (as in the first of the previous examples), the initial value applies to only the last variable in a declaration. You can also group individual variables and initializers on the same line using commas, as with the last example, above.

Variable Names

Variable names in Java can start with a letter, an underscore (`_`), or a dollar sign (`$`). They cannot start with a number. After the first character, your variable names can include any letter or number. Symbols, such as `%`, `*`, `@`, and so on, are often reserved for operators in Java, so be careful when using symbols in variable names.

In addition, the Java language uses the Unicode character set. Unicode is a character set definition that not only offers characters in the standard ASCII character set, but also several million other characters for representing most international alphabets.

Variable Types

In addition to the variable name, each variable declaration must have a type, which defines what values that variable can hold. The variable type can be one of three things:

1. One of the eight basic primitive data types
2. The name of a class
3. An array

The eight primitive data types handle common types for integers, floating-point numbers, characters, and boolean values (true or false). They're called primitive because they're built into the system and are not actual objects, which makes them more efficient to use. There are four Java integer types, each with different ranges.

Type	Size	Range
byte	8 bits	-128 to 127
short	16 bits	--32,768 to 32,767
int	32 bits	-2,147,483,648 to 2,147,483,647
long	64 bits	-9223372036854775808 to 9223372036854775807

3. Comments:

Java has three kinds of comments. `/*` and `*/` surround multiline comments, as in C or C++. All text between the two delimiters is ignored:
`/* I don't know how I wrote this next part; I was working really late one night and it just sort of appeared. I suspect the code elves did it for me. It might be wise not to try and change it. */`

Comments cannot be nested; that is, you cannot have a comment inside a comment.

Double-slashes (`//`) can be used for a single line of comment. All the text up to the end of the line is ignored:

```
int vices = 7; // are there really only 7 vices?
```

The final type of comment begins with `/**` and ends with `*/`. These are special comments that are used for the javadoc system.

4. Literals

Literals are used to indicate simple values in your Java programs.

Literal is a programming language term, which essentially means that what you type is what you get. For example, if you type 4 in a Java program, you automatically get an integer with the value 4. If you type 'a', you get a character with the value a.

Number Literals

There are several integer literals. 4, for example, is a decimal integer literal of type `int` (although you can assign it to a variable of type `byte` or `short` because it's small enough to fit into those types). A decimal integer literal larger than an `int` is automatically of type `long`.

Integers can also be expressed as octal or hexadecimal: a leading 0 indicates that a number is octal—for example, 0777 or 0004. A leading 0x (or 0X) means that it is in hex (0xFF, 0xAF45). Hexadecimal numbers can contain regular digits (0-9) or upper- or lowercase hex digits (a-f or A-F).

Floating-point literals usually have two parts: the integer part and the decimal part—for example, 5.677777. Floating-point literals result in a floating-point number of type `double`, regardless of the precision of that number. You can force the number to the type `float` by appending the letter f (or F) to that number—for example, 2.56F.

Boolean Literals

Boolean literals consist of the keywords `true` and `false`. These keywords can be used anywhere you need a test or as the only possible values for boolean variables.

Character Literals

Character literals are expressed by a single character surrounded by single quotes: 'a', '#', '3', and so on. Characters are stored as 16-bit Unicode characters.

Escape	Character escape codes. Meaning
<code>\n</code>	Newline
<code>\t</code>	Tab
<code>\b</code>	Backspace
<code>\r</code>	Carriage return

\f	Formfeed
\\	Backslash
\'	Single quote
\"	Double quote
\ddd	Octal
\xdd	Hexadecimal
\udddd	Unicode character

String Literals

A combination of characters is a string. Strings in Java are instances of the class String. Strings are not simple arrays of characters as they are in C or C++, although they do have many array like Characteristics (for example, you can test their length and add and delete individual characters as if they were arrays). Because string objects are real objects in Java, they have Methods that enable you to combine, test, and modify strings very easily.

5. Expressions and Operators

Expressions are the simplest form of statement in Java that actually accomplishes something.

Expressions are statements that return a value.

Operators are special symbols that are commonly used in expressions.

Arithmetic operators.

Operator	Meaning	Example
+	Addition	3 + 4
-	Subtraction	5 - 7
*	Multiplication	5 * 5
□□	Division	14 □□7
%	Modulus	20 % 7

Comparisons

Java has several expressions for testing equality and magnitude. All of these expressions return a boolean value (that is, true or false).

Operator	Meaning	Example
==	Equal	x == 3
!=	Not equal	x != 3
<	Less than	x < 3
>	Greater than	x > 3
□□	Less than or equal to	x □□3
□□	Greater than or equal to	x □□3

6. Logical Operators

Expressions that result in boolean values (for example, the comparison operators) can be combined by using logical operators that represent the logical combinations AND, OR, XOR, and logical NOT.

- For AND combinations, use either the `&` or `&&`.
- For OR expressions, use either `|` or `||`.
- In addition, there is the XOR operator `^`, which returns true only if its operands are different (one true and one false, or vice versa) and false otherwise (even if both are true).
- For NOT, use the `!` operator with a single expression argument.

Bitwise Operators

Finally, here's a short summary of the bitwise operators in Java. These are all inherited from C and C++ and are used to perform operations on individual bits in integers.

Bitwise operators.

Operator	Meaning
<code>&</code>	Bitwise AND
<code> </code>	Bitwise OR
<code>^</code>	Bitwise XOR
<code><<</code>	Left shift
<code>>></code>	Right shift
<code>>>></code>	Zero fill right shift
<code>~</code>	Bitwise complement
<code><<=</code>	Left shift assignment (<code>x = x << y</code>)
<code>>>=</code>	Right shift assignment (<code>x = x >> y</code>)
<code>>>>=</code>	Zero fill right shift assignment (<code>x = x >>> y</code>)
<code>x&=y</code>	AND assignment (<code>x = x & y</code>)
<code>x =y</code>	OR assignment (<code>x = x y</code>)
<code>x^=y</code>	NOT assignment (<code>x = x ^ y</code>)

Q. 6 Define Array in details with examples.

Ans: Arrays, one of the most useful objects in Java, which enable you to collect objects into an easy-to-manage list. Arrays in Java are different than they are in other languages. Arrays in Java are actual objects that can be passed around and treated just like other objects.

Arrays are a way to store a list of items. Each element of the array holds an individual item, and you can place items into and remove items from those slots as you need to.

To create an array in Java, you use three steps:

1. Declare a variable to hold the array.
2. Create a new array object and assign it to the array variable.
3. Store things in that array.

Declare a variable to hold the array

Array variables indicate the type of object the array will hold (just as they do for any variable) and the name of the array, followed by empty brackets ([]). The following are all typical array variable declarations:

```
String difficultWords[];  
Point hits[];  
int temps[];
```

Creating Array Objects

There are two ways to do this: Using new
Directly initializing the contents of that array

The first way is to use the new operator to create a new instance of an array:

String[] names = new String[10]; Instead of using new to create the new array object, enclose the elements of the array inside braces, separated by commas:

```
String[] chiles = { "jalapeno", "anaheim", "serrano", "habanero", "thai" };
```

Accessing Array Elements

Once you have an array with initial values, you can test and change the values in each slot of that array. To get at a value stored within an array, use the array subscript expression:

```
myArray[subscript];
```

Multidimensional Arrays

Java does not support multidimensional arrays. However, you can declare and create an array of arrays (and those arrays can contain arrays, and so on, for however many dimensions you need), and access them as you would C-style multidimensional arrays:

```
int coords[][] = new int[12][12];
```



```
coords[0][0] = 1;
coords[0][1] = 2;
```

Q. 7 Define Basic Conditional Statements in JAVA.

Ans:

1. *if* Conditionals

The *if* conditional, which enables you to execute different bits of code based on a simple test in Java, is nearly identical to *if* statements in C. *if* conditionals contain the keyword *if*, followed by a boolean test, followed by a statement (often a block statement) to execute if the test is true:

```
if (x < y)
System.out.println("x is smaller than y");
```

An optional *else* keyword provides the statement to execute if the test is false:

```
if (engineState)
System.out.println("Engine is on.");
else System.out.println("Engine is off");
```

2. The Conditional Operator

An alternative to using the *if* and *else* keywords in a conditional statement is to use the conditional operator, sometimes called the ternary operator.

A *conditional operator* is a *ternary operator* because it has three terms.

The conditional operator is an expression, meaning that it returns a value (unlike the more general *if*, which can result in any statement or block being executed). The conditional operator is most useful for very short or simple conditionals, and looks like this:

```
test ? trueresult : falseresult
```

```
int smaller = x < y ? x : y;
```

3. *Switch* Conditionals

A common practice in programming in any language is to test a variable against some value, and if it doesn't match that value, to test it again against a different value, and if it doesn't match that one to make yet another test, and so on.

```
switch (test) {
case valueOne:
resultOne;
```

```

break;
case valueTwo:
resultTwo;
break;
case valueThree:
resultThree;
break;
...
default: defaultresult;
}

```

While and do Loops

while Loops

The while loop is used to repeat a statement or block of statements as long as a particular condition is true. while loops look like this:

```

while (condition) {
bodyOfLoop;
}

```

The condition is a boolean expression.

If it returns true, the while loop executes the statements in bodyOfLoop and then tests the condition again, repeating until the condition is false.

you can use a compound test with the && operator:

```

while ((ch != ' ') && (ch != '\t') && (ch != '\n') && (ch != '\r')) {
addChar(ch, theName);
ch = instream.read();
}

```

do...while Loops

The do loop is just like a while loop, except that do executes a given statement or block until a condition is false. The main difference is that while loops test the condition before looping, making it possible that the body of the loop will never execute if the condition is false the first time it's tested. do loops run the body of the loop at least once before testing the condition. do loops look like this:

```

do {
bodyOfLoop;
} while (condition);

```

Chapter 4

JAVA Programming-Advance

Q1. What is the difference between procedural and object-oriented programs?

Ans: The difference between procedural and object-oriented programs is

- In procedural program, programming logic follows certain procedures and the instructions are executed one after another. In OOP program, unit of program is object, which is nothing but combination of data and code
- In procedural program, data is exposed to the whole program whereas in OOP's program, it is accessible within the object and which in turn assures the security of the code.

Q2. What are Encapsulation, Inheritance and Polymorphism?

Ans: **Encapsulation** is the mechanism that binds together code and data it manipulates and keeps both safe from outside interference and misuse. **Inheritance** is the process by which one object acquires the properties of another object. **Polymorphism** is the feature that allows one interface to be used more than one class. In other words we can say polymorphism is a reusability of object in more than one class.

Q3. What is the difference between Assignment and Initialization?

Ans: Assignment can be many times as desired whereas initialization can be only once.

Q4. What is OOP's?

Ans: Object oriented programming organizes a program around its data, i. e. , objects and a set of well defined interfaces to that data. An object-oriented program can be characterized as data controlling access to code.

Q5. What are Class, Constructor and Primitive data types?

Ans: **Class** is a template for multiple objects with similar features and it is a blue print for objects. It defines a type of object according to the data the object can hold and the operations the object can perform. **Constructor** is a special kind of method that determines how an object is initialized when created. The name of constructor is same as class name. Primitive data types are 8 types and they are: byte, short, int, long, float, double, Boolean, char.

Q6: What is an Object and how do you allocate memory to it?

Ans: **Object** is an instance of a class and it is a software unit that combines a structured set of data with a set of operations for inspecting and manipulating that data. The object is created by using new keyword. When an object is created using new operator, memory is allocated to it.

Q7: What is the difference between constructor and method?

Ans: **Constructor** will be automatically invoked when an object is created whereas **method** has to be called explicitly by using dot(.) operator .

Q8: What are methods and how are they defined?

Ans: Methods are functions that operate on instances of classes in which they are defined. By use of the method objects can communicate with each other and can call methods in other classes. Method definition has four parts. They are name of the method, type of object or primitive type the method returns, a list of parameters and the body of the method. A method's signature is a combination of the first three parts mentioned above.

Q9: What is the use of bin and lib in JDK?

Ans: Bin contains all tools such as javac, appletviewer, awt tool, etc., whereas lib contains API and all packages.

Q10: What is casting?

Ans: Casting is process of convert the value of one type to another.

Q11: How many ways can an argument be passed to a subroutine and explain them?

Ans: An argument can be passed in two ways. They are *passing by value* and *passing by reference*.

Passing by value: This method copies the value of an argument into the formal parameter of the subroutine.

Passing by reference: In this method, a reference to an argument (not the value of the argument) is passed to the parameter.

Q12: What is the difference between an argument and a parameter?

Ans: At time of defining method, variables passed in the method are called parameters

At time of using those methods, values passed to those variables are called arguments.

Q13: What are different types of access modifiers?

Ans: There are following four types of access modifiers

public: Any thing declared as public can be accessed from anywhere.

private: Any thing declared as private can't be seen outside of its class.

protected: Any thing declared as protected can be accessed by classes in the same package and subclasses in the other packages.

default modifier : Can be accessed only to classes in the same package.

Q14 : When we can declare a method as abstract method ?

Ans: When we have to want child class to implement the behavior of the method.

Q15: Can We call a abstract method from a non abstract method ?

Ans : Yes, We can call a abstract method from a Non abstract method in a Java abstract class

Q.16: What is the difference between an Abstract class and Interface ? And can you explain when you are using an Abstract classes ?

Ans: **Abstract** classes let you define some behaviors; they force your subclasses to provide others. These abstract classes will provide the basic functionality of your application, child class which inherited this class will provide the functionality of the abstract methods in abstract class. When base class calls this method, Java calls the method defined by the child class.

An **Interface** can only declare constants and instance methods, but cannot implement default behavior. Interfaces provide a form of multiple inheritance. A class can extend only one other class. Interfaces are limited to public methods and constants with no implementation. Abstract classes can have a partial implementation, protected parts, static methods, etc. A Class may implement several interfaces. But in case of abstract class, a class may extend only one abstract class. Interfaces are slow as it requires extra indirection to find corresponding method in the actual class. Abstract classes are fast.

Q17: What is user-defined exception in java ?

Ans: User-defined expectations are the exceptions defined by the application developer which are errors related to specific application. Application Developer can define the user defined exception by inherited the Exception class as shown below. Using this class we can throw new exceptions for this we have use throw keyword .
Example of user define exception Java Example :

1. Create an class which extends Exception:-


```
public class greaterVlaueException extends Exception {  
}
```

2. Throw an exception using a throw statement:

```
public class Fund {  
...  
public Object getFunds() throws greaterVlaueException {  
if (id>2000) throw new greaterVlaueException();  
...  
}  
}
```

User-defined exceptions should usually be checked.

Q18 : What is the difference between checked and Unchecked Exceptions in Java ?

Ans: All predefined exceptions in Java are either a checked exception or an unchecked exception. Checked exceptions must be caught using try .. catch() block or we should throw the exception using throws clause. If you don't, compilation of program will fail. All exceptions in RuntimeException and Error class are unchecked exception.

Q19: Explain garbage collection ?

Ans: Garbage collection is an important part of Java's security strategy. Garbage collection is also called automatic memory management as JVM automatically removes the unused variables/objects from the memory. The name "garbage collection" implies that objects that are no longer needed by the program are "garbage" and this object will destroy by garbage collector. A more accurate and up-to-date metaphor might be "memory recycling." When an object is no longer referenced by the program, the heap space it occupies must be recycled so that the space is available for subsequent new objects. The garbage collector must somehow determine which objects are no longer referenced by the program and make available the heap space occupied by such unreferenced objects. In the process of freeing unreferenced objects, the garbage collector must run any finalizers of objects being freed.

Q20 : How you can force the garbage collection ?

Ans: Garbage collection automatic process and can't be forced. We can call garbage collector in Java by calling **System.gc()** and **Runtime.gc()**, JVM tries to recycle the unused objects, but there is no guarantee when all the objects will garbage collected.

Q21 : What are the static fields & static Methods ?

Ans: If a field or method defined as a static, there is only one copy for entire class, rather than one copy for each instance of class. static method cannot access non-static field or call non-static method

Q22: What are the Final fields & Final Methods ?

Ans: Fields and methods can also be declared final. **Final method:** A final method cannot be overridden in a subclass.
Final field: A final field is like a constant: once it has been given a value, it cannot be assigned to again.

Q23: Describe the wrapper classes in Java ?

Ans: Wrapper class is wrapper around a primitive data type. An instance of a wrapper class contains, or wraps, a primitive value of the corresponding type.

Following are the lists of the primitive types and the corresponding wrapper classes:

Primitive	Wrapper
boolean	java.lang. Boolean
byte	java.lang. Byte
char	java.lang. Character
double	java.lang. Double
float	java.lang. Float
int	java.lang. Integer
long	java.lang. Long
short	java.lang. Short
void	java.lang. Void

Q24: What are different types of inner classes ?

Ans: Inner classes nest within other classes. A normal class is a direct member of a package. Inner classes, which became available with Java 1.1, are four types:

- 1.Static member classes
- 2.Member classes
- 3.Local classes
- 4.Anonymous classes

1.Static member classes: A static member class is a static member of a class. Like any other static method, a static member class has access to all static methods of the parent, or top-level, class.

2.Member Classes: A member class is also defined as a member of a class. Unlike the static variety, the member class is instance specific and has

access to any and all methods and members, even the parent's this reference.

3.Local Classes: Local Classes declared within a block of code and these classes are visible only within the block.

4.Anonymous Classes: These type of classes does not have any name and its like a local class

Q25: For concatenation of strings, which method is good, StringBuffer or String ?

Ans : StringBuffer is faster than String for concatenation.

Q26: What is Runnable interface ? Are there any other ways to make a java program as multithred java program

Ans: The thread can be create by using two methods:
1. Define a new class that extends the Thread class
2. Define a new class that implements the Runnable interface, and pass an object of that class to a Thread's constructor.
The advantage of implements the Runnable interface is that the new class can be a subclass of any class, not just of the Thread class.

Q26 : How can we tell what state a thread is in ?

Ans: Prior to Java 5, `isAlive()` was commonly used to test a threads state. If `isAlive()` returned false the thread was either new or terminated but there was simply no way to differentiate between the two. Starting with the release of Tiger (Java 5) you can now get what state a thread is in by using the `getState()` method which returns an Enum of `Thread.States`.

Q27: What methods java providing for Thread communications ?

Ans: Java provides three methods that threads can use to communicate with each other: `wait`, `notify`, and `notifyAll`.

Q28: What is the difference between notify and notify All methods ?

Ans: A call to `notify` causes at most one thread waiting on the same object to be notified (i.e., the object that calls `notify` must be the same as the object that called `wait`). A call to `notifyAll` causes all threads waiting on the same object to be notified. If more than one thread is waiting on that object,

there is no way to control which of them is notified by a call to notify (so it is often better to use **notifyAll** than notify).

Q29: What is synchronized keyword? In what situations you will Use it?

Ans: Synchronization is the act of serializing access to critical sections of code. We will use this keyword when we expect multiple threads to access/modify the same data. To understand synchronization we need to look into thread execution manner. Threads may execute in a manner where their paths of execution are completely independent of each other. Neither thread depends upon the other for assistance. For example, one thread might execute a print job, while a second thread repaints a window. And then there are threads that require synchronization, the act of serializing access to critical sections of code, at various moments during their executions. For example, say that two threads need to send data packets over a single network connection. Each thread must be able to send its entire data packet before the other thread starts sending its data packet; otherwise, the data is scrambled. This scenario requires each thread to synchronize its access to the code that does the actual data-packetsending.

If you feel a method is very critical for business that needs to be executed by only one thread at a time (to prevent data loss or corruption), then we need to use synchronized keyword.

Q30: What is serialization ?

Ans: Serialization is the process of writing complete state of java object into output stream, that stream can be file or byte array or stream associated with TCP/IP socket.

Q31: What does the Serializable interface do ?

Ans: Serializable is a tagging interface; it prescribes no methods. It serves to assign the Serializable data type to the tagged class and to identify the class as one which the developer has designed for persistence. **ObjectOutputStream** serializes only those objects which implement this interface.

Q32: How do I serialize an object to a file ?

Ans: To serialize an object into a stream perform the following actions:

1. Open one of the output streams, for example **FileOutputStream**.
2. Chain it with the **ObjectOutputStream** - Call the method **writeObject()** providing the instance of a Serializable object as an argument.
3. Close the streams

Java Code

```
try{
fOut= new FileOutputStream("c:\\raj.ser");
out = new ObjectOutputStream(fOut);
out.writeObject(employee); //serializing
System.out.println("An employee is serialized into
c:\\emp.ser");

} catch(IOException e){
e.printStackTrace();
```

Q33: How do I deserilaize an Object?

Ans: To deserialize an object, perform the following steps:

1. Open an input stream
2. Chain it with the **ObjectInputStream** - Call the method **readObject()** and cast the returned object to the class that is being deserialized.
3. Close the streams

Java Code

```
try{
fIn= new FileInputStream("c:\\emp.ser");
in = new ObjectInputStream(fIn);

//de-serializing employee
Employee emp = (Employee) in.readObject();
System.out.println("Deserialized " + emp.fName + " "
+ emp.lName + " from emp.ser ");
}catch(IOException e){
e.printStackTrace();
}catch(ClassNotFoundException e){
e.printStackTrace(); }
```

Q34: What is Externalizable Interface ?

Ans: **Externalizable** interface is a subclass of **Serializable**. Java provides **Externalizable** interface that gives you more control over what is being serialized and it can produce smaller object footprint. This interface defines 2 methods: **readExternal()** and **writeExternal()** and you have to implement these methods in the class that will be serialized. In these methods you'll have to write code that reads/writes only the values of the attributes you are interested in. Programs that perform serialization and deserialization have to write and read these attributes in the same sequence.

Chapter 5

Introduction to Classes and Methods

Ques1 Which is used to get the value of the instance variables?

Ans Dot notation.

Ques:2 The new operator creates a single instance named class and returns a reference to that object.

a)True

b)False

Ans a.

Ques:3 A class is a template for multiple objects with similar features.

a)True

b)False

Ans: a.

Ques:4 What is mean by garbage collection?

Ans When an object is no longer referred to by any variable, Java automatically reclaims memory used by that object. This is known as garbage collection.

Ques:5 What are methods and how are they defined?

Ans Methods are functions that operate on instances of classes in which they are defined. Objects can communicate with each other using methods and

can call methods in other classes.

Method definition has four parts. They are name of the method, type of object or primitive type the method returns, a list of parameters and the body of the method. A method's signature is a combination of the first three parts mentioned above.

Ques6 What is calling method?

Ans Calling methods are similar to calling or referring to an instance variable. These methods are accessed using dot notation.
Ex: obj.methodname(param1,param2)

Ques:7 Which method is used to determine the class of an object?

Ans There is method get Class() method in Class class. Which we can be used to find out what class the belongs to. This class is defined in the object class and is available to all objects.

Ques:8 All the classes in java.lang package are automatically imported when a program is compiled.

- a)True
- b)False

Ans a.

Ques:9 How can class be imported to a program?

Ans To import a class, the import keyword should be used as shown;
import package name;
e.g.
import java.sql.*;
We are importing here **all classes**.

```
import java.sql.Connection ;
```

In this way we are just importing **Connection class** here
If we have import **sub package** then we have do as following :

```
import r4r.co.in,*;
```

Ques:10 Where we need to place import statement.

Ans Import statement will be very first statements of any class or just before package statement.

Ques11 What is a constructor?

Ans A constructor is a special kind of method that determines how an object is initialized when created.

Ques 12 Which keyword is used to create an instance of a class?

Ans new.

Ques 13 Which method is used to garbage collect an object?

Ans finalize ().

Ques:14 Constructors can be overloaded like regular methods.

- a) True
- b) False

Ans a.

Ques:15 What is casting?

Ans Casting is converting the value of one type to another.

Ques16 Casting between primitive types allows conversion of one primitive type to another.

- a) True
- b) False

Ans a.

Ques 17 Casting occurs commonly between numeric types.

- a) True
- b) False

Ans a.

Ques18 Boolean values can be cast into any other primitive type.

- a) True
- b) False

Ans b.

Ques19 Casting does not affect the original object or value.
a) True
b) False

Ans a.

Ques 20 Which cast must be used to convert a larger value into a smaller one?

Ans Explicit cast.

Ques 21 Which cast must be used to cast an object to another class?

Ans Specific cast.

Ques 22 Which of the following features are common to both Java & C++?
a. The class declaration
b. The access modifiers
c. The encapsulation of data & methods with in objects
d . The use of pointers

Ans a,b,c.

Ques 23 Which of the following statements accurately describe the use of access modifiers within a class definition?

- a. They can be applied to both data & methods
- b . They must precede a class's data variables or methods
- c. They can follow a class's data variables or methods
- d . They can appear in any order
- e. They must be applied to data variables first and then to methods

Ans a,b,d.

Ques24 Suppose a given instance variable has been declared private. Can this instance variable be manipulated by methods out side its class?

- a. Yes
- b. No

Ans b.

Ques25 Which of the following statements can be used to describe a public method?

- a. It is accessible to all other classes in the hierarchy
- b. It is accessible only to subclasses of its parent class
- c. It represents the public interface of its class
- d. The only way to gain access to this method is by calling one of the public class methods

Ans a,c.

Ques 26 Which of the following types of class members can be part of the internal part of a class?

- a. Public instance variables
- b. Private instance variables
- c. Public methods
- d. Private methods

Ans b,d.

Ques27 You would use the ____ operator to create a single instance of a named class.

- a. new
- b. dot

Ans a.

Ques28 Which of the following statements correctly describes the relation between an object and the instance variable it stores?

- a. Each new object has its own distinctive set of instance variables .
- b. Each object has a copy of the instance variables of its class .
- c. The instance variable of each object are separate from the variables of other objects .
- d. The instance variables of each object are stored together with the variables of other objects .

Ans a,b,c.

- Ques29** If no input parameters are specified in a method declaration then the declaration will include ____.
- a. An empty set of parentheses
 - b. The term void

Ans a.

- Ques30** What are the functions of the dot(.) operator?
- a. It enables you to access instance variables of any objects within a class
 - b. It enables you to store values in instance variables of an object
 - c. It is used to call object methods
 - d. It is to create a new object

Ans a,b,c.

- Ques31** Which of the following can be referenced by this variable?
- a. The instance variables of a class only
 - b. The methods of a class only
 - c. The instance variables and methods of a class

Ans c.

- Ques32** The this reference is used in conjunction with ____ methods.
- a. static
 - b. non-static

Ans b.

- Ques 33** Which of the following operators are used in conjunction with the this and super references?
- a. The new operator
 - b. The instanceof operator
 - c. The dot operator

Ans c.

Ques 34 A constructor is automatically called when an object is instantiated
a. true
b. false

Ans a.

Ques 35 When a constructor be called without specifying arguments?
a. When the default constructor is not called.
b. When the name of the constructor differs from that of the class.
c. When there are no constructors for the class.

Ans c.

Ques 36 Each class in java can have a finalizer method
a. true
b. false

Ans a.

Ques 37 When an object is referenced, does this mean that it has been identified by the finalizer method for garbage collection?
a. Yes
b. No

Ans: b.

Ques 38 Because finalize () belongs to the java.lang.Object class, it is present in all ____.
a. objects
b. classes
c. methods

Ans b.

Ques 39 Identify the true statements about finalization.
a. A class may have only one finalize method
b. Finalizers are mostly used with simple classes
c. Finalizer overloading is not allowed

Ans a,c.

Ques 40 When you write finalize() method for your class, you are overriding a finalizer inherited from a super class.

- a. true
- b. false

Ans a.

Ques 41 Java memory management mechanism garbage collects objects which are no longer referenced?

- a. true
- b. false

Ans: a.

Ques 42 Are objects referenced by a variable candidates for garbage collection when the variable goes out of scope?

- a. yes
- b. no

Ans: a

Ques 43 Java's garbage collector runs as a ___ priority thread waiting for ___priority threads to relinquish the processor.

- a.high
- b.low

Ans a,b.

Ques 44 The garbage collector will run immediately when the system is out of memory

- a.true
- b.false

Ans a.

Ques 45 You can explicitly drop a object reference by setting the value of a variable whose data type is a reference type to ___

Ans Null

Ques 46 When might your program wish to run the garbage collector?

- a. before it enters a compute-intense section of code
- b. before it enters a memory-intense section of code
- c. before objects are finalized
- d. when it knows there will be some idle time

Ans a,b,d

Ques 47 For externalizable objects the class is solely responsible for the external format of its contents?

- a.true
- b.false

Ans a

Ques 48 When an object is stored, are all of the objects that are reachable from that object stored as well?

- a. true
- b. false

Ans a

Ques 49 The default__ of objects protects private and transient data, and supports the __ of the classes

- a. evolution
- b. encoding

Ans: b,a.

Ques 50 Which are keywords in Java?

- a) NULL
- b) sizeof
- c) friend
- d) extends
- e) synchronized

Ans d and e

Ques51 When must the main class and the file name coincide?

Ans When class is declared public.

Ques 52 What are different modifiers?

Ans There are following different modifiers in java: public, private, protected, default, static, transient, volatile, final, abstract.

Ques 53 What are different access modifiers?

Ans : public, private, protected, default.

Ques 54 What is meant by "Passing by value" and " Passing by reference"?

Ans Passing objects – pass by reference
passing primitive values into methods - pass by value

Ques55 Is a class a subclass of itself?

Ans : Yes . A class is a subclass itself.

Ques 56 What modifiers may be used with top-level class?

Ans : Public, abstract, final.

Ques 57 What is an example of polymorphism?

- a. Inner class
- b. Anonymous classes
- c. Method overloading
- d. Method overriding

Ans : c

Introduction to Classes and Methods

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In this way we are just importing **Connection class** here
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PACKAGES AND INTERFACE

Ques 67 What are packages ? what is use of packages ?

Ans : The package statement defines a name space in which classes are stored.If you omit the package, the classes are put into the default package.

Signature... package pkg;

Use: * It specifies to which package the classes defined in a file belongs to. * Package is both naming and a visibility control mechanism.

Ques 68 What is difference between importing "java.applet.Applet" and

"java.applet.*;" ?

Ans : "java.applet.Applet" will import only the class Applet from the package java.applet
Where as "java.applet.*" will import all the classes from java.applet package.

Ques 69 What do you understand by package access specifier?

Ans : public: Anything declared as public can be accessed from anywhere
private: Anything declared in the private can't be seen outside of its class.
default: It is visible to subclasses as well as to other classes in the same package.

Ques 70 What is interface? What is use of interface?

Ans : It is similar to class which may contain method's signature only but not bodies.
Methods declared in interface are abstract methods. We can implement many interfaces on a class which support the multiple inheritance.

Ques71 Is it is necessary to implement all methods in an interface?

Ans : Yes. All the methods have to be implemented.

Ques72 Which is the default access modifier for an interface method?

Ans : public.

Ques 73 Can we define a variable in an interface ?and what type it should be ?

Ans : Yes we can define a variable in an interface. They are implicitly final and static.

Ques 74 What is difference between interface and an abstract class?

Ans : All the methods declared inside an Interface are abstract. Where as abstract class must have at least one abstract method and others may be concrete or abstract.

In Interface we need not use the keyword abstract for the methods.

DATA TYPES, VARIABLES AND ARRAYS

Ques 75 What is meant by variable?

Ans: Variables are locations in memory that can hold values. Before assigning any value to a variable, it must be declared.

Ques 76 What are the kinds of variables in Java? What are their uses?

Ans : Java has three kinds of variables namely, the instance variable, the local

variable and the class variable.

Local variables are used inside blocks as counters or in methods as temporary variables and are used to store information needed by a single method.

Instance variables are used to define attributes or the state of a particular object and are used to store information needed by multiple methods in the objects.

Class variables are global to a class and to all the instances of the class and are useful for communicating between different objects of all the same class or keeping track of global states.

Ques77 How are the variables declared?

Ans: Variables can be declared anywhere in the method definition and can be initialized during their declaration. e.g.

```
int i; //declare the variable.  
i=0; //Initialize the variable
```

They are commonly declared before usage at the beginning of the definition.

Variables with the same data type can be declared together. Local variables must be given a value before usage.

Ques 78 What are variable types?

Ans: Variable types can be any data type that java supports, which includes the eight primitive data types, the name of a class or interface and an array.

Ques79 How do you assign values to variables?

Ans. Values are assigned to variables using the assignment operator =.

```
e.g.  
int i=0;  
int i;  
i=0;
```

Ques 80 What is a literal? How many types of literals are there?

Ans: A literal represents a value of a certain type where the type describes how that value behaves. There are different types of literals namely number literals, character literals, boolean literals, string literals, etc.

Que81 What is an array?

Ans: An array is an object that stores a list of items with same data type.

Ques82 How do you declare an array?

Ans: Array variable indicates the type of object that the array holds.

Ex: int arr[];

Ques83 Java supports multidimensional arrays.

a)True

b)False

Answer: b.

Java Support Array of array. This mean we can assign an array into other make multidimensional. array.

Ques84 An array of arrays can be created.

a)True

b)False

Ans: a.

Ques 85 What is a string?

Ans: A combination of characters is called as string. The is a String class into `java.lang.*` package which is used to wrap any character to make a string.

Exception Handling

Ques86 What is the difference between 'throw' and 'throws' ?And it's application?

Ans : Exceptions that are thrown by java runtime systems can be handled by Try and catch blocks. With throw exception we can handle the exceptions thrown by the program itself. If a method is capable of causing an exception that it does not handle, it must specify this behavior so the callers of the method can guard against that exception.

Ques 87 What is the difference between 'Exception' and 'error' in java?

Ans : Exception and Error are the subclasses of the Throwable class. Exception class is used for exceptional conditions that user program should catch. With exception class we can subclass to create our own custom exception. Error defines exceptions that are not expected to be caught by you program. Example is Stack Overflow.

Ques 88 What is 'Resource leak'?

Ans : Freeing up other resources that might have been allocated at the beginning of a method.

Ques89 What is the 'finally' block?

Ans : Finally block will execute whether or not an exception is thrown. If an exception is thrown, the finally block will execute even if no catch statement match the exception. Any time a method is about to return to the caller from inside try/catch block, via an uncaught exception or an explicit return statement, the finally clause is also execute.

Ques90 Can we have catch block with out try block? If so when?

Ans : No. Try/Catch or Try/finally form a unit.

Ques91 What will happen to the Exception object after exception handling?

Ans : It will go for Garbage Collector. And frees the memory.

Ques92 How many Exceptions we can define in 'throws' clause?

Ans : We can define multiple exceptions in throws clause.

Signature is..

Type method-name (parameter-list) throws exception-list

Multi Threading

Ques93 What is meant by timeslicing or time sharing?

Ans : Timeslicing is the method of allocating CPU time to individual threads in a priority schedule.

Ques94 What is meant by daemon thread? In java runtime, what is it's role?

Ans : Daemon thread is a low priority thread which runs intermittently in the background doing the garbage collection operation for the java runtime system

Send your requisition at

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