**Java Interview Questions**

# Java is Pass by Value and Not Pass by Reference

One of the biggest confusion in Java programming language is whether java is **Pass by Value** or **Pass by Reference**. I ask this question a lot in interviews and still see interviewee confused with it. So I thought to write a post about it to clarify all the confusions around it.

First of all we should understand what is meant by pass by value or pass by reference.

* **Pass by Value**: The method parameter values are copied to another variable and then the copied object is passed, that’s why it’s called pass by value.
* **Pass by Reference**: An alias or reference to the actual parameter is passed to the method, that’s why it’s called pass by reference.

|  |
| --- |
| package com.journaldev.test;  public class Balloon {  private String color;  public Balloon(){}    public Balloon(String c){  this.color=c;  }    public String getColor() {  return color;  }  public void setColor(String color) {  this.color = color;  }  } |

And we have a simple program with a generic method to swap two objects, the class looks like below.

|  |
| --- |
| package com.journaldev.test;  public class Test {  public static void main(String[] args) {  Balloon red = new Balloon("Red"); //memory reference 50  Balloon blue = new Balloon("Blue"); //memory reference 100    swap(red, blue);  System.out.println("red color="+red.getColor());  System.out.println("blue color="+blue.getColor());    foo(blue);  System.out.println("blue color="+blue.getColor());    }  private static void foo(Balloon balloon) { //baloon=100  balloon.setColor("Red"); //baloon=100  balloon = new Balloon("Green"); //baloon=200  balloon.setColor("Blue"); //baloon = 200  }  //Generic swap method  public static void swap(Object o1, Object o2){  Object temp = o1;  o1=o2;  o2=temp;  }  } |

When we execute above program, we get following output.

red color=Red

blue color=Blue

blue color=Red

If you look at the first two lines of the output, it’s clear that swap method didn’t worked. This is because Java is pass by value, this swap() method test can be used with any programming language to check whether it’s pass by value or pass by reference.

Let’s analyze the program execution step by step.

Java is always Pass by Value and not pass by reference, we can prove it with a simple example.

Let’s say we have a class Balloon like below.

# Difference between x++ and x=x+1 in Java

In x++, it increase the value of x by 1 and in x=x+1 it also increase the value of x by 1. But the question is that both are same or there is any difference between them. We should aware with the fact that whenever we are trying to apply any arithmetic operator between two variables a and b, the result type is always max ( int, type of a, type of b). Let’s see now see difference between both of them :

1. **Internal Typecasting of data:**In the below example, we are doing arithmetic operation i.e. addition on b and 1. Here b is of byte type and 1 is of int type. Therefore, the result should be of int type i.e max(int,type of b i.e. byte,type of 1 i.e. int). We are assigning int type to byte type in the above program that’s why we are getting compile time error saying “possible loss precision”. Here typecasting is required to perform addition.

**Using x = x + 1**

|  |
| --- |
| // Java program to illustrate  // how arithmetic operations performed  // depends on data types  public class Test  {      public static void main(String[] args)      {          byte b = 10;            // Using b = b+1          b = b + 1;          System.out.println(b);            /\* Using typecasting will work          b=(byte)b+1;          System.out.println(b);\*/      }  } |

Run on IDE

Output:

error: incompatible types: possible lossy conversion from int to byte

Using Typecasting, output will be

11

**Using x++**

In the next example, we are doing increment but internally we are doing operation like b++. The result should be of int type i.e max(int,type of b i.e. byte,type of 1 i.e. int) and we are getting the result as 11 because implicit typecasting is done by compiler like byte b=(byte)(b+1) here.

|  |
| --- |
| // Java program to understand the  // operations of ++ operator  public class Test  {      public static void main(String[] args)      {      byte b = 10;      b++;      System.out.println(b);      }  } |

Run on IDE

Output:

11

How many numeric data types are supported in Java

**Numeric types**  
  
There are six numeric data types four integer and two floating point:  
  
byte 1 byte -128 to -127  
short 2 bytes -32,768 to 32,767  
int 4 bytes -2,147,483,648 to 2,147,483,647  
long 8 bytes -9,223,372,036,854,775,808 to 9,223,372,036,854,775,80  
float 4 bytes 7 decimal digits  
double 8 bytes 16 decimal digits  
  
These are also called as primitive data types and the most common primitive data type in computer language is number. The number can be used with everything from variable to classes and methods. It can be available in different formats. The following form is used to declare a variable:  
  
type variable = initial value;  
  
where the initial value is optional.   
  
For example:  
  
int myInteger=100;  
  
or  
  
int myInteger;

Which of the following statements declare class Sample to belong to the payroll.admindept package?

**Options**  
- package payroll; package admindept;  
- import payroll.\*;  
- package payroll.admindept.Sample;  
- import payroll.admindept.\*;  
- package payroll.admindept;  
  
CORRECT ANSWER : package payroll.admindept;

The class java.lang.Exception is

**Options**  
- protected  
- extends Throwable  
- implements Throwable  
- serializable  
  
CORRECT ANSWER : extends Throwable

Which of the following statements is true?

**Options**  
- An exception can be thrown by throw keyword explicitly.  
- An exception can be thrown by throws keyword explicitly.  
  
CORRECT ANSWER : An exception can be thrown by throw keyword explicitly.

All the wrapper classes (Integer, Boolean, Float, Short, Long, Double and Character) in java

**Options**  
- are private  
- are serializable  
- are immutatable  
- are final  
  
CORRECT ANSWER : are final

The code snippet  
  
if( "Welcome".trim() == "Welcome".trim() )  
System.out.println("Equal");  
else  
System.out.println("Not Equal");  
  
will

**Options**  
- compile and display “Equal”  
- compile and display “Not Equal”  
- cause a compiler error  
- compile and display NULL  
  
CORRECT ANSWER : compile and display “Equal”

Consider the following code snippet. What will be assigned to the variable fourthChar, if the code is executed?  
  
String str = new String(“Java”);  
char fourthChar = str.charAt(4);

**Options**  
- ‘a’  
- ‘v’  
- throws StringIndexOutofBoundsException  
- null characater  
  
CORRECT ANSWER : throws StringIndexOutofBoundsException

Which of the following statements is preferred to create a string "Welcome to Java Programming"?

**Options**  
- String str = “Welcome to Java Programming”  
- String str = new String( “Welcome to Java Programming” )  
- String str; str = “Welcome to Java Programming”  
- String str; str = new String (“Welcome to Java Programming” )  
  
CORRECT ANSWER : String str = “Welcome to Java Programming”

Which of the following statements is true?

**Options**  
- A super class is a sub set of a sub class  
- class ClassTwo extends ClassOne means ClassOne is a subclass  
- class ClassTwo extends ClassOne means ClassTow is a super class  
- the class Class is the super class of all other classes in Java.  
  
CORRECT ANSWER : A super class is a sub set of a sub class

What kind of thread is the Garbage collector thread is?

**Options**  
- Non daemon thread  
- Daemon thread  
- Thread with dead state  
- None of the above  
  
CORRECT ANSWER : Daemon thread

When a thread terminates its processing, into what state that thread enters?

**Options**  
- Running state  
- Waiting state  
- Dead state  
- Beginning state  
  
CORRECT ANSWER : Dead state

Which statement is true?

**Options**  
- HashTable is a sub class of Dictionary  
- ArrayList is a sub class of Vector  
- LinkedList is a subclass of ArrayList  
- Vector is a subclass of Stack  
  
CORRECT ANSWER : HashTable is a sub class of Dictionary

Which of these statements is true?

**Options**  
- LinkedList extends List  
- AbstractSet extends Set  
- HashSet extends AbstractSet  
- WeakHashMap extends HashMap  
  
CORRECT ANSWER : HashSet extends AbstractSet

Which of the following is synchronized?

**Options**  
- Set  
- LinkedList  
- Vector  
- WeakHashMap  
  
CORRECT ANSWER : Vector

Select all the true statements from the following.

**Options**  
- AbstractSet extends AbstractCollection  
- AbstractList extends AbstractCollection  
- HashSet extends AbstractSet  
- Vector extends AbstractList  
- All of the above  
  
CORRECT ANSWER : All of the above

Which of the methods should be implemented if any class implements the Runnable interface?

**Options**  
- start()  
- run()  
- wait()  
- notify() and notifyAll()  
  
CORRECT ANSWER : run()

A thread which has invoked wait() method of an object, still owns the lock of the object. Is this statement true or false?

**Options**  
- True  
- False  
  
CORRECT ANSWER : False

Which of the following is not a method of the Thread class.

**Options**  
- public void run()  
- public void start()  
- public void exit()  
- public final int getPriority()  
  
CORRECT ANSWER : public void exit()

To execute the threads one after another

**Options**  
- the keyword synchronize is used  
- the keyword synchronizable is used  
- the keyword synchronized is used  
- None of the above  
  
CORRECT ANSWER : the keyword synchronized is used

The object of DataInputStream is used to

**Options**  
- To covert binary stream into character stream  
- To covert character stream into binary stream  
- To write data onto output object  
- All of the above  
  
CORRECT ANSWER : To covert binary stream into character stream

DataInputStream is an example of

**Options**  
- Output stream  
- I/O stream  
- Filtered stream  
- File stream  
  
CORRECT ANSWER : Filtered stream

Which one is better to retrieve the elements in forward and backward direction?

**Options**  
- for-each loop  
- Enumeration interface  
- ListIterator Interface  
- Iterator Interface  
  
CORRECT ANSWER : ListIterator Interface

What happens if sleep() and wait() executes in synchronized block?

**Options**  
- The object still under lock in both the cases  
- sleep() still under lock ,wait() the lock is removed  
- sleep() the lock is removed ,wait() still under lock  
- Sleep() and wait(),for both the method lock is removed  
  
CORRECT ANSWER : sleep() still under lock ,wait() the lock is removed

Which one is true in case of collections?

**Options**  
- A Set will not allow duplicate elements  
- A List will allow duplicate elements  
- both a and b  
- Neither a nor b  
  
CORRECT ANSWER : both a and b

Which method is used for cloning an object?

**Options**  
- getClass()  
- clone()  
- hashCode()  
- notify()  
  
CORRECT ANSWER : clone()

What is boxing?

**Options**  
- Converting primitive data type to object  
- Converting object data type to Primitive Data Type  
- Creating implemented object to an interface  
- None of the above  
  
CORRECT ANSWER : Converting primitive data type to object

What is the scope of default access specifier?

**Options**  
- default member are available to all the packages  
- default member is available only within the class  
- default member is available only within the package  
- None of the above  
  
CORRECT ANSWER : default member is available only within the package

Which alogorithm is used by garabage collector ?

**Options**  
- Mark  
- Sweep  
- Both a and b  
- None  
  
CORRECT ANSWER : Both a and b

What is the super class for all Exception and error?

**Options**  
- Run Time Exception  
- Compile Time Exception  
- Exception  
- Throwable  
  
CORRECT ANSWER : Throwable

Why @SuppressWarning Annotation is used?

**Options**  
- To show exceptions  
- To show warnings  
- To suppress exception issued by compiler  
  
CORRECT ANSWER : To suppress exception issued by compiler

How to create API document to a user defined classes?

**Options**  
- Javac \*.java;  
- javadoc \*.java;)  
- javaapi \*.java  
- java \*.java  
  
CORRECT ANSWER : javadoc \*.java;)

Which of the following statements are true?

**Options**  
- Method overloading is done in super and sub classes.  
- In method over riding two or more methods with same number but with different signatures  
- In method overriding method return type can be same or different  
- None of the above  
  
CORRECT ANSWER : None of the above

|  |
| --- |
| **Discussion Board** |
| **Both option 1 & 3 are correct**  because return type can be of more scope i.e if it is private in super class , it can be protected or public in subclass for overriden method |

Which of the following statements is true ?

**Options**  
- swing provide better look and feel than awt  
- awt provide better look and feel than swing  
- Neither a nor b  
- None of these  
  
CORRECT ANSWER : swing provide better look and feel than awt

Which of the following statements about the Java language is true?

**Options**  
- Both procedural and OOP are supported in Java.  
- Java supports only procedural approach towards programming.  
- Java supports only OOP approach.  
- None of the above.  
  
CORRECT ANSWER : Both procedural and OOP are supported in Java.

Which of the following statements is false about objects?

**Options**  
- An instance of a class is an object  
- Objects can access both static and instance data  
- Object is the super class of all other classes  
- Objects do not permit encapsulation  
  
CORRECT ANSWER : Objects do not permit encapsulation

Which methods can access to private attributes of a class?

**Options**  
- Only Static methods of the same class  
- Only instances of the same class  
- Only methods those defined in the same class  
- Only classes available in the same package.  
  
CORRECT ANSWER : Only methods those defined in the same class

What is an aggregate object?

**Options**  
- An object with only primitive attributes  
- An instance of a class which has only static methods  
- An instance which has other objects  
- None of the above  
  
CORRECT ANSWER : An instance which has other objects

Also, assume that the method toFile() is implemented in both Binary File and Image File. Which implementation method will be called when a File references an ImageFile object in memory and the toFile method is called?

**Options**  
- Binary File  
- Image File  
- Both File and Binary Files  
- None of the above  
  
CORRECT ANSWER : Image File

A class can have many methods with the same name as long as the number of parameters or type of parameters is different. This OOP concept is known as

**Options**  
- Method Invocating  
- Method Overriding  
- Method Labeling  
- Method Overloading  
  
CORRECT ANSWER : Method Overloading

Which of the following is considered as a blue print that defines the variables and methods common to all of its objects of a specific kind?

**Options**  
- Object  
- Class  
- Method  
- Real data types  
  
CORRECT ANSWER : Class

What are the two parts of a value of type double?

**Options**  
- Significant Digits, Exponent  
- Length, Denominator  
- Mode, Numerator  
  
CORRECT ANSWER : Significant Digits, Exponent

After the following code fragment, what is the value in fname?  
  
String str;  
int fname;  
str = "Foolish boy.";  
fname = str.indexOf("fool");

**Options**  
- 0  
- 2  
- -1  
- 4  
  
CORRECT ANSWER : -1

What is the value of ‘number’ after the following code fragment execution?  
  
int number = 0;  
int number2 = 12;  
while (number < number2)  
{  
number = number + 1;  
}

**Options**  
- 5  
- 12  
- 21  
- 13  
  
CORRECT ANSWER : 12

Given the following code snippet;  
  
int salaries[];  
int index = 0;  
salaries = new int[4];  
while (index < 4)  
{  
salaries[index] = 10000;  
index++;  
}  
What is the value of salaries [3]?

**Options**  
- 40000  
- 50000  
- 15000  
- 10000  
  
CORRECT ANSWER : 10000

Which of the following is not a return type?

**Options**  
- boolean  
- void  
- public  
- Button  
  
CORRECT ANSWER : public

If result = 2 + 3 \* 5, what is the value and type of ‘result’ variable?

**Options**  
- 17, byte  
- 25, byte  
- 17, int  
- 25, int  
  
CORRECT ANSWER : 17, int

What is the data type for the number 9.6352?

**Options**  
- float  
- double  
- Float  
- Double  
  
CORRECT ANSWER : double

Assume that the value 3929.92 is of type ‘float’. How to assign this value after declaring the variable ‘interest’ of type float?

**Options**  
- interest = 3929.92  
- interest = (Float)3929.92  
- interest = 3929.92 (float)  
- interest = 3929.92f  
  
CORRECT ANSWER : interest = 3929.92f

Which of the following statements is true?

**Options**  
- The default char data type is a space( ‘ ‘ ) character.  
- The default integer data type is ‘int’ and real data type is ‘float’  
- The default integer data type is ‘long’ and real data type is ‘float’  
- The default integer data type is ‘int’ and real data type is ‘double’  
  
CORRECT ANSWER : The default integer data type is ‘int’ and real data type is ‘double’