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Java Programming

1. What is OOPS?

OOPS is an Object Oriented Programming system in which programs are collection of objects. Each object is an instance of a class.

2. Write basic concepts of OOPS?

Abstraction.

Encapsulation.

Inheritance.

Polymorphism

3. What is a class?

A class is simply a representation of a type of object.

4. What is an object?

An object is an instance of a class. It has its own state, behavior, and identity.

5.What is Encapsulation ?

The process of encapsulating data and functions in one unite to protect from the outside world. Class is responsible for encapsulation in java.

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6. What is Polymorphism?

One interface and multiple methods .

Processing data depending on their type.

Called dynamic or late binding (method overriding)

Parent class reference uses to refer to child class object.

7. What is Inheritance?

Its mechanism for software reusability

An object acquires the properties of its parent,

One class shares the structure and behavior defined in another class

Represent is a relationship between different objects.

Creates new classes from existing classes .

Java doesn't support multiple inheritance as c++ ;

8. Define a constructor?

A constructor is a method used to initialize the state of an object,

Has no return type

It can be overloaded

The same name as class name

Can take arguments .

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10. Define Destructor?

A destructor is a method which is automatically called when the object is made of scope or destroyed .This used for memory allocation.

11. What is an Inline function?

Inserting complete body of the function but its increase execution time and code size and slow your program .

12. What is a virtual function?

A function who is behavior can be overridden within subclass by a function with same signature to achieve polymorphism behavior.

13. What is a friend function?

Friend Function: is a function that can access the private members of a class in c++ and it is preceded by friend keyword but isn't a member of class.

14. What is function overloading?

Function which can perform different tasks. It allows the creation of several methods with the same name which differ from each other by the type of input and output of the function.

Example

Void add(int& a, int& b);

Void add(double& a, double& b);

`

Void add(struct bob& a, struct bob& b);

15. What is operator overloading?

Is a specific case of polymorphism, where different operators have different implementations depending on their arguments. Operator overloading is generally defined by a programming language a programmer, or both.

16. What is an abstract class?

An abstract class is a class which cannot be instantiated. Creation of an object is not possible with an abstract class, but it can be inherited. An abstract class can contain only Abstract method. Java allows only abstract method in abstract class while for other languages allow non-abstract method as well.

هي كلاس بتحتوي عللا ابستراكت فنكشنز وكونستنتسس ما بقدر اعمل منها اوبجكت جديد ولكن بقدر اعمل منعا انهيرتنس .

17. What is a ternary operator?

The ternary operator is an operator that takes three arguments. The first argument is a comparison argument, the second is the result upon a true comparison, and the third is the result upon a false comparison. Also called a conditional operator.

18. What is the use of finalize method?

Finalize method helps to perform cleanup operations on the resources which are not currently used. Finalize method is protected, and it is accessible only through this class or by a derived class.

19.what is the difference between argument and parameter

Parameter is variable in the declaration of function.

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Argument is the actual value of this variable that gets passed to function.

There are two types of Arguments. :

- Call by Value – Value passed will get modified only inside the function, and it returns the same value whatever it is passed it into the function.

- Call by Reference – Value passed will get modified in both inside and outside the functions and it returns the same or different value.

20. What is the super keyword?

Super can be used to refer immediate parent class instance variable.

Super can be used to invoke immediate parent class method.

Super () can be used to invoke immediate parent class constructor.

21. What is method overriding?

Method overriding is a feature that allows a subclass to provide the implementation of a method that overrides in the main class. This will overrides the implementation in the superclass by providing the same method name, same parameter and same return type.

22. What is an interface?

An interface is a collection of an abstract method. If the class implements an interface, and then thereby inherits all the abstract methods of an interface.

Contains only abstract methods and constants

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Interface can extend many interfaces , Cant be instantiated

Variables are final , constant ,static , public

Methods are abstract and public

Interface extend interface but class implement interface .

23. What is exception handling?

An exception is an event that occurs during the execution of a program. Exceptions can be of any type – Runtime exception, Error exceptions. Those exceptions are adequately handled through exception handling mechanism like try, catch and throw keywords

Class throwable has two subclasses error and exception .

24. What are tokens?

The token is recognized by a compiler, and it cannot be broken down into component elements. Keywords, identifiers, constants, string literals and operators are examples of tokens.

25. Difference between overloading and overriding?

Overloading:

static binding whereas Overriding is dynamic binding.

Same fun name but different type of parameters and different numbers of parameters

Overriding

Same fun name and same type of parameters and numbers.

But different implementation of the function .

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26. Difference between class and an object?

Class :

Representation of object .

Definition of properties and functions done in class and can be used by the object.

Classes don't have any information

A class can have sub-classes,

object:

Is an instance of a class.

Objects hold multiple information

object doesn't have sub-objects.

27. What is an abstraction?

It shows only the necessary details to the client of an object. Means, it shows only required details for an object,

viewing bigger data rather than details .

28. What are access modifiers?

Access modifiers determine the scope of the method or variables that can be accessed from it .

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- Private.
- Protected.
- Public.
- Friend.
- Protected Friend.

29. What are sealed modifiers?

Sealed modifiers are the access modifiers where it cannot be inherited by the methods.

30. What are the various types of constructors?

There are three various types of constructors, and they are as follows:

- Default Constructor – With no parameters.

- Parametric Constructor – With Parameters. Create a new instance of a class and also passing arguments simultaneously.

- Copy Constructor – Which creates a new object as a copy of an existing object.

31. What is early and late binding?

Early binding refers to the assignment of values to variables during design time whereas late binding refers to the assignment of values to variables during run time.

The Virtual keyword is always used in a base class that tells the compiler that this method will be overridden in its derived class

New: "The new keyword hides the definition of the base class method and gives a new definition in the derived class."

32. What is 'this' pointer?

THIS pointer refers to the current object of a class.

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THIS keyword is used as a pointer which differentiates between the current object with the global object. Basically, it refers to the current object

35. What is the difference between structure and a class?

Structure default access type is public , but class access type is private.

A structure is used for grouping data whereas class can be used for grouping data and methods .

Structs are *value types* and classes are *reference types*.

A short summary of each:

Classes Only:

- Can support inheritance
- Are reference (pointer) types
- The reference can be null
- Have memory overhead per new instance

Structs Only:

- Cannot support inheritance
- Are value types
- Are passed by value (like integers)
- Cannot have a null reference.
- Do not have a memory overhead per new instance -.

36. What is the default access modifier in a class?

The default access modifier of a class is Private by default.

`

37. What is a pure virtual function?

A pure virtual function is a function which can be overridden in the derived class

38. What are all the operators that cannot be overloaded?

Following are the operators that cannot be overloaded -.

Scope Resolution (::)

Member Selection (.)

Member selection through a pointer to function (.*)

39.What is dynamic or run time polymorphism?

Dynamic or Run time polymorphism is also known as method overriding in which call to an overridden function is resolved during run time, not at the compile time.

40. Do we require a parameter for constructors?

No, we do not require a parameter for constructors.

41. What is a copy constructor?

This is a special constructor for creating a new object as a copy of an existing object.

42. What does the keyword virtual represented in the method definition?

It means, we can override the method.

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43. Whether static method can use nonstatic members?

False.

44. What is a base class, sub class, and super class?

The base class is the most generalized class, and it is said to be a root class.

A Sub class is a class that inherits from one or more base classes.

The superclass is the parent class from which another class inherits.

45. What is static and dynamic binding?

Static binding is a binding in which name can be associated with the class during compilation time, and it is also called as early Binding.

Dynamic binding is a binding in which name can be associated with the class during execution time, and it is also called as Late Binding.

46. How many instances can be created for an abstract class?

Zero instances will be created for an abstract class.

47. Which keyword can be used for overloading?

Operator keyword is used for overloading.

48. What is the default access specifier in a class definition?

Private access specifier is used in a class definition.

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49. Which OOPS concept is used as reuse mechanism?

Inheritance is the OOPS concept that can be used as reuse mechanism.

Network:

Q1. What do you mean by Network?

Set of devices connected to each other over the physical medium is known as a computer network. For example the Internet.

Q2. What do you mean by Node?

In the computer network, the node is known as a device.

Q3. What do you mean by Network Topology?

A network topology is a physical structure of the network which defines how the computers or node will be connected to each other.

Q4. What is Routers?

A router is a device which is responsible for sending data from source to destination over the computer network.

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Q5. What is the OSI model?

OSI model stands for Open System Interconnection. . It's a reference model which describes that how different applications will communicate to each other over the computer network.

Q6. Explain the Different layers of the OSI model.

Physical Layer	Converts data bit into an electrical impulse. including defining cables, cards and physical aspects. Examples : Fast Ethernet, RS232,
Datalink Layer	, data packets are encoded and decoded into bits. data link layer is divided into two sub layers: The Media Access Contro layer and the Logical Link Control (LLC) layer.
Network Layer	Transfer of datagrams from one to another. Routing and forwarding are functions of this layer provides switching and routing technologies responsible for congestion control

Q7. Describe Hub, Switch and Router,TRUNK?

The router forwards data packets along networks.

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Transport Layer	Responsible for Data transfer from one to another. provides transparent transfer of data between end systems, or hosts, is responsible for end-to-end error recovery and flow control.
Session Layer	This layer establishes, manages and terminates connections between app It deals with session and connection coordination
Presentation Layer	Transform data into application layer format. The presentation layer works to transform data into the form that the appl layer can accept. This layer formats and encrypts data to be sent across a
Application Layer	An end user will interact with the Application layer. supports application and end-user processes.

The Switch forwards packets between LAN segments

A hub is a common connection point for devices in a network. Hubs connect segments of a LAN

Trunk : Is connection between switches to carry traffic .

Through trunk any packet from any Vlan can pass .

Q8. Describe VLANS ?

VLAn : way of separating lan into different virtual local area networks based on functionality not on space .

Q9. What do you mean by the TCP/IP Model?

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TCP/IP stands for Transmission control protocol and Internet protocol. It describes how the data will get transmitted and routed from end to end communication.

Q10. What do you mean by HTTP?

HTTP stands for Hyper Text Transfer Protocol and the port for this is 80. This

protocol is responsible for web content.

Q11. What do you mean by TCP and UDP?

TCP stands for Transfer control protocol and UDP stands for User Datagrams protocol and TCP is a connection-oriented protocol and UDP is a Connectionless protocol.

Q12. What do you mean by a Firewall?

A firewall is a system designed to prevent unauthorized access to or from a private network. Firewalls prevent unauthorized internet users from accessing private networks connected to the internet.

Q13.What do you mean by DNS?

(Domain Name System) The Internet's system for converting alphabetic names into numeric IP addresses.

Q14.What do you mean by Proxy server?

proxy server is a dedicated computer or a software system running on a computer.

An advantage of a proxy server is that its cache can serve all users. If one or more Internet sites are frequently requested, these are likely to be in the proxy's cache.

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it looks in its local cache of previously pages. If it finds the page, it returns it to the user without needing to forward the request to the Internet.

Q15. What do you mean by NIC?

Stands for "Network Interface Card" A NIC is a component that provides networking capabilities for a computer. It may enable a wired connection (such as Ethernet) or a wireless connection (such as Wi-Fi) to a local area network.

Q17. What do you mean by ASCII?

ASCII is the American Standard Code for Information Interchange.

Q18. What are the types of mode available in Network?

Data transferring mode in a computer network will be of three types:

Simplex, Half-Duplex and Full Duplex.

Q19. What do you mean by Decoder?

A decoder is a program which converts the encrypted data into its actual format.

Q20. What is OSI reference model?

Open System Interconnection, the name itself suggest that it is a reference model which defines how applications can communicate with each other over a networking system.

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Q21. Explain TCP/IP Model

The most widely used and available protocol is TCP/IP i.e. Transmission Control Protocol and Internet Protocol. TCP/IP specifies how data should be packaged, transmitted and routed in their end to end data communication.

Q22. Explain DHCP briefly?

DHCP stands for Dynamic Host Configuration Protocol and it automatically assigns IP addresses to the network devices.

Q23. What is SNMP?

SNMP stands for Simple Network Management Protocol. It is a network protocol used for collecting organizing and exchanging information between network devices. SNMP is widely used in network management for configuring network devices like switches, hubs, routers, printers, servers.

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DataBase

1.Define SQL Constrains ?

SQL constraints are used to specify rules for the data in a table. Constraints can be column level or table level. Column level constraints apply to a column, and table level constraints apply to the whole table.

NOT NULL - Ensures that a column cannot have a NULL value

UNIQUE - Ensures that all values in a column are different

PRIMARY KEY - A combination of a NOT NULL and UNIQUE.

Uniquely identifies each row in a table.

FOREIGN KEY - Uniquely identifies a row/record in another table

CHECK - Ensures that all values in a column satisfies a specific condition

DEFAULT - Sets a default value for a column when no value is specified

INDEX - Used to create and retrieve data from the database very quickly

2. What is Views in SQL?

In SQL, a view is a virtual table based on the result-set of an SQL statement.

A view contains rows and columns, just like a real table. The fields in a view are fields from one or more real tables in the database.

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3. Define SQL Hosting?

If you want your web site to be able to store and retrieve data from a database, your web server should have access to a database-system that uses the SQL language.

4. What is the difference Between CHAR and VCHAR ?

CHAR:

Used to store character string value of fixed length.

The maximum no. of characters the data type can hold is 255 characters.

It's 50% faster than VARCHAR.

Uses static memory allocation.

VARCHAR:

Used to store variable length alphanumeric data.

It's slower than CHAR.

Uses dynamic memory allocation

6.Query to find third highest salary

SELECT MIN(EmpSalary)

FROM Salary

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WHERE EmpSalary IN(SELECT TOP 3 EmpSalary FROM Salary ORDER BY EmpSalary DESC)

WEB

1. What Is the Parts of URL ?

scheme://host: port/path? Query

1- **A scheme.** The scheme identifies the protocol to be used to access the resource on the Internet. It can be HTTP (without SSL) or HTTPS (with SSL).

2- **A host.** The host name identifies the host that holds the resource. For example, www.example.com.

3- **Port Number :**

4- **A path.** The path identifies the specific resource within the host that the Web client wants to access. For example, `/software/htp/cics/index.html`.

5- **A query string.** If a query string is used, it follows the path component, and provides a string of information .

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2.What is the difference between get and post method ?

GET	POST
• It is default method. • It is designed to **GET** data from the server. • It is suitable to carry (2kb-8kb) data only [it varies from one browser to another]. • It carries only **ASCII** characters. • It is not suitable for (X)file uploading and (X)data encryption. • It supports (v) caching. • It supports (v) bookmarking. • It appends form data to the request URL as querying to send request to server. • It doesn't give any (X) secrecy. • It uses service (or) doGet(_,_) in servlet program to process the request. • It is (v) idempotent , i.e Its safe to repeat multiple same requests (ex: downloading the same file multiple times etc...) • Faster to send the request.	• It is not a default method. • It is designed to **SEND** data to the server. • It can carry unlimited of data. • It carries any type of data like images,mp3 etc... • It is suitable for (v)file uploading and (v)data encryption . • It doesn't supports (x) caching. • It doesn't supports (x) bookmarking. • It sends data from web browser separately through the sockets. • It gives(v) data Secercy. • It uses service (or) doPost(_,_) in servlet program to process the request. • It is (x) not idempotent , i.e Its not safe to repeat multiple same requests(ex: filling and sending same data in application forms will results problem) . • It is little slow.

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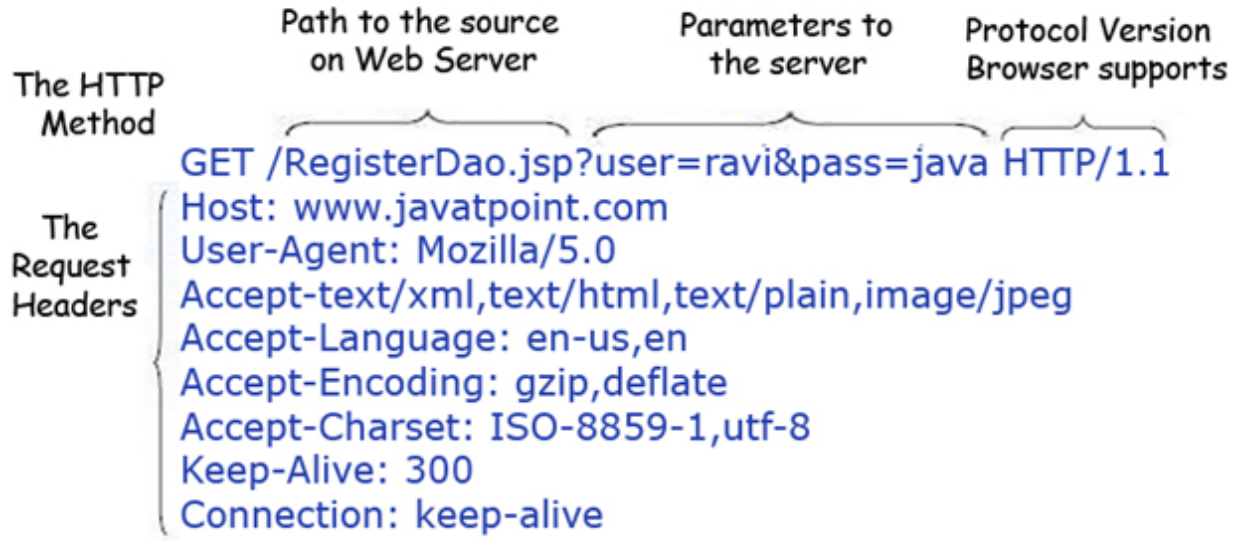
Path to the source on Web Server
Parameters to the server
Protocol Version Browser supports
The HTTP Method
GET /RegisterDao.jsp?user=ravi&pass=java HTTP/1.1
The Request Headers
Host: www.javatpoint.com
User-Agent: Mozilla/5.0
Accept-text/xml,text/html,text/plain,image/jpeg
Accept-Language: en-us,en
Accept-Encoding: gzip,deflate
Accept-Charset: ISO-8859-1,utf-8
Keep-Alive: 300
Connection: keep-alive


Path to the source on Web Server
Protocol Version Browser supports
The HTTP Method
Post /RegisterDao.jsp HTTP/1.1
The Request Headers
Host: www.javatpoint.com
User-Agent: Mozilla/5.0
Accept: text/xml,text/html,text/plain,image/jpeg
Accept-Language: en-us,en
Accept-Encoding: gzip,deflate
Accept-Charset: ISO-8859-1,utf-8
Keep-Alive:300
Connection:keep-alive
User=ravi&pass=java
Message body

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4.Describe the SSL Layer ?

SSL : socket session layer for establish encrypted link between server and client typically a web server .

SSL allows sensitive information such as credit card numbers , social security numbers to be transmitted securely ,

5.Describe the Main Concepts in Security?

Security of Data

Confidentiality: only sender, intended receiver should “understand” message contents

Authentication: sender, receiver want to confirm identity of each other

Message integrity: sender, receiver want to ensure message not altered (in transit, or afterwards) without detection.

Access and availability: services must be accessible and available to users

6.Describe the Denial of service ?

Denial of service: prevent service from being used by others (e.g., by overloading resources) .

7.Describe the symmetric Key and Public Key Cryptography?

Symmetric key cryptography : both sender and receiver share the same secret symmetric key .

Public Key Cryptography : sender, receiver do not share the same secret key

Public encryption key known to all and private decryption key known only to receiver as RSA

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8.Mention Hash function Algorithms?

Hash function algorithms : MD5 and SHA1

7.Describe Http specific request Methods?

HTTP utilizes specific request methods in order to perform various tasks:

GET requests a specific resource in its entirety

HEAD requests a specific resource without the body content

POST adds content, messages, or data to a new page under an existing web resource

PUT directly modifies an existing web resource or creates a new URI if need be

DELETE gets rid of a specified resource

TRACE shows users any changes or additions made to a web resource

OPTIONS shows users which HTTP methods are available for a specific URL

CONNECT converts the request connection to a transparent TCP/IP tunnel

PATCH partially modifies a web resource

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"Interview Questions Answers "

2.Talk about Your Graduation Project :

My project idea was an educational game for Autistic children, which aims to provide an educational system and world of learning and fun for kids to encourage them to develop their skills in order to communicate with the outer world through learning the required cognitive and daily skills.

For designing the user interface of the game, we used one of the most popular frameworks which is unity framework. For the backend, we used the SQLite database, and the game linked with Android devices especially tablet devices.

The game has two main user groups a child mode for children, and Instructor Mode as a guidance to instructors of the children.

Through child mode, children will have fun learning common and basic objects to facilitate the daily activities , and they will become familiar with the sound of words and letters.

This mode consists of three different learning levels that increase in difficulty, starting from the level one which provide different units of learning (food unit, home unit, body unit).

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The second level aims to teach children the different parts of the home (bedroom, kitchen, bathroom, living room, quests room and the garden), so children will learn each part of the home from what parts is made up.

The third level provides learning higher skills than two previous levels; children will learn the main concepts of safety to keep themselves safe at home, food, and clothes.

To achieve the safety in home children will learn about the safe and dangerous equipment's in the home and to achieve safety in food they will learn about healthy and unhealthy food, and to achieve the safety in clothes, they will learn the appropriate clothes in winter and summer seasons, and appropriate clothes for policeman and doctor.

Each level will have many well-constructed quizzes to evaluate the children and their progress in each level and based on the evaluation of quizzes instructors can start teaching children at the next level.

The instructor mode provides guidance to instructors of children, this mode provides some statistical analysis and progress reports to ensure that children are progressing and learning required skills and all learning activities.

The game will track the performance of children step by step and record every simple transaction, the recorded information will provide fast feedback about the children performance, for example, our system will record the results of each quiz and the number of times each quiz is done and how many times are succeeded and failed, also records the time is needed to complete this quiz successfully. In addition, the instructors access our system records the time needed by each student to complete each unit of learning.

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Final Classes and Methods :

A class declared as final cannot be extended while a method declared as final cannot be overridden in its subclasses. A method or a class is declared final using the final keyword. Though a final class cannot be extended, it can extend other

Final methods are inherited but they are not eligible for overriding.

An interface is similar to a class in the following ways –

An interface can contain any number of methods.

An interface is written in a file with a .java extension, with the name of the interface matching the name of the file.

The byte code of an interface appears in a .class file.

However, an interface is different from a class in several ways,-

You cannot instantiate an interface.

An interface does not contain any constructors.

All of the methods in an interface are abstract.

An interface cannot contain instance fields. The only fields that can appear in an interface must be declared both static and final.

An interface is not extended by a class; it is implemented by a class.

An interface can extend multiple interfaces.

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Purposes of tagging interfaces –

Creates a common parent – As the EventListener interface. You can use a tagging interface to create a common parent among a group of interfaces.

Adds a data type to a class – A class that implements a tagging interface does not need to define any methods (since the interface does not have any), but the class

.

What is the type of variables in java language?

Class variables - declared as static within a class declaration.

Instance variables - declared within a class declaration without using the static keyword.

Local variables - declared in a block ({ }) or for statement.

Abstract class vs Interface :

- ✓ Interface can have only abstract methods. Abstract class can have abstract and non-abstract methods.
- ✓ Variables declared in a Java interface are by default final. An abstract class may contain non-final variables.
- ✓ Abstract class can have final, non-final, static and non-static variables. Interface has only static and final variables.
- ✓ Abstract class can provide the implementation of interface. Interface can't provide the implementation of abstract class
- ✓ A Java interface can be implemented using keyword "implements" and abstract class can be extended using keyword "extends".
- ✓ An interface can extend another Java interface only, an abstract class can extend another Java class and implement multiple Java interfaces.

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Define Object class in Java?

The Object class is the parent class of all the classes in java by default.

What is java ?

Java is interpreted language , compiler will convert source code to byte code, then byte code can be executed on any programing language (Portability of Java)

The JVM convert byte code to machine code.

Source code → byte code → Machine code .

AutoBoxing && AutoUnBoxing in Java?

AutoBoxing : Convert Value from primitive data type to an object .

AutoUnBoxing : Convert an Object to Primitive Data Type.

Access Modifiers In Java:

For Class :

Public: Called from anywhere.

No Modifier: Accessed From Same Package ..

For Variables & Methods :

The public member can be accessed anywhere (same class ,same package, derived Class, other Package).

The protected member can be accessed in same class, same package, derived class ,but cant be accessed in another package.

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No modifier can be accessed inside the same class and same package and cant be accessed in derived class and in another package .

The private member can be accessed only inside the same class.

Arrays in Java :

int anArray[] =new int [10] ;

int anArray[10] =new int [10] ;//ERROR

TO Define two Arrays together :

Double [] a1 ,a2 ;

Double a1, [] a2 //ERROR

Enhancment For Statement In Java :

int sum = 0 ;

For (int item: items)

Sum+ = item

Variable Length Argument List in JAVA:

Average (double … numbers)

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Define Generic Method in Java :

Public static <T> Print (T[] MyArray);

Define Generic Class In Java :

Public Class Box <T> {

Private T obj ;

Public void set (T obj);{}

Public T get () {}

}

// to create object of this class :

Box <integer> b = new Box <integer> () ;

This Reference :

Use it explicitly in a non static method body .

Use it to call another class constructor → this (0,0)

Every class must have at least one constructor "Default

Constructor" by the compiler.

`

What is the Composition in Java ?

Its has a relationship in java .

What is the garbage collection in java ?

The jvm perform Automic garbage .

System.gc() // to call java garbage collection .

What is the Enumeration in java ?

It's the collection of constants , cant be instantiated .

Hiding in Inheritance :

Hiding in Inheritance : Means declaring a field in the subclass with the same name as one in the super class.

Static method hiding : subclass defines method with the same name as a static method in the super class so that the method in sub class will hide super class method.

Exception Handling in Java :

Stack Trace :information displayed when an exception occurs and isn't handled .

`

Type of Exceptions in java :

We have two types of exceptions : checked exceptions and unchecked exceptions .

Checked Exceptions : exceptions you must handle it

Unchecked Exceptions : You can/can't handle it .

Finally BLOCK in JAVA

Finally Block : Always executed whether the exception is handled or not (if the exception occurred and handles ,if the exception occurred and isn't handled , if the exception isn't handled) .

The only case the finally block isn't executed where the statement

"system. Exit(0)" executed .

Thread in JAVA

Thread : to have parallel execution of different tasks at the same time.

difference between runtime error and Compilation Error:

Runtime error : causes the crash of program and happens through the execution of the program.

Compilation Error : Happens though the compilation of your program.

What is the Http protocol ?

Protocol responsible for web pages .Port number (80)

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What is the Https ?

it's a secure Http Protocol .Port number (443)

localhost IP:

Local host Ip : 127.0.0.1

What is PAN?

Personal Area Network as Bluetooth

What is the protocol :

set of instructions to establish the connection between network devices .

Template in java

Template : is a special fun which can operate with generic types .

Tcp and Udp Protocols :

Tcp and udp are examples of protocols built in top of IP protocol .

Define Firewall:

The firewall is a network security system .

Define RTT :

RTT : the time needed to send packet from src to destination then return back .

Database sql commands :

DDL : Data Definition Language .

DML :Data Manipulation language .

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Attribute types in DB :

Composite : can divide to subparts as name

Simple : cant divide to subparts as gender

Single : have only one value as age

Multivalued: has more than one value as color

Stored : attribute stored inside the database as City , Date

Driven : attribute isn't stored inside the database as Birthday , Address

Complex : multivalue + composite .

Primary key and Foreign Key:

Primary key : uniquely identify the record in the table

We can have only one primary key in the table

Primary key cant have null values .

Forignkey : a key which refers to primary key in another table and we can have more than one forigen key in the table .Can have null values.

Array Class in java:

Compare two Arrays :Array.equals(a1,a2);

To sort the Array :Array.sort(a1) ;

`

If the array has negative size then you will have NegativeArraySize Exception .

Difference Between Array and ArrayList ?

Array has fixed size which cant change once declare ,but Arraylist has dynamic size .

Array contain both primitive and object data type , but array list contain only object data type.

Array doesn't have genric feature whereas Arraylist has Genric Feature.

ArrayOutOfBound Exception :

occurs when the program access invalid index (higher or negative Value)

Cookies and sessions :

Cookies : stored in browser side and sent with http request where Session : stores in server side

Object oriented languages :

An object-oriented language is a computer programming language that revolves around the concept of an object as Java, C++, Smalltalk, Python, Javascript, ….

Assembly language

`

Is specific to a particular type of computer; moving the program to a different type of computer requires writing a whole new program. Assembly language programs are difficult to write, debug, and maintain

Importance of Inheritance ?

which is a powerful mechanism of reusing code, minimizing data redundancy, and improving the organization of object oriented system.

For example: A Car is a Vehicle, so the class Car has all the features or properties of class Vehicle and in addition to its own features. However, we cannot always have is a relationship between objects of different classes.

Define Java Language ?

Java is a portable language , object oriented languages ,Robust language , high performance,

Java language is interpreted language since java programming language byte code can be execute on any platform .

Size for int , double, byte ,float in java is constant .

Encapsulation and Abstraction

Encapsulation : binds data and code together in one unite and protect it from outside the world .

Abstraction : manages the complexity whereas the encapsulation encapsulates the complexity ,

Dynamic Binding :

`

Late Binding

One interface and multiple methods,

At run time the mapping between the virtual function and member function occurs.

Late binding between objects and functions.

Depends on polymorphism and inheritance .

Generalization and specialization :

Generalization : creating new super classes by extracting the shared characters between two or more shared sub classes .

Specialization : Creating new subclasses from existing classes

Five phases to execute Java Program :

Edit : programmer store the program in the disk

Compile : compiler creates bytecodes for program

Load : loader load bytecode into memory

Verify : verifier verify the bytecode

Execute : the interpreter convert the byte code into machine code .

`

To read from keyboard in java

We use class scanner object

Scanner Input = new scanner(System.in)

Int number ;

Number = input.nextInt() ;

Next() , nextInt () ,nextDouble() ,nextByte() , nextFloat()

No need to import java.lang class

Terminate application with window

System.exit(0) // terminate application with window

We have two type of packages in java:

Extension packages : begin with javax

Core packages: start with java

We have two types of data in java :

Primitive types as int , float, Boolean , double ,short , long , byte ,char

Reference types : as arrays ,class types, interface types .

`

DATA Types in Java:

The char in java is 16 bit Unicode character .

Int , short , float is 32 bit in java

Long , double is 64 bit in java

Byte default is 0

Int default is 0

Short default is 0

Long default is 0L

Float default is 0.0f

Double default is 0.0d

String default is null

Boolean default is false

Char default id '\u0000'

Create reference variable in java:

Car a = new car ()

What is wrapper class in java ?

The class that manipulate primitive data types as object .

We have 8 wrapper classes , Integer ,Double ,Float ,Byte, Character ,,,, etc

`

Access Modifiers in java:

For the class only two access modifiers public and no modifier

Public : it can be accessed anywhere

No modifier : can be accessed inside the same package only ,

Variables and methods can be private , protected , public , no modifier .

The protected access modifier cannot be applied to class and interfaces. Methods, fields can be declared protected, however methods and fields in a interface cannot be declared protected.

Math class method in java : abs (x) , cos(x) ,sin(x) .min(x) , max(x) .sqrt(x), pow(x)

Constant fields are static ,final , public

Argument promotion : prevents data loosing when converting data .

Random number Generation : use math static method Random

In java arrays is data reference types so no static arrays in java .

Every primitive is pass by value

Every object is pass by reference

`

In java arrays is object so its passed by reference .

System.arraycopy(Array1 ,0 ,Array2 ,4 ,7)

2D Array

Int a [][] = new int[3][4];

Int a[][] =new int [3][3];

Variable Argument List in java :

indicates that the method can receive variable number of arguments of that particular type .

Class Array in JAVA :

provide static method for array manipulation

methods :

sort : to sort two arrays

equals : for compare arrays

binarySearch : to search a sorted array

fill : to place values on array

Generic Class and Methods :

generic method : means method with parametrized types .

type of parameters can represent only reference types , not primitive types

`

Array List its Generic Class from package java.util which can dynamically change its size to accept more elements.

Each java class must extend another class explicitly ,if not it will implicitly extend class object

Class can have several constructors through overloading

This reference :

Every object can access a reference to itself with keyword this .

Enables the class code to know which object should be manipulated .

We can use keyword this explicitly in non static method body .

We can use keyword to call another class constructor .

Composition vs inheritance :

Composition : has a relationship

Unlike Inheritance in which a subclass extends the functionality of a superclass, in composition, a class reuses the functionality by creating a reference to the object of the class it wants to reuse. For example: A car has a engine, a window has a button, a zoo has a tiger.

`

Finalize method :

return memory to the system

provided by the class object

You can write a new static method in the subclass that has the same signature in the superclass thus hiding it , and You can write a new instance method in the subclass that has the same signature in the superclass thus overriding it.

The finalize() method may be called automatically by the system ,but when its called or even if its called its not certain .

So you shouldn't relay on the finalize method to clean up resources

The solution is Call → super.finalize()

Annotation in java :

Annotation: A form of metadata which provides a data about a program that isn't part of program itself .as @Deprecated && @override

Polymorphism in java :

Polymorphism: the ability of code to take many forms .

The Parent class reference refers to the child class object.

Its need the inheritance and function override

`

Called dynamic binding or late binding

Interface in java:

If the subclass does not implement the abstract methods then it must be declared as abstract class

The constructor of the subclass will implicitly call the superclass or explicitly using super keyword .

Define String in Java :

String a = new String ("hello);

String s1 = "Hi"

String s2 = "Hi"

S1 , s2 refers to the same string literal in memory

System.out.println (s.length());

Char x = a.CharAt(2) ;

`

OSI Model Layers :

OSI model		
Layer	**Name**	**Example protocols**
7	Application Layer	HTTP, FTP, DNS, SNMP, Telnet
6	Presentation Layer	SSL, TLS
5	Session Layer	NetBIOS, PPTP
4	Transport Layer	TCP, UDP
3	Network Layer	IP, ARP, ICMP, IPSec
2	Data Link Layer	PPP, ATM, Ethernet
1	Physical Layer	Ethernet, USB, Bluetooth, IEEE802.11

`

Differentiate Between Array and Linked List ?

BASIS FOR COMPARISON	ARRAY	LINKED LIST
Basic	It is a consistent set of a fixed number of data items.	It is an ordered set comprising a variable number of data items.
Size	Specified during declaration.	No need to specify; grow and shrink during execution.
Storage Allocation	Element location is allocated during compile time.	Element position is assigned during run time.
Order of the elements	Stored consecutively	Stored randomly
Accessing the element	Direct or randomly accessed, i.e., Specify the array index or subscript.	Sequentially accessed, i.e., Traverse starting from the first node in the list by the pointer.
Insertion and deletion of element	Slow relatively as shifting is required.	Easier, fast and efficient.
Searching	Binary search and linear search	linear search
Memory required	less	More
Memory Utilization	Ineffective	Efficient

`

// C++ Program to swap two numbers without using temporary variable

```
#include <bits/stdc++.h>

using namespace std;

 int main()

{

    int x = 10, y = 5;

    // Code to swap 'x' and 'y'

    x = x + y; // x now becomes 15

    y = x - y; // y becomes 10

    x = x - y; // x becomes 5

    cout << "After Swapping: x =" << x << ", y=" << y;

}
```

#) What do you understand by 'Database'?

Ans: Database is an organized collection of related data where the data is stored and organized to serve some specific purpose

`

#) How many SQL statements are used? Define them.

Ans: SQL statements are basically divided into three categories, DDL, DML, and DCL.

#) Weak entity Define it.

weak entity is an entity that cannot be uniquely identified by its attributes alone; therefore, it must use a foreign key in conjunction with its attributes to create a primary key

What is the AJAX ?

Update a web page without reloading the page.

AJAX is a new technique for creating better, faster, and more interactive web applications with the help of XML, HTML, CSS, and Java Script.

AJAX is a web browser technology independent of web server software.

What is the difference between session and cookies?

Cookies and Sessions are used to store information. Cookies are only stored on the client-side machine, while sessions get stored on the client as well as a server.

`

The difference between TCP and UPD internet Protocols?

There are two types of Internet Protocol (IP) traffic. They are TCP or Transmission Control Protocol and UDP or User Datagram Protocol

Edit	TCP	UDP
Acronym for	Transmission Control Protocol	User Datagram Protocol or Universal Datagram Protocol
Connection	Transmission Control Protocol is a connection-oriented protocol.	User Datagram Protocol is a connectionless protocol.
Function	As a message makes its way across the internet from one computer to another. This is connection based.	UDP is also a protocol used in message transport or transfer. This is not connection based which means that one program can send a load of packets to another and that would be the end of the relationship.
Usage	TCP is suited for applications that require high reliability, and transmission time is relatively less critical.	UDP is suitable for applications that need fast, efficient transmission, such as games. UDP's stateless nature is also useful for servers that answer small queries from huge numbers of clients.
Use by other protocols	HTTP, HTTPs, FTP, SMTP, Telnet	DNS, DHCP, TFTP, SNMP, RIP, VOIP.
Ordering of data packets	TCP rearranges data packets in the order specified.	UDP has no inherent order as all packets are independent of each other. If ordering is required, it has to be managed by the application layer.
Speed of transfer	The speed for TCP is slower than UDP.	UDP is faster because error recovery is not attempted. It is a "best effort" protocol.
Reliability	There is absolute guarantee that the data transferred remains intact and arrives in the same order in which it was sent.	There is no guarantee that the messages or packets sent would reach at all.

`

What is the main difference between stack and queue ?

Stack and Queue both are the non-primitive data structures.

BASIS FOR COMPARISON	STACK	QUEUE
Working principle	LIFO (Last in First out)	FIFO (First in First out)
Structure	Same end is used to insert and delete elements.	One end is used for insertion, i.e., rear end and another end is used for deletion of elements, i.e., front end.
Number of pointers used	One	Two (In simple queue case)
Operations performed	Push and Pop	Enqueue and dequeue
Examination of empty condition	Top == -1	Front == -1 || Front == Rear + 1
Examination of full condition	Top == Max - 1	Rear == Max - 1
Variants	It does not have variants.	It has variants like circular queue, priority queue, doubly ended queue.
Implementation	Simpler	Comparatively complex

`

//Write a small code to add "1" to binary Number:

```
public static byte[] addOne(byte[] A) {
    int lastPosition = A.length - 1;

    // Looping from right to left
    for (int i = lastPostion; i >= 0; i--) {
        if (A[i] == 0) {
            A[i] = 1; // If current digit is 0 I change it to 1
            return A; // I can exit because I have no reminder
        }
        A[i] = 0;     // If current digit is 1 I change it to 0
                      // and go to the next position (one position left)
    }
    return A;         // I return the modified array
}
```

Find the sum of two binary numbers

`

```c
/*
 * C Program to Find the Sum of two Binary Numbers
 */
#include <stdio.h>

int main()
{

    long binary1, binary2;
    int i = 0, remainder = 0, sum[20];

    printf("Enter the first binary number: ");
    scanf("%ld", &binary1);
    printf("Enter the second binary number: ");
    scanf("%ld", &binary2);
    while (binary1 != 0 || binary2 != 0)
    {
        sum[i++] =(binary1 % 10 + binary2 % 10 + remainder) % 2;
        remainder =(binary1 % 10 + binary2 % 10 + remainder) / 2;
        binary1 = binary1 / 10;
        binary2 = binary2 / 10;
    }
    if (remainder != 0)
        sum[i++] = remainder;
    --i;
    printf("Sum of two binary numbers: ");
    while (i >= 0)
        printf("%d", sum[i--]);
    return 0;
}
```

`

Code to find prime factors of number

```cpp
#include <iostream>

int main()
{
  int n;
  std::cout << "Enter number\n";
  std::cin >> n;
  for (int p = 2; n > 1 && p <= n; p++)
  {
    while (n % p == 0)
    {
      std::cout << p << " ";
      n /= p;
    }
  }
  std::cout << n << "\n";
}
```

Relational database and Relation in database :

In a relational database, the table is a relation because it stores the relation between data in its column-row format. The columns are the table's attributes, while the rows represent the data records. A single row is known as a tuple to database designers.

Relational database : collection of normalized relations with distinct relation names .

Relation : is two dimensional table composed of rows and columns.

Table name is distinct from all other table names in the database.

Each table must have an attribute or combination of attributes that uniquely identify the database .

Tuple is a record in a relation and must be destinict.

Domain : set of allowable values for one or more attributes .

We call the row → tuple / record

`

We call the column -> attribute

Each column represents an attribute .

Each table must have a primary key that uniquely identify each row .

Each column has specific range of values called as the attribute domain

The order of rows and columns isn't important in the database .

The schema is structure of the relation

Types of Key in DataBase:

Primary key : is an attribute or set of attributes that uniquely identify an given entity .

Composite key : is a key that consists of more than one key .

Super key : is a column or set of column that uniquely identify record in the table.

Candidate key ; is a super key .

Foreign key : is a column or set of column that matches the primary key of another table .

`

Define Trigger in the database?

In a DBMS, a trigger is a SQL procedure that initiates an action (i.e., fires an action) when an event (INSERT, DELETE or UPDATE) occurs. Since triggers are event-driven specialized procedures, they are stored in and managed by the DBMS. the DBMS automatically fires the trigger as a result of a data modification to the associated table.

Each trigger is attached to a single, specified table in the database. triggers are implicitly executed

Procedures stored at the database level.

Code to detect loop in linked list

```
boolean hasLoop(Node first) {
    Node slow = first;
    Node fast = first;

    while(fast != null && fast.next != null) {
        slow = slow.next;          // 1 hop
        fast = fast.next.next;     // 2 hops

        if(slow == fast)  // fast caught up to slow, so there is a loop
            return true;
    }
    return false;  // fast reached null, so the list terminates
}
```

`

Array list vs Linked List complexity :

	ArrayList	LinkedList
get()	O(1)	O(n)
add()	O(1)	O(1) amortized
remove()	O(n)	O(n)

Define MVC

A model is data used by a program. This may be a database, file, or a simple object,

A view is the means of displaying objects within an application.

A controller updates both models and views. It accepts input and performs the corresponding update.

How to make web pages responsive:

Take a look at Bootstrap and more specifically the Grid System. It should help you with css for different screen sizes.

`

Code to return the largest substring that begins and ends with sub with its respective length.

```
public int strDist(String str, String sub) {
  if (str.length()==0) return 0;
  if (!str.startsWith(sub))
      return strDist(str.substring(1),sub);
  if (!str.endsWith(sub))
    return strDist(str.substring(0,str.length()-1),sub);
  return str.length();
}
```

```
/* Counts no. of nodes in linked list */
int getCount(Node* head)
{
    int count = 0; // Initialize count
    Node* current = head; // Initialize current
    while (current != NULL)
    {
        count++;
        current = current->next;
    }
    return count;
}
```

`

```cpp
// C++ program to print all possible
// substrings of a given string

#include<bits/stdc++.h>
using namespace std;

// Function to print all sub strings
void subString(char str[], int n)
{
    // Pick starting point
    for (int len = 1; len <= n; len++)
    {
        // Pick ending point
        for (int i = 0; i <= n - len; i++)
        {
            //  Print characters from current
            // starting point to current ending
            // point.
            int j = i + len - 1;
            for (int k = i; k <= j; k++)
                cout << str[k];

            cout << endl;
        }
    }
}
```

`

// code to find non repeating element in an Array

```
#include <stdio.h>
#include <stdlib.h>
int non_repeating_elements(int arr[], int n)
{
int i,j;
int count = 1;
for(i = 0; i < n; i++)
{
for(j = 0; j < n; j++)
{
if(arr[i] == arr[j] && i != j)
break;
}
if(j == n )
{
printf("\nNon-repeating element [%d] : %d \n",count,arr[i]);
++count;
}
}
return -1;
}
```