Computer Village & Multimedia

Java Tutorial

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Java

Interview Questions

Java

1. What is Java ?

- Java is high level programing language originally developed by Sun microsystem and created by James Gosling. It is a Platform Independent Programing Language, Which is Java Program writes on any operating system and can run in another operating system. Write once and run anywhere.(WORA).
- Java is currently owned by Oracle. Java was first Publicly released in 1995.

2. What is the advantage of using Java and why we should learn Java / Features of Java ?

- Java is one of the widely usable and user friendly programming language. We should learn the Java for following reasons :
  - Platform independent. (WORA)
  - Object Oriented.
  - Support Desktop and web-based application.
  - Robust. (Well error handling or exception handling ability)
  - Secure.
  - Multi-threaded.

Interview Questions

Java

3. What is JDK, JRE, JVM, JavaC, and IDE ?

- JDK : JDK stands for Java Development Kit, It is one of three core technology packages used in Java programming. The JDK is a key platform component for building Java applications and allows developers to create Java programs that can be executed and run by the JVM and JRE.
- JRE : JRE stands for Java Runtime Environment. The JRE is a set of components to create and run a Java application. Which is acts as a kind of translator and facilitator between the java program and the OS.
- JVM : JVM stands for Java Virtual Machine. The JVM is the Java platform components that executes program and allow Java programs to run on any device or operating system (known as the “Write once, run anywhere” principle).
- JavaC : JavaC stands for Java Compiler. Java Compiler(javac) command compile Java source code to Java bytecode in order to run the Java programs.
- IDE : IDE stands for Integrated Development Environment. IDE is a software application which is normally consists of at least a source code editor, build automation tools and a debugger that provides comprehensive facilities to computer programmers for software development.

Interview Questions

Java

4. How I can create a class using Notepad or Bracket and compile and run it?

- First, I must open Notepad or Bracket, or other text editor application then create a .java file with a name and save it in my desktop. Suppose I have created a file with the name of Demo.java and in the file I must write the following codes to create a class. Remember the class name and the file name should be the same.

```
public class Demo{
        public static void main(String[] args){
                System.out.print("My Name is Mohammad Jashim Uddin.);
    }
}
```

- To compile and Run my Demo class I must open my cmd or terminal command prompt. Then I have to write the following command to compile and run my program

cd Desktop ⟶ press Enter or Return button.

javac Demo.java ⟶ press Enter or Return button.

java Demo ⟶ press Enter or Return button.

The output will be My Name is Mohammad Jashim Uddin.

Interview Questions

Java

5. What is Project in Java?

- A Project is group of source files and the settings with which we build, run, and debug those source files. In the IDE, all Java development has to take place within a project.

6. What is Package in Java?

- A package is a namespace that organizes a group of related classes and interfaces.

7. What is a Class in Java?

- In Java a class is a group of objects which have common properties. It is the blueprint or template that describes the state, behavior, and identity of an object.

8. What is a variable?

- A variable is a piece of memory that can contain a data value. The memory size depends on the type of that data.
- Example: int x = 29; here int is data type, x is the variable, and 29 is the value.

9. What is a method?

- A method is a block of code or collection of statements or a set of code grouped together to perform a certain task or operation. It is used to achieve the reusability of code.
- A method has the following components : Access Modifier, Return type, Method name, Method sign or Parameter list, and Building block.

Interview Questions

Java

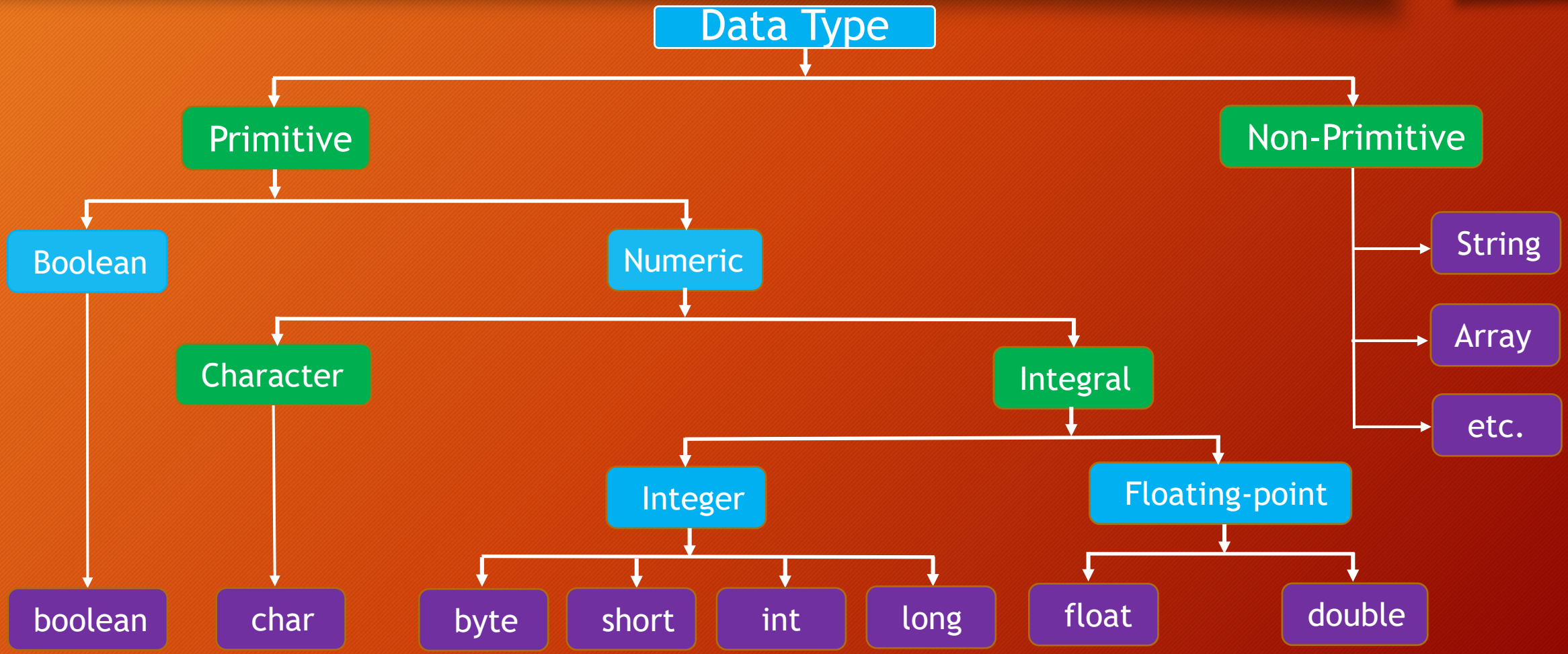
10. What is the Data Type?

- Data type specifies the size and type of values that can be stored in a variable(Identifier).
- Data types in Java are classified into two types :

- Primitive data type: Primitive data types are the predefined data types of Java. They specify the size and type of any standard values. Java has 8 Primitive data types.
- Non-Primitive data type: Any classes or interfaces build by programmer and is not defined by Java(Except String) to call methods to perform certain operations, while primitive data type cannot. Ex: classes, interfaces, Arrays, String etc.

Interview Questions

Java



Interview Questions

Java

Primitive Data Types

Type Name	Description	Size	Range	Sample Declaration & Initialization
boolean	True or false	1bit	{true,false}	Boolean myAge=true;
byte	Signed Integer	1 byte	.128 to 127	byte myByte=100;
char	Unicode Character	2 bytes	\u0000 to \uFFFF	char myChar='a';
short	Signed Integer	2 bytes	-32768 to 32767	short myShort=1000;
int	Signed Integer	4 bytes	-2147483648 to 2147483647	int myInt=100000;
long	Signed Integer	8 bytes	-9223372036854775808 to 9223372036854775807	long myLong=0;
float	IEEE 754 floating point	4 bytes	+1.4E-45 to +3.4028235E+38	float myFloat=10.0f;
double	IEEE 754 floating point	8 bytes	+4.9E-324 to +1.7976931348623157E+308	double myDouble=20.0;

Interview Questions

Java

11. What is an Object in Java?

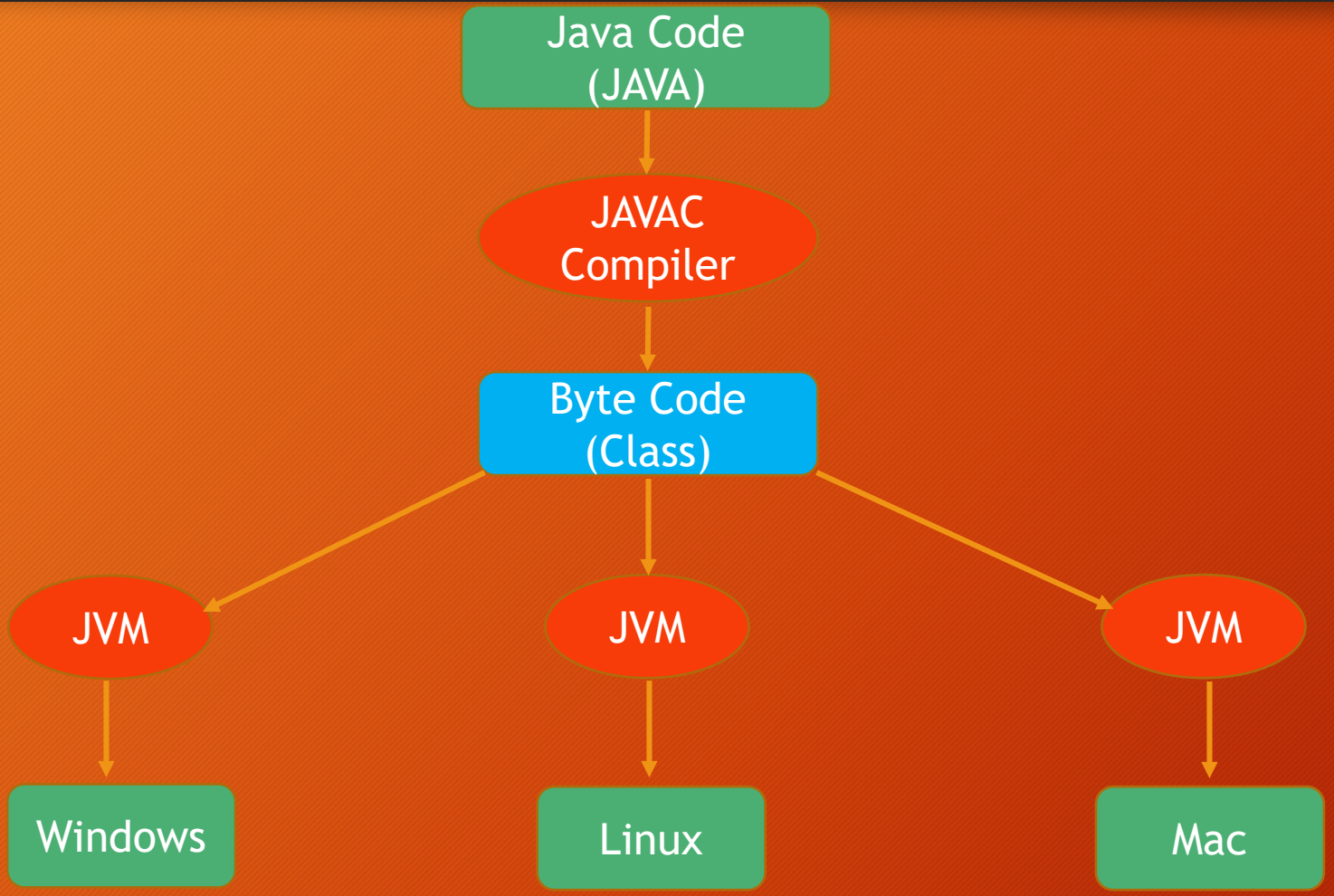
- Object is an instance of a class, which is a piece of code that represents the real-life entity. Object has its own state, behavior, and identity. Object consists real values instead of variables. Without the class, object does not exist.

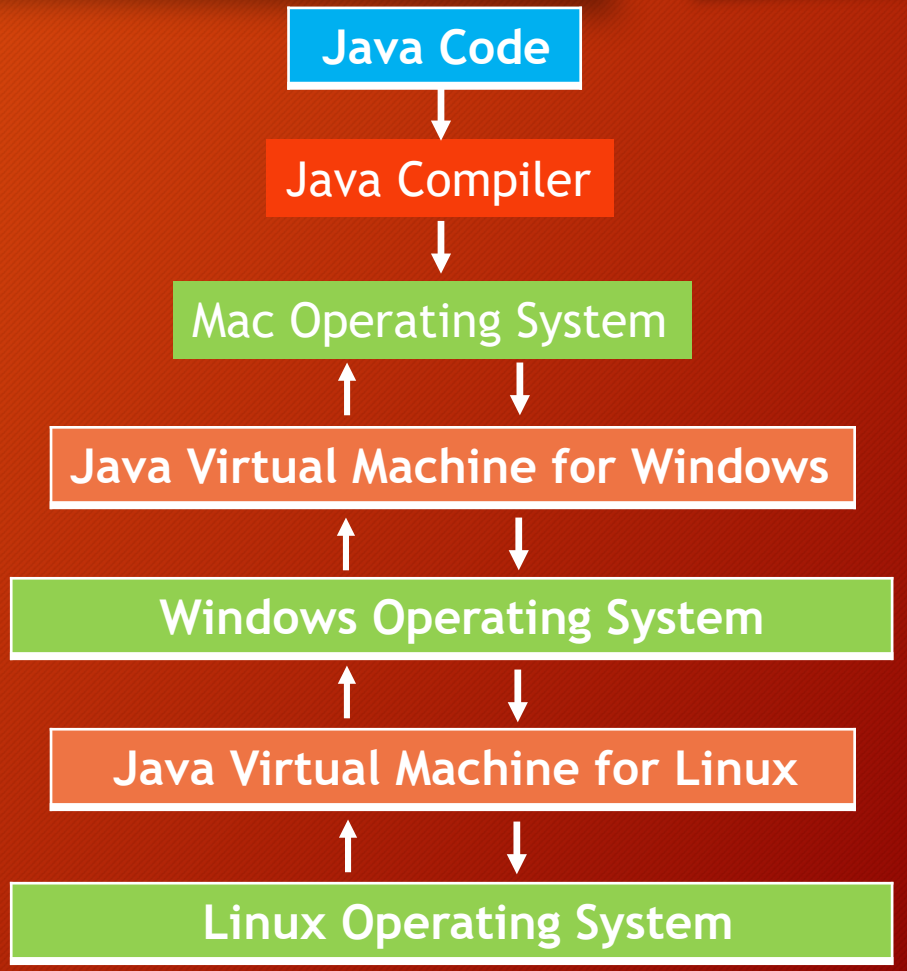
12. Why Java is a platform independent language?

- Java is a platform-independents language, because it has JVM so we can write and compile Java code in one operating system and run in any other operating system.

Interview Questions

Java





Interview Questions

Java

13. What is the base class of all classes in Java ?

- Object class is the base class or super class of all classes in Java by default. Every class has Object as superclass. It is present in java.lang package.

14. What is the local, Instance, class, and constant variable in Java ?

- **Local variable:** A local variable in Java is a variable that is declared within the body of a method. Then you can use the variable only within that method. Other methods in the class aren't even aware that the variable exists.
- **Instance variable: An** Instance variable is a variable which is declared in a class but outside of the method. Instance variables are created when an object is instantiated and are accessible to all the method in the class .
- **Class variable:** A class variable is a variable which is also known as static variable. Class variable is declared with the static keyword in a class, but outside of method. There would only be one copy of each class variable per class.
- **Constant variable: A c**onstant variable is a variable in java whose value cannot change once it has been assigned. A constant variable declared as static and final. Constant variable name always written with all upper cases.

Interview Questions

Java

15. What are the four fundamental concepts of Java ?

- Java is an object-oriented programming language based on its four basic concepts, whose are as follows :
  - Encapsulation.
  - Abstraction.
  - Inheritance.
  - Polymorphism.

16. Why Java is OOP language ?

- OOP's is stands for object-oriented programming system. In Java OOP is a Programing paradigm or methodology which is associated with the concepts like Class, Object, Inheritance, Encapsulation, Abstraction, Polymorphism. An object-based application in Java is based on declaring classes, creating objects from them and interacting between these objects. Java is fully Object-Oriented Programing language because without Class and Object, it is impossible to write any Java Program. Java is not pure Object-Oriented Programing Language, because Java supports primitive Datatypes.

Interview Questions

Java

17. Why Java is not a pure OOP language ?

- Java is not pure Object-Oriented Programing Language, because Java supports primitive Datatypes such as int, byte, long …. etc., to be used, which is not object and Java cannot inherit more than one class at a time.

18. What is Abstraction ?

- Abstraction is a process of hiding the trivial elements from the user and only the essential elements will be provided to the user. In other words, the user will have the information on what the object does instead of how it does it.

19. How we can achieve abstraction in Java ?

- In Java, abstraction is achieved by using the Abstract keyword for classes and Interfaces. In Abstract classes, we can have abstract methods as well as concrete methods. In Abstract Interfaces, we can only have abstract methods. In other words, we can achieve 0-100% abstraction from Abstract class and 100% abstraction from Abstract Interface.

20. What is inheritance in Java ?

- Inheritance in java can be defined as the process where one object acquires the properties of another object. In other words a child object inherit the properties of a parent object by using extends keyword is called inheritance. The object which inherits the properties of other is known as subclass (child class, derived class) and the object whose properties are inherited is known as super class (base class, parent class).

Interview Questions

Java

21. What is Encapsulation in Java?

❖ Encapsulation in Java is a mechanism to wrap up the data and code acting on the data together as a single unit. It is the process of hiding information details and protecting data and behavior of the object. it is one of the four important OOP concepts. To achieve encapsulation in Java we can use modifiers like protected, public, private. In encapsulation we may retrieve and update data with the help of getter and setter method.

22. What is Polymorphism ?

❖ Polymorphism means : **many**(poly) **forms**(morphism)

- Examples: a) Water: liquid, solid, gas.
  b) Shapes: square, rectangle, circle etc.
  c) Sound: roar, burking etc.
- There are Two types of Polymorphism:

❖ Compile time Polymorphism:

static polymorphism => Achieve with method overloading.

❖Runtime Polymorphism:

Dynamic polymorphism => Achieve with method overriding.

Interview Questions

Java

23. What is method overloading and method overriding ?

❖ In Java overloading occurs when two or more methods in one class have the same method name but different parameters. Overriding occurs when two or more methods in different class have same method name and same parameters.

Method Overloading & Method Overriding

Method Overloading	Method Overriding
➢ Methods are in Same Class. ➢ Methods has Same Name ➢ Methods has Different Arguments : a) No. of Arguments are different. b) Types of Arguments are different. c) Sequence of Arguments are different.	➢ Methods has Same Name ➢ Methods are in Different Classes. ➢ Methods has Same Arguments : a) No. of Arguments are same. b) Types of Arguments are same. c) Sequence of Arguments are same. d) Inheritance (Multiple classes has a Relationship)

Interview Questions

Java

24. What is the Interface ?

- An interface in Java is a blueprint of a class and a mechanism to achieve abstraction. It has static constants and only abstract methods. It is used to achieve abstraction and multiple inheritance in Java.

25. What are runtime exception ?

- The runtime exception is the parent class in all Exceptions of the Java programming language that are expected to crash or break down the program. Runtime Exceptions are not warned by the compiler, but it is thrown at runtime.
- The most common Runtime Exceptions are NullPointerException, ArrayIndexOutOfBoundsException, and the InvalidArgumentException.

26. What are the difference between Declaration and Definition in Java ?

- Declare means to announce or proclaim while Define means to describe some entity. In Java the concept of declaration includes information the compiler about properties of the variable, While the definition is basically the actual implementation and memory location of a variable or function.
- Memory has not been allocated during the declaration of a variable or function.
- Memory has been allocated during the definition of a Variable or function.

Interview Questions

Java

27. What is Constructor ?

- Constructor is used for initialize an object, not for create an object.
- Constructor is a block (like method) having same name as that of class name.
- Constructor does not have any return type, not even void.
- The only modifiers applicable for Constructor are access modifier, which are : public, private, protected, and default.
- Constructor executes automatically when we create an object.
- Constructor can be overloaded.

28. What is the difference between encapsulation and private variable ?

- Encapsulation is defined as the wrapping up data under a single unit. So, we may achieve encapsulation methodology using by access modifier, i.e. private, protected, and public.

29. What is the difference between = and == sign ?

- Single equal '=' sets a variable to the given value, and double equals "==" compares the value stored in a variable with the given value. For example:

```
int x=5; // now the value 5 is set to x
int x==7; // checks if the value in x is 7; if so, returns true, else returns false
output will be false, because the value of x is 5.
```

Interview Questions

Java

30. What is the % operator ?

- Operators are a group of symbols which is used to perform operations. In Java, % operator is a remainder operator which returns the reminder of dividing the first.

31. What is the difference between == operator and equal() method?

- == operator is used for reference or address comparison. It means == operator checks if both objects point to the same memory location or not.
- .equals() method is used for content comparison (in String class). It means .equals() method is used to check object value.
- For Example:

```
String s1 = new String("Uddin");
String s2 = new String("Uddin");
System.out.println(s1==s2);
output: false // because memory location is different, or reference is diference.
System.out.println(s1.equals(s2));
output : True // because content or value are same.
```

Required Software

Java

- JDK (Java Development Kit);
- IDE (NetBeans/Eclipse/JDeveloper);

An integrated development environment (IDE) is a software application that provides comprehensive facilities to computer programmers for software development. An IDE normally consists of at least a source code editor, build automation tools and a debugger.

We will use eclipse (IDE) for our JAVA codding.

Day One

Java

I'm using Eclipse for our Java Programing.

At first, we need to create a JavaProject.

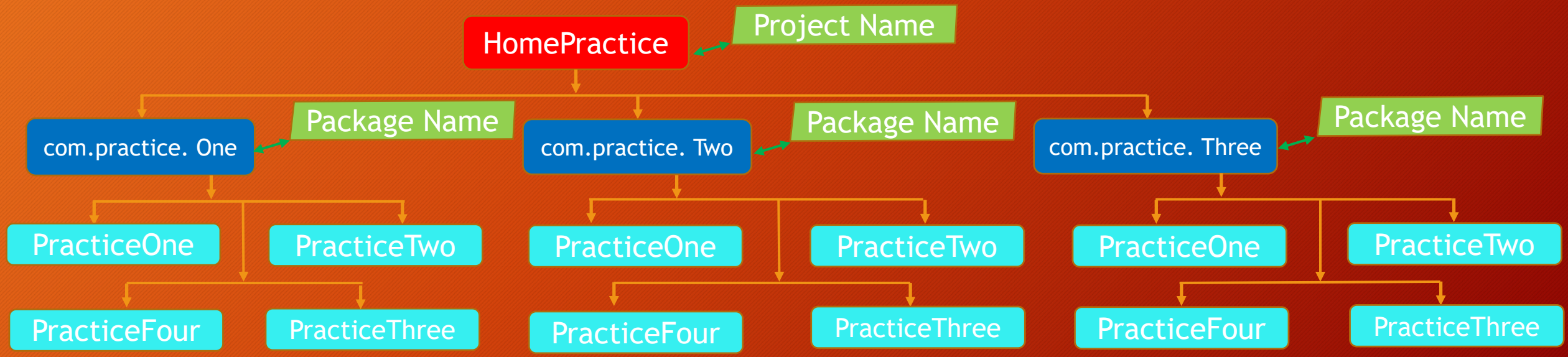
Then we will create a package under the JavaProject we have already created. We may create as much as package that the JavaProject demand.

Then we will create a Class under the package we have already created. Remember we may create as much as class that the individual package demand as well.

Day One

Java

- I'm using eclipse (IDE), lets create a Project Name: “HomePractice”
- Then create three Package Name as follows:“com.practice.one” and so on
- Then create four Classes on under each package name as follows: “PracticeOne” and so on
- So the diagram should be as follows:



```
public class Javaclass2 {
	public static void main(String [] args) {

		String s; // declaring a String variable called s
		s="My name is s";    //assigning value for the variable s

		String name="Bangladesh";  //we declared a String variable and assigned value for the variable
		System.out.println("Hello "+name); //we print string value and variable
		System.out.println("This is our second class"); //we print string value directly

		int a=59;
		//here int is variable type
		// a is the name of variable
		// after = sign, what ever we have, it will be the value of the variable, here 59 is the value of a

		//There are two different types of data we have in JAVA:
		//1) Primitive data: The types of data that are already built by java developer those are called primitive data

		//THE FOLLOWING 8 DIFFERENT DATA TYPES ARE CALL PRIMITIVE DATA TYPE:
		//the following data type can hold only whole number;
		byte b=123;
		short k=32767;
		int b=2147483647;
		long p;
		//The following data type can hold both whole and fraction number
		float m=56.43f;
		double d=6543.45453;
		//boolean type variable can hold only true or false
		boolean n=true;//boolean nn=false;
		char myCharValueIsThis='@';
		//2) Non-primitive/Referance data: The types of data we create, all of the types are called referance type data
		String y="adnan01";
	}
}
```

Modifier Keywords

Java

- In java we have two type of Modifiers :
  - ❖ Access Modifiers.
  - ❖ Non Access Modifiers.

Access Modifiers	Non Access Modifiers
➢ Public ➢ Private ➢ Protected ➢ Default (No Modifier)	➢ static ➢ final ➢ abstract ➢ synchronized ➢ transient ➢ volatile ➢ strictfp

Static Keyword

Java

We can use Static Keyword with :

- Variable (class level)
- Methods
- Block
- Inner Class (nested class)

We can not use Static Keyword with :

- Local variable
- Outer Class

Why we create static variable ?

❖ Static variable are used for memory management. With static keyword our program become memory efficient, and we can save memory space.

Constructor

Java

Constructor is used for initialize an object, not for create an object.

- Constructor is a block (similar to method) having same name as that of class name.
- Constructor does not have any return type, not even void.
- The only modifiers applicable for Constructor are access modifier, which are : public, private, protected, and default.
- Constructor executes automatically when we create an object.

Object Creation

- By using reference variable
- By using method
- By using constant

Inheritance

Java

- Inheritance is the procedure by which one object acquires all the properties and behaviors of a parent object.
- OR
- It is inheriting the properties of parent class into child class.

❖ There are 5 types of inheritance:

a) Single inheritance
b) Multilevel inheritance
c) Hierarchical inheritance
d) Multiple inheritance
e) Hybrid inheritance

//In java we can not use multiple and hybrid //inheritance. We only can use //single, multilevel and hierarical inheritance

Polymorphism

Java

- Polymorphism means: **many**(poly) **forms**(morphism)
- Examples: a) Water: liquid, solid, gas.
  b) Shapes: square, rectangle, circle etc.
  c) Sound: roar, burking etc.
- There are Two types of Polymorphism:

❖ Compile time Polymorphism:

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❖Runtime Polymorphism:

Dynamic polymorphism => Achieve with method overriding.

RegEx

Java

- Regular Expression:

If we want to Represent a Group of Strings according to a Particular Pattern, then we should go for Regular Expression.

Pattern p = Pattern.compile();

Matcher m = p.matcher();

Pattern object :

Compiled version of Regex.

Equivalent java object of Regular Expression.

Pattern p = Pattern.compile(“ab”);

Matcher object:

We can use Matcher object to match the given pattern in the target String.

We can create Matcher object by using matcher method() of Pattern Class.

Matcher m = p.matcher(“ababbaba”);