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WK 37 (257-10B)

SEPTEMBER • THURSDAY

14

## Assignment 3

Edge - my 20

Daveshwan Saste.

Q 1 What is Java?

→ Java is a general-purpose, object-oriented programming language developed by Sun Microsystems of USA in 1991. Originally called Oak by James Gosling, one of the inventors of the language, Java was designed initially for the development of software for consumer electronic devices like TV, VCR, toasters and such other electronic machines.

The goal had a strong impact on the development team to make the language simple, portable and highly reliable.

Java is collection of programs that help programmers to develop and run Java programming application efficiently. It includes an execution engine, a compiler, and a set of libraries in it. It is a set of computer software and specifications.

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FRIDAY • SEPTEMBER

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- ② what is a package in java? list down various advantages of packages.

→ packages are java's way of grouping a variety of classes and/or interfaces together. The grouping is usually done according to functionality in fact, packages act as containers for classes. By organizing or classes into package we archive the following benefits!

① The classes contained in the package of other programs can be easily reused.

② in package, classes can be unique compared with classes in other package. That is two classes in two different package can be unique can have the same name. They may be referred by their fully qualified.

③ java package provide access protection

④ java package is used to categorize the classes and interfaces so that they can be easily maintained

⑤ java package remove naming collision.

Q) Explain JDK, JRE and JVM?

→ JDK - The Java Development Kit (JDK) is one of three core technology packages used in Java programming. Along with JVM and the JRE, it's important to differentiate between these three technologies as well as understanding how they connected.

JDK is a kit which provides the environment to develop and execute the Java program.

JRE - Java runtime environment is an installation package which provides environment to only run (not develop) the Java program onto your machine. JRE is only used by them who only want to run the Java program i.e. end users of your system.

JVM:- Java virtual machine is very important part of both JDK and JRE because it is contained or inbuilt in both. Whatever Java program you run using JRE or JDK goes into ~~JRE or JDK~~: JVM and JVM is responsible for executing program line by line, hence it is also known as interpreter.

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18

MONDAY • SEPTEMBER

17

④ explain `public static void main(String args[])` in java?

→ in java program, the point from where the program starts its execution or simply the entry point of java program is the `main()` method. Hence, it is one of the most important methods of java and having proper understanding of it is very important.

① `public`: it is an access modifier, which from where and who can access the method making the `main()` method `public` makes it globally available. It is made `public` so that jvm can invoke it from outside the class as it is not present in the current class.

② `void`:

`static` it is a keyword which is used when associated with a method makes it a class related method. The `main()` method is `static` so that jvm can invoke it without instantiating the class. This also saves the unnecessary wastage of memory which would have been used by object declared only for calling method.

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WK 38 (262-103)

SEPTEMBER • TUESDAY

19

③ void :- it is a keyword and used to specify that a method doesn't return anything. As main() method does not return anything its return type is void.

④ main; it is the name of java main method it is the identifier that the JVM looks for as the starting point of the java program, its not a keyword

⑤ String[] args :- it stores java command line arguments is an array of type java.lang.String class Here, the name of a String array is args but it is not fixed and user can any name in place of it

```
class main
{
```

```
    public static void main(String args)
```

{

```
        //body
```

{

{

NOVEMBER

20

WEDNESDAY • SEPTEMBER

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⑤ what are the differences between C++ and Java?

8 →

C++

Java

a) platform

b) C++ is platform dependent Java is platform independent

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② C++ is mainly used for system programming Java is mainly used for application programming

it is widely used in windows, web-based enterprise and mobile applications

③ C++ supports goto statement Java doesn't support the goto statement

④ C++ supports operator overloading Java doesn't support operator overloading

⑤ C++ supports structures and unions Java doesn't support structures and unions

⑥ C++ is nearer to hardware Java is not so interactive with hardware

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WK 38 (20A-101)

SEPTEMBER • THURSDAY

21

Q Why Java is platform independent?

→ The most significant contribution of Java over other languages is its portability. Java programs can be moved from one computer system to another, anywhere and any time changes and upgrades in operating systems, processors and system resources will not force any changes in Java programs. This is the reason why Java has become a popular language for e.g. programming on Internet which interconnects different kinds of system worldwide. We can download a Java applet from a remote computer onto our local system via Internet and execute it locally. This makes the Internet an extension of the computer to our local system of the user's basic system providing practically unlimited number of desirable applets and applications.

22

**FRIDAY • SEPTEMBER**

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7 what are wrapper classes in java?

- <sup>8</sup> → As pointed out earlier, vectors cannot handle primitive date types like int.
  - <sup>9</sup> → float, long, char and double primitive date types may be converted into object type by using the wrapper classes contained in the java.lang package.
  - <sup>10</sup>
  - <sup>11</sup>

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## Booleean

cher

## Character

double

## Double

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float

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Longy

Long

- <sup>3</sup> The wrapper classes have a number of unique methods for handling primitive data types and objects. They are listed in the following tables.

3nteger::interval = new::Pointger(i)

Q why pointers are not used in Java?

- most studies agree that pointers are one of the primary feature they enable developers to inject bugs into their code
- when Java was created, the intention was to create a language that is easy to learn and not prone to the bugs that C++ is prone to. it's not like C/C++ where we have to manage the memory management by destructors in Java. automatic garbage collector works for memory management. Actually Java reference are pointer. so everything in Java is accessed only through pointer.

Q list some features of Java?

- ① Compiled and Interpreted
- ② Platform-Independent and portable
- ③ Object-oriented
- ④ robust and secure
- ⑤ Distributed
- ⑥ Familiar, Simple and Small
- ⑦ multithreaded and interactive
- ⑧ High performance
- ⑨ Dynamic and extensible

25

MONDAY • SEPTEMBER

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## ⑩ why a Java Architectural Neutral?

→ Java is architecture neutral because there are no implementation dependent features, for example - the size of primitive types is fixed.

In C programming, int data type occupies 2 bytes of memory for 32 bit architecture and 4 bytes of memory for 64 bit architecture. However it occupies 4 bytes of memory for both 32 and 64 bit architecture in Java.

## ⑪ How Java enabled High performance?

→ J2SE 5.0 assures a significant increase in scalability and performance by improving the startup time and reducing the amount of memory used in Java's runtime environment. For ex. the introduction of the `ClassLoader`, data sharing in the HotSpot Java Virtual Machine improves the startup time by loading the core classes from the Jar files into a shared archive. Memory utilization is reduced by sharing data in the shared archive among multiple JVM processes.

Wk 39 (269-036)  
1 2 3 4 5 6 7 8  
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SEPTEMBER • TUESDAY

26

⑫ why Jara is considered dynamic?

→ Jara is a dynamic language. Jara is capable of dynamically linking in new class libraries, methods and objects. Jara can also determine the type of class through a query, making it possible to either dynamically link or abort the program depending on the response.

Jara program support functions written in ~~an~~ order other language such as C and C++. These functions are known as native methods. This facility enable the programmer to use the efficient functions available in these languages.

⑬ what is JVM and how it is considered in context of Jara's platform independent feature?

→ JVM - Jara virtual machine is very important part of both JRE & JRE. Inbuilt JRE in both JVM is responsible for executing program line by line hence it is also known as interpreter. The most significant contribution of Jara is portability. Jara program can be moved from one computer system to another.

27

WEDNESDAY • SEPTEMBER

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14) list out two java IDE's?

→ ① eclipse is a java IDE that is one of biggest and most popular IDE

② IntelliJ IDEA:

IntelliJ IDEA is Java IDE is one of 3 biggest and most popular IDE

IDE

15) why java is called as "platform"?

→ Java is called as platform because

- ii) java is collection of programs that help programmers to develop and run java programming application efficiently.
- iii) includes an execution engine, a compiler and a set of libraries
- iv) it is set of computer software and specification.

16) Is java pure object oriented?

→ Java is not pure object oriented because

① pure object oriented means it should contain classes and objects it should not contain primitive data type like int, float, etc.

28

SEPTEMBER • THURSDAY

- ② pure object-oriented language we share access everything by message passing through objects but Java (contrary to static variables and methods which can be accessed directly without using objects) does not support multiple inheritance.
- ③ Java

- ④ Which version of Java have you learned? Name some of the new features added to Java 8 - JDK 1.8 -

- ① Lambda expressions
- ② method reference
- ③ functional interface
- ④ Stream API
- ⑤ Default method
- ⑥ Base 64 encode or decode
- ⑦ Static method in interface

- ⑧ What gives Java its "write once and run anywhere" nature?

Java applications are called "write once and run anywhere". This means a programmer can develop Java code on one system and can expect it to run on any other system.

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FRIDAY • SEPTEMBER

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other java enabled system without any adjustment. This is all possible because of JVM.

⑨ Difference between path and classpath  
→ path

An environment variable which is used by the operating system to find executables. i.e it refers to system

classpath

An environment variable which is used by the Java Compiler to find the path of classes. i.e J2EE we give the path of jar files  
it refers to the Developing Environment.

⑩ what is the signature of main function in java?

→ the signature of the main method is `public static void main(String[] args)` puts `public static void main()` the main entry point signature for a typical java program.

30

SEPTEMBER • SATURDAY

21

what is the difference between JDK and JRE?

→ JDK

JDK is an acronym from Java Development Kit. The Java Development Kit is a software development environment which is used to develop Java application and applets. It physically exists. It contains JRE and development kit.

JVM JRE

- it is also written as Java RTE
- The Java Runtime Environment is a set of software tools which are used for developing Java application. It is used to provide the runtime environment.
- It is the implementation of JVM.
- It physically exists. It contains a set of libraries & other files that JVM uses at run time.

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what is JVM? What it does?

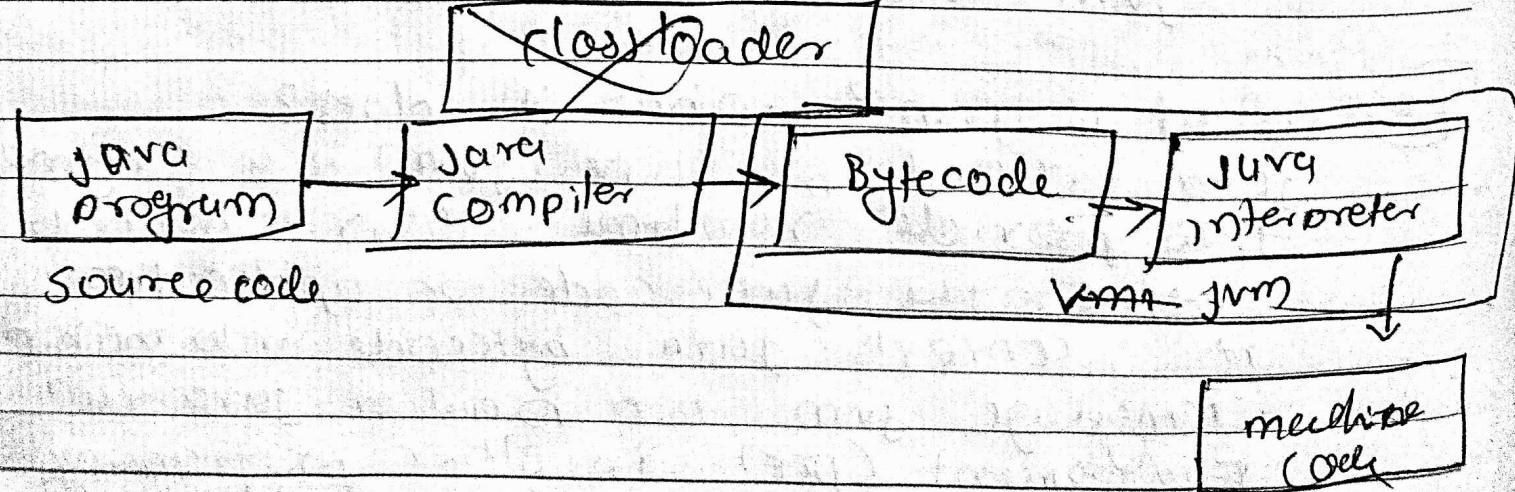
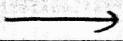
Java Virtual Machine (JVM) is a engine that provides runtime environment to drive the Java code or application. It converts Java bytecode into machine language. JVM is a kind of Java run Environment (JRE) in other programming

languages, the compiler produces machine code for a particular system. However java compiler produces code for a virtual machine known as java virtual machine

23) why jvm is called virtual machine

→ jvm is virtual because it is generally implemented in software on top of a real hardware platform and operating system. all java programs are compiled for the jvm therefore the jvm must be implemented on a particular platform before compiled java programs will run on that platform.

24) what are the main components of jvm  
explain them or explain jvm architecture 2.



01

SUNDAY • OCTOBER

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java compiler produces an intermediate code known as bytecode for a machine that does not exist. The machine is called as jvm and it exists by inside the computer memory it is a simulated computer within the computer and does all major functions of a real computer.

The machine specific code (machine code) is generated by the java interpreter by acting as an intermediary between the virtual machine and the real machine. ~~it knows~~

Q25 what is the difference between java compiler (javac) and JIT?

→ A compiler to compile the given program to execute code (whole code compilation)

A JIT compiler perform a similar task but it is used by jvm internally to translate the hotspot in the byte code

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WK 40 (275-030)

02

OCTOBER • MONDAY

26) Is Empty.java file name a valid source file name?

→ 9) Yes Empty.java file name works. but class must not be public it means that must be default. if class is public then it shows error.

10) Java compiler doesn't consider it same file name or except our class having public specified we can save any name or empty. but when .

27) Is JRE different for different platform?

3) The JRE are both platform and architecture specific but the byte code and jvm function identically between all platforms.

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03

TUESDAY • OCTOBER

28 Difference between C++ and Java in term of object creation.

- in C++ we have to create object of every class which contains ~~the~~ name to access.
- in Java we have to create object to access. but when we use static keyword there is no need to create object to access the method and variable.

29 Who invoke main() function?

→ The main method in Java language is similar to the main function in C and C++. When the Java interpreter executes an application it by being invoked upon the application controlling class. It starts by calling the class's main method.

When compiler starts to compile it will find where the main method and start program with main method. It is automatically get invoked by class and Java compiler.

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OCTOBER • WEDNESDAY

04

(30) what is .class file known as?

→ .class file is generated when we compile a java program file which java compiler compile a source file and convert it to generate an intermediate code file that is called as byte code.

.class file is bytecode or intermediate code file.

(31) Can we define more than one public class in a java source code? what is the rule of public class and file name?

→ No while defining multiple classes in a single java file you need to make sure that only one class among them is public. If you have more than one public class in a single file a compile-time error will be generated.

when we define a public class in a file the file must have same name as class name.

NOVEMBER

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05

THURSDAY • OCTOBER

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32

what is JIT compiler?

- JIT - just-in-time compiler i)  
 a an essential part of the JRE i.e  
 java runtime Environment that is  
 responsible for performance optimization  
 of java based application at run time  
 complir is one of the key aspects in  
 deciding performance of an application  
 for both parties.

33 HOW many types of memory areas  
 are allocated by jvm?

diff

- all function take different form of  
 the memory structure. the memory in  
 the jvm divided into 5 different parts

- ① class (method) Area
- ② - Heap
- ③ - Stack
- ④ - program counter - Register
- ⑤ - native method Stack

(34) what is the rule for local member in java.

- ① Local variable cannot use any of the access level since their scope is only inside the method
- ② final is the only Non access modifier that can be applied to a local variable
- ③ Local variable are not assigned a default value hence they need to be initialized

(35) what are the various access specifier in java?

→ There are four type of access modifier available in java

- ① Default - No keyword required
- ② private
- ③ protected
- ④ public

Default :- when no access modifier is specified a class, method or date member it is said to be having the default access

07

SATURDAY • OCTOBER

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modifier by default having default access modifier are accessible only within the same package

10 private :-

The method or data members declared as private are accessible only within the class in which they are declared any other class of the same package will not be able to access these members.

11 protected :-

The methods or data member declared as protected are accessible within the same package or sub-classes in different packages

08

SUNDAY

public:- The public access modifier if specified using has the widest scope among all other access modifiers.

→ classed method, or data members that are declared as public are accessible from everywhere in the program.

87 what is native code?

→ Native code is computer programming code that is compiled to run with a particular processor and its set of instructions. If the same program is run on a computer with a different processor.

The virtual machine is a program that converts the platform generalized bytecode into the native code that will run in a specific processor.

88 why there is no size operator in java?

→ Because the size of primitive types is explicitly mandated by the Java Lang. There is no raninme between JVM implementation.

No more over since allocation is done by the new operator depending on its argument there is no need to specify the amount of memory needed.

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TUESDAY • OCTOBER

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24	25	26	27	28	29	30

39 what kinds of program u can develop using Java

- 1 Desktop GUI
- 2 mobile
- 3 Enterprise
- 4 scientific
- 5 web based
- 6 embedded
- 7 big data
- 8 distributed
- 9 cloud based etc.

40 you have reference type as a member of class. what is the default value it gets?

→ The default value of a reference type variable is null when they are not initialized. Null means not referring to any object.

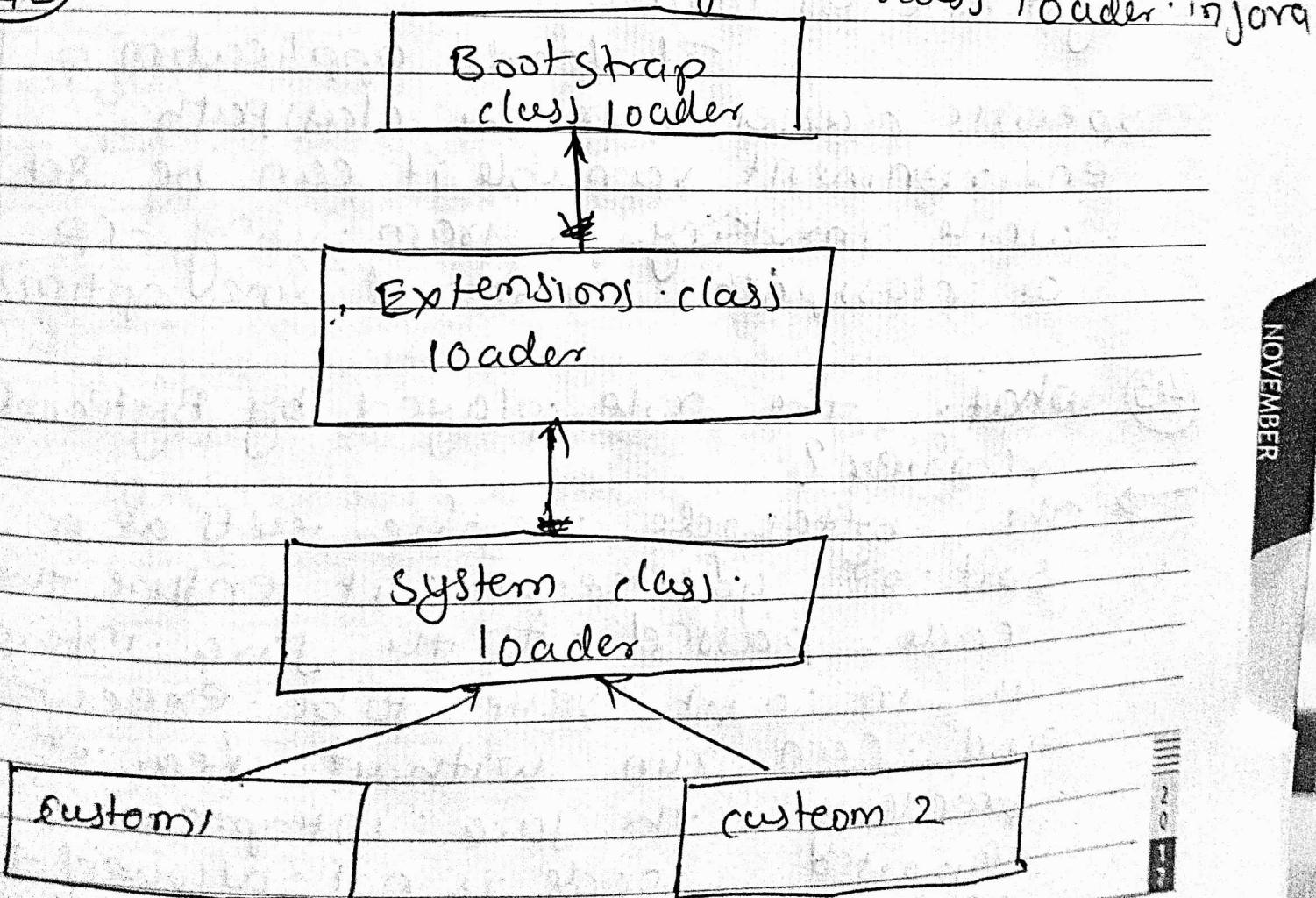
Q1) What is the job done by class loader

→ Java class loader is an abstract class.

It belongs to a java lang package.  
it loads classes from different resources

Java class loader is used to load the classes at run time. In other words JVM performs the linking process at runtime.

Q2) Explain the hierarchy of class loader in Java



• Boot strap class loader:- it loads standard JDK files from rt.jar and other core classes. It is a parent of all class loaders.

• Extension class loader:-

It delegates class loading request to its parent. If the loading of a class is unsuccessful it loads classes from jre/lib/ext directory or any other directory as jura.ext

System.class loader:-

It loads application specific classes from the classpath environment variable. It can be set while invoking program using -cp or -classpath command line option.

Q3) What is the role played by Bytecode verifier?

→ The bytecode verifier acts as a sort of gatekeeper. It ensures that code passed to the Java interpreter is in a fit state to be executed and can run without fear of breaking the Java interpreter. Imported code is not allowed to execute by any means until

After it has passed the verifier tests

Q4) What are the memory area allocated by JVM?

→ The memory in the JVM is divided into five different parts

① Method area - The method area stores the class code - code of the variables and methods

② Heap - The Java objects are created in this area

③ Java Stack while running methods the result are stored in the stack memory PC registers These contain the address of the instructions of the methods.

④ Native method stack - similar to Java stack. Native methods are executed on the native method stack.

14

SATURDAY • OCTOBER

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46) when parseInt() method can be used?

→ parseInt() method is used to convert primitive data type to integer.

when we want to convert any primitive data object we use parseInt() into integer type we used parseInt();

47) what is Finalized() method?

→ The java.lang.Object.finalize() is called by the garbage collector on an object when garbage collection determines that there are no more references to the object.

15      A subclass overrides the finalize method to dispose of system resource or to perform other cleanup.

Syntax

protected void finalize()

13 14 15 16 17 18 19  
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OCTOBER • MONDAY

16

48 Difference between C++ pointer and Java reference?

→ C/C++ allows pointer arithmetic but Java pointer (reference) not. The term pointer is strongly associated with the C/C++ concept of pointer which are variable which store memory address and can be modified arithmetically to point to arbitrary address.

In Java pointer only exist as an implementation detail for references a copy of the reference is copied to the stack of a called function pointing to the same object as the calling function and allows you to manipulate that object. However you cannot change the object the calling function refers

Java doesn't support pointer explicitly.  
But Java uses pointer implicitly.

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17

TUESDAY • OCTOBER

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3	4	5	6	7	8	9
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Q) What are the expressions allowed in `switch` block of Java?

→ Switch Statement in Java

The switch statement is a multi-way branch statement.

It provides an easy way to dispatch execution of the expression. Basically the expression can be byte, short, char, and int primitive type. Beginning with it also works with enumerated type (Enums in Java). The String class and wrapper class