



KCA UNIVERSITY

FACULTY: COLLEGE OF TECHNOLOGY

COURSE: DIPLOMA IN IT

UNIT CODE:

DIT 409

UNIT NAME:

JAVA PROGRAMMING

NAME:

GERALD MANYASA 21/05029

SUBMITTED TO:

Mr. John K

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1. Explain the differences between primitive and reference data types.

Primitive data type-they are the most basic data type available within the java language, which are eight in number, they include: Boolean, integer, string, short, long, float and double.

Imprimitive /reference data type- this is a kind of data type created using constructor of the classes which are used to access objects. They cannot be changed.

2. Define the scope of a variable (hint: local and global variable)

A scope of a variable is the area where the variable can be accessed whether by whole program or in a block of code.

Therefore, a global variable is the variable which can be accessed by any function in a program.

Then a local variable is the variable declared within the method.

3. Why is initialization of variables required?

This is to prevent bug where they are initialized to prevent null errors.

4. Differentiate between static, instance and local variables.

Static variable-they are variable that are runner in the whole program

Instance variable- type of variable outside constructor, method and blocks.

Local variable- they are the variable inside block of code.

5. Differentiate between widening and narrowing casting in java.

Widening is the process of converting lower data type to higher data type while

Casting is the process of converting from one data type to another. (type conversion)

6. the following table shows data type, its size, default value and the range. Filling in the missing values.

TYPE	SIZE (IN BYTES)	DEFAULT	RANGE
<i>Boolean</i>	1 bit	False	true, false
<i>Char</i>	2	'\u0000'	'\0000' to '\ffff'
<i>Byte</i>		0	-2^7 to $+2^7-1$
<i>Short</i>		0	-2^{15} to $+2^{15}-1$
<i>Int</i>	4	0	-2^{31} to $+2^{31}-1$
<i>Long</i>		0L	-10^{308} to $+10^{308}$
<i>Float</i>	4	00.0f	-10^{38} to $+10^{38}$
<i>Double</i>	8	0.0d	$-1.8E+308$ to $+1.8E+308$

(Hint answer is in bold)

7. Explain the importance of using Java packages

- Used to classify the classes interfaces which can be easily be maintained.
- So that it can be protected
- To remove naming collision

8.Explain three controls used when creating GUI applications in Java language.

- **Java swing password field-** this is a control that looks like a text box but displays hidden characters in asterisk.
- **Java swing scroll control-** provides the scroll view of a given component.
- **Java swing text area control-**this is the part of Java swing that provide multiline area that displays text.
- **Java swing Button control-** to create a platform called button that perform independent implementation.
- **Java swing checkbox-** it is used to turn an option on or off
- **Java swing combo box-**this is the control that displays a pop up where a user chooses his or her choice.

9.Explain the difference between containers and components as used in Java.

A container is a space where components are stored and located. While the component are the objects with graphical representation.

10. Write a Java program to reverse an array having five items of type int.

```
1. // https://github.com/gera9692/javatask3.git
2. public class ReverseAnArray {
3.     public static void main(String[] args) {
4.         //Initialize array
5.         int [] arr = new int [] {1, 2, 3, 4, 5};
6.         System.out.println("Original array: ");
7.         for (int i = 0; i < arr.length; i++) {
8.             System.out.print(arr[i] + " ");
9.         }
10.        System.out.println();
11.        System.out.println("Array in reverse : ");
12.        //Loop through the array in reverse order
13.        for (int i = arr.length-1; i >= 0; i--) {
14.            System.out.print(arr[i] + " ");
15.        }
16.    }
17.}
```

11. Programs written for a graphical user interface have to deal with “events.”

Explain what is meant by the term event.

An event is the process of changing in the state of object behaviors by performing actions

12. Give at least two different examples of events, and discuss how a program might respond to those events.

Background event -this is the kind of event that requires end user interaction. this is

When an operating system interrupts hardware or software failure.

Foreground events-this is an event that necessitate the user's participation. Which are produce as a result of user interaction with graphical user interface.

13. Explain the difference between the following terms as used in Java programming.

➤ **Polymorphism and encapsulation**

Polymorphism is the instance where there are many classes relating to each other through inheritance.

Encapsulation is when the variable and methods are integrated as a single unit.

Method overloading and method overriding

Overloading-this is the form of polymorphism that uses object oriented programming.

Overriding-this occurs when su class have the same method as the parent class.

➤ **Class and interface**

Class is a logical template for creating object that share common properties and method.

Interface-this is the reference type in java which is similar to a class also we can say it is a collection of abstract methods.

➤ **inheritance and polymorphism**

➤ **inheritance** is the concept that acquires the properties from one class to another classes.

➤ **Polymorphism**-this is the ability of a class to provide different implementation of methods depending on the type of objects that is passed to method.

14. using examples, explain the two possible ways of implementing polymorphism. Show your code in java.

- **By overloading**

<https://github.com/gera9692/javatask3.git>

```
static int plusMethod(int x, int y) {  
    return x + y;  
}  
  
static double plusMethod(double x, double y) {  
    return x + y;  
}  
  
public static void main(String[] args) {  
    int myNum1 = plusMethod(8, 5);  
    double myNum2 = plusMethod(4.3, 6.26);  
    System.out.println("int: " + myNum1);  
    System.out.println("double: " + myNum2);  
}
```

➤ **By overriding**

<https://github.com/gera9692/javatask3.git>

```
class Vehicle{ //defining a method void
run(){System.out.println("Vehicle is moving");} } //Creating a
child class class Car2 extends Vehicle{ //defining the same
method as in the parent class void
run(){System.out.println("car is running safely");} public
static void main(String args[]){ Car2 obj = new
Car2();//creating object obj.run();//calling method } }
```

With relevant examples, explain the following concepts as used in Java programming.

a. Mutable classes.

Explain what is meant by mutable class

A mutable class is a type of class which its object can be changed after it is created.

Write a program that implements the concept of mutable class

b. mutable classes.

<https://github.com/gera9692/javatask3.git>

```
public class IntegerPair {

    int x;

    int y;

    IntegerPair(int x, int y) {

        this.x = x;

        this.y = y;

    }

}

IntegerPair p = new IntegerPair(5, 10);

// p.x = 5, p.y = 10
```

```
p.x = 50;
```

```
// p.x = 50, p.y = 10
```

Explain what is meant by immutable class

This is the type of class that its object can't be changed once the class is created

Write a program that implements the concept of immutable class

<https://github.com/gera9692/javatask3.git>

```
public class IntegerPair {  
  
    private final int pairx;  
  
    private final int pairy;  
  
    IntegerPair(int pairx, int pairy) {  
  
        this.pairx = pairx;  
  
        this.pairy = pairy;  
  
    }  
}  
  
IntegerPair p = new IntegerPair(5, 10);  
  
p.pairx = 50;  
  
// Compilation error: cannot assign a value to a final variable
```

c. Explain the situations where mutable classes are more preferable than immutable classes when writing a Java program.

When defining our own class we can make objects immutable by making all fields final and private.

2. Explain what a String buffer class is as used in Java

It is used in to create mutable string objects

the syntax of creating an object of StringBuffer class

StringBuffer()

Explain the methods in the StringBuffer class

Append(String)-used to append or change the specified string with a new string.

Insert(string)-used to add a specified string at a specified location.

Replace(string)-used to modify a particular string from one to the specified one.

Delete()-used to remove the specified string.

Reverse()-it is used to reverse the String.

Capacity()-it ensures the capacity reaches the required minimum.

charAt(int index)-used to return the character at the specified position.

Substring-used to return substring from the beginning of an index to the end of an index.

class Myoutput

```
1.      {  
  
2.          public static void main(String args[])  
  
3.      {  
  
4.          String ast = "hello i love java";  
  
5.          System.out.println(ast.indexOf('e')+"  
          "+ast.indexOf('a')+" "+ast.lastIndexOf('l')+"  
          "+ast .lastIndexOf('v')) ;  
  
6.      }}
```

There will be no output

c. Explain your answer in (2b) above.

Single quotation has been used inside the rounded brackets which will result to an error.

when the error is changed to using double quotation the program is expected to give the following output:1 1 8 15

d. With explanation, write the output of the following program.

```
class Myoutput
1.      {

2.          public static void main(String args[])

3.          {

4.              StringBuffer bfobj = new
                StringBuffer("Jambo");

5.              StringBuffer bfobj1 = new
                StringBuffer(" Kenya");

6.              c.append(bfobj1);

7.              System.out.println(bfobj);

8.          }

9.      }
```

There will be an error. **(c.append(bfobj1));** the given variable C is not declared instead for the code to run it must be rectified.

e. With explanation, write the output of the following program.

```
class Myoutput
1.      {
2.          public static void main(String args[])
3.          {
4.              StringBuffer str1 = new
                StringBuffer("Jambo");
5.              StringBuffer str2 = str1.reverse();
6.              System.out.println(str2);
7.          }
8.      }
```

There will be no output because of the array in the code is wrongly placed the error should be rectified to **public static void main(String[]args) {block of code}**

f. With explanation, write the output of the following program.

```
class Myoutput
1.      {
2.          class output
3.          {
4.              public static void main(String args[])
5.              {
6.                  char c[]={ 'A', '1', 'b' , ' ' , 'a' ,
                '0' };
```

```

7.          for (int i = 0; i < 5; ++i)
8.          {
9.              i++;
10.             if(Character.isDigit(c[i]))
11.                 System.out.println(c[i]+" is a digit");
12.             if(Character.isWhitespace(c[i]))
13.                 System.out.println(c[i]+" is a Whitespace
                    character");
14.             if(Character.isUpperCase(c[i]))
15.                 System.out.println(c[i]+" is an Upper case
                    Letter");
16.             if(Character.isLowerCase(c[i]))
17.                 System.out.println(c[i]+" is a lower case Letter");
18.             i++;
19.         }
20.     }
21. }

```

22. the code will not run . in the output lines
there are no opening double quotes hence the code

wont run . by adding quotation inside the rounded
brackets of the *System.out.println("")*