# IJSE

## Institute of Software Engineering

Graduate Diploma in Software Engineering

Batch - GDSE69

Module - Programming Fundamentals

Assignment

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# Assignment 02

1. What is the difference between the print() and println() methods in Java?

The println("...") method prints the string "..." and moves the cursor to a new line. The print("...") method instead prints just the string "...", but does not move the cursor to a new line.

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2. What is the advantage of using the printf() method in Java over print() and println() ? println is short for "print line", meaning after the argument is printed then goes to the next line.

- System.out.println ("hello") **hello**
- System.out.println ("java") **java**

Print is does not add any new line

- ❖ System.out.print("hello") **hellojava**
- ❖ System.out.print("java")

printf is short for print formatter, it gives you the ability to mark where in the String variables will go and pass in those variables with it. This saves from having to do a long String concatenation

- ❖ ("Hello " + "World" = "Hello World.")

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3. Write a complete Java program that displays your first name and last name on the same line and your address on several lines on the screen.

```
public class Example{
   public static void main(String args[]){
         System.out.print("Shimara");
         System.out.println(" "+"Ilshani");
         System.out.println("Moratuwa");
   }
}
```

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4. Write a Java program to get the following output using a single “System.out.println()”

ABC
XYZ
PQR

```
public class Example{
   public static void main(String args[]){
         System.out.print("ABC"+"\nXYZ"+"\nPQR");


   }
}
```

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5. What is the primary purpose of comments in Java programming?

Comments can be used to explain Java code, and to make it more readable. It can also be used to prevent execution when testing alternative code.

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6. What are the types of comments in Java and provide examples of each.

There are three types of comments in Java.

1. Single Line Comment
   - The single-line comment is used to comment only one line of the code.
   - Single line comments starts with two forward slashes **(//)**.
   - Eg –: //This is single line comment

2. Multi Line Comment
   - The multi-line comment is used to comment multiple lines of code.
   - Multi-line comments are placed between /* and */.

   -
     ```
     /*

     This

     is

     multi line

     comment

     */
     ```

3. Documentation Comment
   - Documentation comments are usually used to write large programs for a project or software application as it helps to create documentation API.
   - To create documentation API, we need to use the javadoc tool.

   -
     ```
     /**

     *

     *We can use various tags to depict the parameter

     *or heading or author name

     *We can also use HTML tags

     *

     */
     ```

7. Which of the following is not a legal comment in Java? Select the one correct answer.

a. /* // */
b. /* */ //
c. // /* */
d. /* /* */
e. /* /* */ */ illegal
f. // //

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8. What is a Java literal? Briefly explain the types of Java literals with suitable examples.

Literal are containers for storing data values.

In Java, there are different **types** of literal, for example:

● `String` - stores text, such as **"Hello"**. String values are surrounded by double quotes ● `int` - stores integers (whole numbers), without decimals, such as **123 or -123** ● `float` - stores floating point numbers, with decimals, such as **19.99 or -19.99** ● `char` - stores single characters, such as **'a' or 'B'**. Char values are surrounded by single quotes
● `boolean` - stores values with two states: **true or false**

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9. Write the output statement necessary for the following:

a. Good Morning Sri Lanka!

```
public class Example{
   public static void main(String args[]){
          System.out.print("Good Morning Sri Lanka!");
   }
}
```

b. Good
Morning
Sri Lanka

```
public class Example{
   public static void main(String args[]){
          System.out.println("Good \nMorning \nSri Lanka\n");


   }
}
```

c. "Good Morning Sri Lanka"

```
          public class Example{
             public static void main(String args[]){
                    System.out.println("\""+"Good Morning Sri Lanka"+"\"");

             }
          }
```

d. \Good Morning Sri Lanka\

```
          public class Example{
             public static void main(String args[]){
                    System.out.println("\\"+"Good Morning Sri Lanka"+"\\");

             }
          }
```

e. /Good Morning Sri Lanka/

```
          public class Example{
             public static void main(String args[]){
                    System.out.println("/"+"Good Morning Sri Lanka"+"/");

             }
          }
```

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10. Which of the following are not legal literals in Java?

a. 0Xbad

b. 0B_101_101

c. 07

d. +_764

e. 8_6e2f

f. '\y'

g. "what\'s your marks?"

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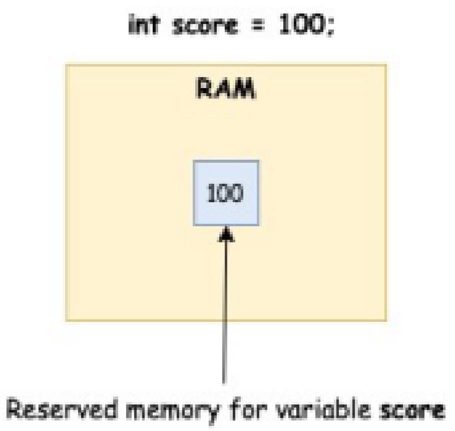
11. What is a variable? Clarify where Java stores variables during program execution and how the
memory allocation for variables works in Java.

A variable is a container which holds the value while the Java program is executed. A variable is assigned with a data type.

Variable is a name of memory location. There are three types of variables in java: local, instance and static.



Java uses a combination of stack memory for local variables and method call information, heap memory for objects and dynamically allocated data, and various other memory areas (such as the method area and constant pool) to manage variables and other program data. Memory allocation and management are handled by the JVM, which abstracts the underlying hardware details to provide a portable and memory-safe environment for Java programs.

12. What is the naming convention for variables in Java?

**Camel Case**: Variable names should be in camel case, which means the first word starts with a lowercase letter, and subsequent words are capitalized. For example: ❖ `myVariable`

❖ `totalAmount`
❖ `studentName`

**Descriptive Names**: Variable names should be descriptive and convey the purpose or meaning of the variable. Avoid using single-letter or cryptic names like `x`, `y`, or `temp`.

**Start with a Letter**: Variable names must start with a letter (a to z or A to Z), an underscore (_), or a dollar sign ($). However, it's a good practice to use letters or underscores and avoid using dollar signs.

**No Spaces or Special Characters**: Variable names cannot contain spaces or special characters (except underscores and dollar signs) like `!`, `@`, `#`, `%`, etc.

**Case Sensitivity**: Java is case-sensitive, so variable names like `myVariable` and `MyVariable` are considered different.

**Avoid Java Keywords**: You cannot use Java reserved keywords (e.g., `public`, `class`, `static`, `int`, etc.) as variable names.

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13. What do you mean by variable declaration and initialization?

declaration means creating a variable in a program for operating different information. The Java variable declaration creates a new variable with required properties. Initialization is the specification of the initial value to be stored in an object, which is not necessarily the same as the first time you explicitly assign a value to it.

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14. All variables in Java have to be declared and initialised before they are used.

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15. Which are valid declarations? (Choose all that apply.)

a. int $x;
b. int 123;
c. int _123;
d. int #dim;
e. int %percent;
f. int *divide;
g. int sales_ Summer_2005_gross_sales;

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16. Given the following code within a method, which statement is true?

int a, b;
b = 5;

Select the one correct answer.

a. Local variable a is not declared.
b. Local variable b is not declared.
c. Local variable a is declared but not initialized.
d. Local variable b is declared but not initialized.
e. Local variable b is initialized but not declared.

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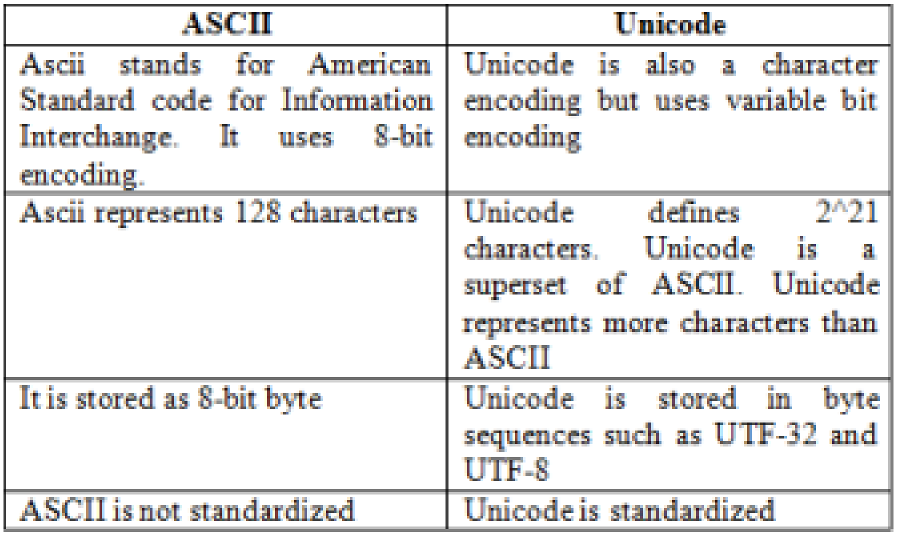
17. Explain the difference between ASCII and Unicode.



| ASCII | Unicode |
|---|---|
| Ascii stands for American Standard code for Information Interchange. It uses 8-bit encoding. | Unicode is also a character encoding but uses variable bit encoding |
| Ascii represents 128 characters | Unicode defines 2^21 characters. Unicode is a superset of ASCII. Unicode represents more characters than ASCII |
| It is stored as 8-bit byte | Unicode is stored in byte sequences such as UTF-32 and UTF-8 |
| ASCII is not standardized | Unicode is standardized |

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18. What are escape characters? What is the purpose of escape characters in Java strings, and why are they useful?

Escape sequences are used to signal an alternative interpretation of a series of characters. In Java, a character preceded by a backslash (\) is an escape sequence. The Java compiler takes an escape sequence as one single character that has a special meaning.

❖ **`\t`: Inserts a tab**

This sequence inserts a *tab* in the text where it’s used.

❖ **`\n`: Inserts a new line**

This sequence inserts a *new line* in the text where it’s used.

❖ **`\r`: Inserts a carriage return**

This sequence inserts a *carriage return* in the text where it’s used. It’s expected to move the cursor back to the beginning of the line without moving down the line.

❖ **`\'`: Inserts a single quote**

This sequence inserts a *single quote* character in the text where it’s used.

❖ **\": Inserts a double quote**

This sequence inserts a *double quote* character in the text where it’s used.

❖ **\\: Inserts a backslash**

This sequence inserts a *backslash* character in the text where it’s used.

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19. Write a Java program that takes a character as input from the user and prints its corresponding ASCII value.

```
public class Example{
    public static void main(String[] String) {
             int chr = 'c';
             System.out.println("The ASCII value of c is :"+chr);
    }
}
```

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20. Give the reason why the following code will not be compiled successfully.

```
public class Example {
public static void main(String[] args) {
int a, b, c =3;
b = a;
c = b;
}
}
```

Variable a ,b ,c is declared
But variable’b’ and ‘c’not been initialized
‘b=a’ so variable ‘a ‘assign into’b’ but variable ‘a’ not initialize
‘c=b’ so variable ‘b ‘assign into’c’ but variable ‘b’ not initialize
So, we can’t get the output of this statement

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21. Which declarations are valid? Select the three correct answers.

a. char a = '\u0061';
b. char 'a' = 'a';
c. char \u0061 = 'a';
d. ch\u0061r a = 'a';
e. ch'a'r a = 'a';

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22. Create a Java program that asks the user for their first name and last name as input and then
prints a greeting message in the following format
Hello, [FirstName] [LastName]!

```
import java.util.*;
public class Example{

    public static void main(String[] String) {
        Scanner input =new Scanner (System.in);
        System.out.print("input your first name : ");
        String first =input.nextLine();
        System.out.print("input your last name : ");
        String last =input.nextLine();
        System.out.println("Hello , " +first +" "+last+"!");

    }
}
```

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23. Write a Java program to get the following output using a single “System.out.println()”

```
Name : James
Total : 846
Average: 84.6
Grade : A
```

```
public class Example{
    public static void main(String[] String) {
        System.out.println("Name : James"+"\nTotal : 846 "+"\nAvarage : 84.6 "+"\nGrade : A ");
    }
}
```

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24. You need to correct the syntax errors to make the provided source code compile successfully
with minimal changes.

```
public class Example {
public static void main(String [] args){
System.out.println("What’s wrong with me?”) ;
}
}
```

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25. Write Java programs to obtain the following patterns using print() and println() methods.

```
a. ****** ******
         * * *
            ****** ******
```

```
public class Example {
public static void main(String [] args){
System.out.println("*****"+"\t*****");
System.out.println("\t*"+" "+"*"+" "+"*");
System.out.println("\t*****"+"\t*****");
}
}
```

```
b. *
   * *
   * * *
   * * * *
   * * * * *
```

```
public class Example {
public static void main(String [] args){
System.out.println("*");
System.out.println("*"+" "+"*");
System.out.println("*"+" "+"*"+" "+"*");
System.out.println("*"+" "+"*"+" "+"*"+" "+"*");
System.out.println("*"+" "+"*"+" "+"*"+" "+"*"+" "+"*");
}
}
```

```
c. *
   **
   ***
   ****
   *****
```

```
public class Example {
public static void main(String [] args){
System.out.println("*");
System.out.println("*"+"*");
System.out.println("*"+"*"+"*");
System.out.println("*"+"*"+"*"+"*");
System.out.println("*"+"*"+"*"+"*"+"*");
}
}
```

```
D. *
          * * *
      * * * * *
           * * *
               *
```

```
public class Example {
public static void main(String [] args){
System.out.println(" "+" "+" "+" "+" *"+" "+" "+" "+" ");
System.out.println(" "+" "+" *"+" "+" *"+" "+" *"+" "+" ");
System.out.println(" *"+" "+" *"+" "+" *"+" "+" *"+" "+" *");
System.out.println(" "+" "+" *"+" "+" *"+" "+" *"+" "+" ");
System.out.println(" "+" "+" "+" "+" *"+" "+" "+" "+" "); }
}
```

```
e. # # # # #
   # #
  # #
 # # # # # # #
          # #
         # #
 # # # # #
          public class Example {
          public static void main(String [] args){
          System.out.println("#"+"\t# # # # ");
          System.out.println("#"+"\t#");
          System.out.println("#"+"\t#");
          System.out.println("# # # # # # #");
          System.out.println("\t #"+"\t #");
          System.out.println("\t #"+"\t #");
          System.out.println("# # # #"+"\t #");
          }
          }
```

```
F. ________
             / \ / \
           / \ / \
         / \ / \
       /________\ /_______ \
        \ / \ /
         \ / \ /
          \ / \ /
            \ /________\ /
          public class Example {
          public static void main(String [] args){
          System.out.println(" ______________");
          System.out.println(" / \\ / \\");
          System.out.println(" / \\ / \\");
          System.out.println(" / \\ / \\");
          System.out.println(" / \\ / \\");
          System.out.println(" __________ ___________");
          System.out.println(" \\ / \\ /");
          System.out.println(" \\ / \\ /");
          System.out.println(" \\ / \\ /");
          System.out.println(" \\ / \\ /");
          System.out.println(" _____________");
          }
          }
```

```
g. * * * * * * ==================================
   * * * * * ===================================
   * * * * * * ==================================
   * * * * * ===================================
   * * * * * * ==================================
   * * * * * ===================================
   * * * * * * ==================================
   * * * * * ===================================
  * * * * * ==================================
  ==============================================
  ==============================================
  ==============================================
  ==============================================
  ==============================================
  ==============================================
```

```
public class Example {
public static void main(String [] args){
System.out.println("******===========================================");
System.out.println("******===========================================");
System.out.println("******===========================================");
System.out.println("******===========================================");
System.out.println("******===========================================");
System.out.println("******===========================================");
System.out.println("******===========================================");
System.out.println("******===========================================");
System.out.println("******===========================================");
System.out.println("=====================================================");
System.out.println("=====================================================");
System.out.println("=====================================================");
System.out.println("=====================================================");
System.out.println("=====================================================");
System.out.println("=====================================================");
}
}
```

```
h. + ' ' ' ' ' ' '+
        ( | o o | )
          | ^ |
          | ' _' |
          | |
            +- - - - - - -+
```

```
public class Example {
public static void main(String [] args){
System.out.println(" + "+" '"+ " '"+ " '"+ " '"+ " '"+ " '" +" +");
System.out.println("("+" |"+" o" + " o" + " |"+" )" );
System.out.println(" | "+" " +" ^"+ " |");
System.out.println(" | "+" '"+" '"+ " |");
System.out.println(" | "+ " " +" |");
System.out.println(" |"+" "+ " |");
System.out.println(" +"+" -"+ "-"+" -"+" -"+" -"+" -"+" -"+ "+");
}
}
```

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26. Write a Java program to get the following output.

```
|"/"\"/"\"|
```

```
public class Example {
public static void main(String [] args){
System.out.println("|"+'"'+"/"+'"'+"\\"+'"'+"/"+'"'+"\\"+"/"+'"'+"|");


}
}
```

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27. Write a Java program to get the following output.

```
"+"\"+/"+"""+"\n"+"\n"
```

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

```
System.out.println(""+"+"+""+"\\"+""+"+"+"/"+""+"+"+""+"""+""+"+"+""+"\\"+"n"+""+"+"+""+"\\
"+"n"+"");

}
}
```

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28. Show how to use the print() method once in order to print the following message on the screen.
She said, "Let's meet at the park,
under the big oak tree,
at 3 o'clock sharp!"

```
public class Example {
public static void main(String [] args){
System.out.println("She said,"+""+"Let's meet at the park,"+"\nunder the big oak
tree,"+"\nat 3 o'clock sharp!"+"");

}
}
```

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29. Write a Java program to accomplish the following tasks in one.
a. Declare an integer variable named as “i“.
b. Initialize the variable as 100.
c. Declare another variable “age” and initialize it dynamically, as 20.
d. Print the value of age (“The age is ....”).

```
public class Example {
public static void main(String [] args){
int i;
i=100;
int age=20;
System.out.println("The age is "+age);
}
}
```

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30. Write a Java program that creates 2 variables as integers, named x, y and assign values in

the
same statement.
a. Print the values as x, y format
(eg: if x is 10 and y is 20 output should be 10 20)
b. Print the values in y, x format.

```
public class Example {
public static void main(String [] args){
int x=10;
int y=20;
System.out.println(x+" "+y);
}
}
```

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31. Write a Java program using the help of the “Scanner”,
a. Input two values and store them in two variables.
b. Print the values as they assign to the variable and finally print them as “Values are ...”

```
import java.util.*;
public class Example {
public static void main(String [] args){
Scanner input=new Scanner (System.in);
System.out.print("input num1 : ");
int num1=input.nextInt();
System.out.print("input num2 : ");
int num2=input.nextInt();
System.out.println("values are "+num1+","+num2);
}
}
```

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32. Write a Java statement to accomplish each of the following tasks:
a. Declare variables sum and x to be of type int.
b. Assign 1 to variable x.
c. Assign 0 to variable sum.
d. Add variable x to variable sum, and assign the result to variable sum.
e. Print "The sum is: ", followed by the value of the variable sum.

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

```
int sum = 0;
int x=1;
sum=x;
System.out.println("The sum is "+sum);
}
}
```

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33. Write one Java program to accomplish the given task.
a. Declare 4 variables using only ONE statement. (Variable names: Computing, Maths, Science, English)
b. Initialize the 4 variables. (Use a value from 1 to 100)
c. Declare another Integer variable as total, and sum up the 4 variables and add to the total.
d. Print the total (“The total is ...”)
e. Write a print statement, which prints the total by not using the total variable or any other variable except the given 4 variables.
f. Print the four variables keeping space between them. (20 10 30 40)
g. Declare a variable “average” as double and initialize it as 0.0.
h. Find the average of the 4 variables and store them in the variable “average”.
i. Print the average as (“The Average is ....”).

```
public class Example {
public static void main(String [] args){
int Computing=100, Maths=80,Science=90, English=100;
int total=Computing+Maths+Science+English;
System.out.println("The total is "+total);
System.out.println(Computing+" "+ Maths+" "+Science+" "+English);
double avg=total/4;
System.out.println("The avarage is "+avg);
}
}
```

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34. Given
int a, b, c;
double x, y;
Choose the valid assignment statement(s) from the following and for each valid assignment statement you selected, determine the values assigned by that statement. a. b = 5 ; a = 7 ;

c = 9 ;

b. c = 2 + a = 2+ b = 5 ;

c. x = y = 10.7 ;

d. (a + b) = c;

e. a = 2; b = 5 + a;

f. x = 7 * b;

g. x = y = a = b = c = 7;

h. x = 2.5; b = x ;

i. (x * y) = 5.7;

j. b = 10; c = 20; b = b + c; c = b- c; b = b - c;

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35. Which of the following variable declarations are correct? If a variable declaration is not correct, provide the correct variable declaration.

a. short A,B,a = 12;

b. double i = j = k = 5;

c. int x, y = 5; z;

d. boolean flag, isExist = 1;

e. char space = “ “;

f. String test = "Hey!"

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36. Write a Java program to print the total of two integer numbers input by the keyboard. 37. Write a program in Java to print the full name by taking first name, middle name and last Name.

```
import java.util.*;

public class Example{
   public static void main(String args[]){
          Scanner input = new Scanner(System.in);

          System.out.print("Input number1: ");
          int num1 = input.nextInt();
          System.out.print("Input number2: ");
          int num2 = input.nextInt();
          int total=num1+num2;
          System.out.println("Total : "+total);
          }
          }
```

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38. Write a Java program that reads a number in inches and converts it to meters. Note: One inch is 0.0254 meter.

```
import java.util.*;
public class Example{
   public static void main(String args[]){
   Scanner scanner = new Scanner(System.in);
   System.out.print("Enter a number in inches: ");
   double inches = scanner.nextDouble();
        double meters = inches * 0.0254;
        System.out.println(inches + " = " + meters + " meters.");
        }
}
```

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39. Write a Java program to convert ounces to grams. The conversion formula is “gram =ounce x 28.3495”.

```
import java.util.*;
public class Example{
   public static void main(String args[]){
   Scanner scanner = new Scanner(System.in);
   System.out.print("Enter a ounce: ");
   double ounce = scanner.nextDouble();
        double gram= ounce * 28.3495;
        System.out.println(ounce + " = " + gram + " gram");
        }
}
```

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40. What is the use of + operator in Java?

Java, the `+` operator is primarily used for two purposes:

1. Arithmetic Addition:
   - When used with numeric data types (such as `int`, `double`, `float`, `long`, etc.), the `+` operator performs addition.

```
int a = 5;
int b = 3;
int sum = a + b;
```

2. String Concatenation:

- When used with `String` objects, the `+` operator performs string concatenation, which means it combines two strings into one. For example:
  java
  ```
  String firstName = "John";
  String lastName = "Doe";
  String fullName = firstName + " " + lastName;
  ```
- The `+` operator in the context of strings can also be used to concatenate strings with other data types, in which case the non-string data type is automatically converted to a string representation.
  ```
  int age = 30;
  String message = "My age is: " + age;
  ```

So, the `+` operator in Java serves both as an arithmetic addition operator and a string concatenation operator,

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41. What will be the value when the following expressions are evaluated? Explain how the expression is evaluated.

a. 4 + 5 + "step"

First, `4 + 5` is evaluated, which results in `9` (since it's an arithmetic addition). Then, the result `9` is concatenated with the string `"step"`.

So, the final result is `"9step"` because when you use the `+` operator with a string and a non-string, it converts the non-string to a string and performs string concatenation.

b. "step" + 4 + 5

First, `"step" + 4` is evaluated. Since we have a string `"step"` and an integer 4, it converts `4` to a string and concatenates it with `"step"`, resulting in `"step4"`.

Then, `"step4" + 5` is evaluated in the same way. It converts `5` to a string and concatenates it with `"step4"`.

So, the final result is `"step45"`

c. "step" + 4 * 5

First, `4 * 5` is evaluated, which results in `20`.
Then, `"step"` is concatenated with `20`.

So, the final result is `"step20"`.

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42. Write a Java program to accomplish the following task.
a. Input your age.
b. Store it in an integer variable named “age”
c. Find your age after 3 years (No additional variables can be used).
d. Print the new age as “New age : “

```
public class Example{
    public static void main(String args[]){
    int age;
    age=20;
            System.out.println("New age : "+(age+3));
            }
}
```

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43. Write a Java program to input marks for 10 subjects and find the total and average. The result
must be as follows.
Marks [34,45,62,34,23,89,56,45,67,56]
Total :511
Average :51.1

```
import java.util.*;
public class Example{
    public static void main(String args[]){
             Scanner input = new Scanner(System.in);

             System.out.print("Input a number1: ");
             int sub1 = input.nextInt();

             System.out.print("Input a number2: ");
             int sub2 = input.nextInt();

             System.out.print("Input a number3: ");
```

```
          int sub3 = input.nextInt();
          System.out.print("Input a number4: ");
          int sub4 = input.nextInt();

          System.out.print("Input a number5: ");
          int sub5 = input.nextInt();

          System.out.print("Input a number6: ");
          int sub6 = input.nextInt();

          System.out.print("Input a number7: ");
          int sub7 = input.nextInt();

          System.out.print("Input a number8: ");
          int sub8 = input.nextInt();

          System.out.print("Input a number9: ");
          int sub9 = input.nextInt();

          System.out.print("Input a number10: ");
          int sub10 = input.nextInt();
    System.out.println("marks:"+"["+sub1+","+sub2+","+sub3+","+sub4+","+sub5+","+sub6+",
    "+sub7+","+sub8+","+sub9+","+sub10+"]");

          double total=sub1+sub2+sub3+sub4+sub5+sub6+sub7+sub8+sub9+sub10;
          System.out.println("Total: "+total);

          double avg=total/10;
          System.out.println("Avarage: "+avg);

         }
    }
```

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44. Which of the following can be legally inserted at line 12? Explain your answer.

```
public class Example{
public static void main(String args[]){
int x;
//Insert code here //Line 12
System.out.println(x);
}
}
```

a. int y;

b. int x;

c. y=100;

d. x=200;

❖ Variable ‘x’ declared but x might not been initialized so,variable x should be initialize e. Insert nothing

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45. Which of the following can be legally inserted at line 12? Explain your answer.

```
public class Example{
public static void main(String args[]){
//Insert code //Line 12
System.out.println(x);
System.out.println(y);
}
}
```

a. int x,y;

b. int x=10,y;

c. int x=10,y=20;

d. int x=y=10;

e. int x,y=20;

f. int x=10,y=20,z=30;

❖ If we want to get the answer from variables ‘x’ and ‘y’ declare variables x y and should be initialized.

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46. What is the result of attempting to compile and run the program?

```
public class Example{
public static void main(String args[]){
System.out.print("A\nB");
System.out.println("CD");
System.out.print("\nEF\n");
System.out.print("G\nH");
}
}
```

A

```
BCD

EF
G
H
```

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47. What will be the output when you compile and run the following program?

```
public class Example{
public static void main(String args[]){
System.out.println(10+20+30);
System.out.println("10+20+30");
System.out.println("10+20"+30);
System.out.println("10"+"20"+"30");
System.out.println("10"+20+30);
System.out.println(10+20+"30");
System.out.println(10+"20"+30);
}
}
```

```
60
10+20+30
10+2030
102030
102030
3030
102030
```

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48. Which of the following lines are valid statements? Explain your answers.

```
public class Example{
public static void main(String args[]){
System.out.println(0B11100100); //Line 1
System.out.println(0b11100100); //Line 2
System.out.println(0B11100200); //Line 3
System.out.println(0144); //Line 4
System.out.println(0148); //Line 5
System.out.println(0x64); //Line 6
System.out.println(0xabc); //Line 7
System.out.println(0xabcg); //Line 8
System.out.println(0X); //Line 9
System.out.println(0Xfffffff); //Line 10
System.out.println(B1010); //Line 11
System.out.println(01012); //Line 12
}}
```

Line 1>>>>Valid. This line prints the decimal equivalent of the binary literal `0B11100100`, which is `228`.

Line 2>>>>Valid. This is the same as Line 1 but uses a lowercase `b` for the binary literal. It also prints `228`.

Line 3>>>>Invalid. error

Line 4>>>>Valid. This line prints the decimal equivalent of the octal literal `0144`, which is `100`.

Line 5>>>>Invalid. error.

Line 6>>>>Valid. This line prints the decimal equivalent of the hexadecimal literal `0x64`, which is `100`.

Line 7>>>>Valid. This line prints the decimal equivalent of the hexadecimal literal `0xabc`, which is `2748`.

Line 8>>>>Invalid. compilation error.

Line 9>>>>Invalid. compilation error.

Line 10>>>>Valid. This line prints a very large hexadecimal number. The decimal equivalent of `0Xfffffff` is `4,294,967,295`.

Line 11>>>>Invalid.compilation error.

Line 12>>>>Valid. This line prints the decimal equivalent of the octal literal `01012`, which is `520`.

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49. Write Java statements to get following output (Only one “System.out.print()” statement can be used)

a. Java is a typed language

```
public class Example{
public static void main(String args[]){
System.out.println("Java is a typed language");

}
}
```

b. AB"CB

```
          public class Example{
          public static void main(String args[]){
          System.out.println("AB"+'"'+"CD");
          }
          }
```

c. AB\CD

```
public class Example{
public static void main(String args[]){
System.out.println("AB"+”\\”+"CD");

}
}
```

d. C:\Windows\Program

```
          public class Example{
          public static void main(String args[]){
          System.out.println("C"+":"+"\\"+"Windows"+"\\"+"Program");


          }
          }
```

e. AB\"CD

```
          public class Example{
          public static void main(String args[]){
          System.out.println("AB"+"\\"+'"'+"CD");


          }
          }
```

f. AB\\'"'CD

```
public class Example{
public static void main(String args[]){
System.out.println("AB"+"\\\\"+""+""+"CD");
}
}
```

g. AB\nCD

```
public class Example{
public static void main(String args[]){
System.out.println("AB\\n”+"CD");

}
}
```

h. AB\tCD

```
public class Example{
public static void main(String args[]){
System.out.println("AB\\t”+"CD");

}
}
```

i. AB\bCD

```
public class Example{
public static void main(String args[]){
System.out.println("AB\\b”+"CD");

}
}
```

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50. Which of the following can be legally inserted at line 12? Explain your answer.

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

```
int x;
//Line 12
System.out.println(x);
}
}
```

a. x+1;

b. x=100;

c. int y=100

d. int x=200;

e. Insert nothing.

- ❖ Variable ‘x’ declared but x might not been initialized so,variable x should be initialize

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51. What is the result of attempting to compile and run the program?

```
public class Example{
public static void main(String args[]){
int x=10,y=20,z=30;
System.out.println(x);
System.out.println(y);
System.out.println(z);
int y=200;
System.out.println(y);
}
}
```

error: variable y is already defined in method main(String[])

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52. What is the result of attempting to compile and run the program?

```
public class Example{
public static void main(String args[]){
int x,y,z; //line 1
x=y=z=10; //line 2
int a=12,b,c=4; //line 3
int p=10; //line 4
int q=p; //line 5
int i=j=k=10; //line 6
}
}
```

a. Compile error at line 2
b. Compile error at line 3
c. Compile error at line 5

d. Compile error at line 6
e. None of the above

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53. What is the result of attempting to compile and run the program?

```
public class Example{
public static void main(String args[]){
int x,y,z;
System.out.println(x+y+z);
}
}
```

a. prints : nothing
b. prints : undefined value
c. prints null.

d. Runtime error
e. Compile-time error
f. None of the above

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54. What is the result of attempting to compile and run the program?

```
public class Example{
public static void main(String args[]){
int x;
System.out.println(x);
}
}
```

a. prints : nothing
b. prints : x
c. prints : 100

d. Runtime error
e. Compile time error

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55. What will be the result of attempting to compile and run the following program?

```
public class Example {
public static void main(String[] args) {
System.out.println(0x10 + 10 + 010);
}
}
```

Select the one correct answer.

a. The program will not compile. The compiler will complain about the expression “ 0x10 + 10 + 010.”

b. When run, the program will print 28.

c. When run, the program will print 30.

d. When run, the program will print 34.

e. When run, the program will print 36.

f. When run, the program will print 101010.

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56. Compile time error is generated at which line?

```
public class Example{
public static void main(String args[]){
char a = '\c'; // Line 1
char b = '\r'; // Line 2
char c = '\"'; // Line 3
char d = '\b'; // Line 4
char e = '\''; // Line 5
}
}
```

a. Line 1

b. Line 2

c. Line 3

d. Line 4

e. Line 5

f. None of the above

57. What is the output for the following code fragment and explain your answer?

a. System.out.println(1+2+3);

Output 6

arithmetic operation

b. System.out.println("1"+"2"+"3");

Output 123

String concatenation

c. System.out.println('1'+'2'+'3');

Output 150

1' corresponds to the Unicode value 49.

'2' corresponds to the Unicode value 50.

'3' corresponds to the Unicode value 51.

d. System.out.println('1'+" "+'2'+" "+'3');

Output 1 2 3

`'1'` is a character literal.

`" "` is a string literal containing a space.

`'2'` is a character literal.

`" "` is another string literal containing a space.

`'3'` is a character literal.

e. System.out.println('A'+'B'+'C');

Output 198

A' corresponds to the Unicode value 65.

'B' corresponds to the Unicode value 66.

'C' corresponds to the Unicode value 67.

f. System.out.println("A"+"B"+"C");

Output ABC

String concatenation

g. System.out.println('A'+100+200);

Output 365

A' corresponds to the Unicode value 65.

`100` is an integer literal.

`200` is also an integer literal.

h. System.out.println('A'+" "+'B'+" "+'C');

Output A B C

`'A'` is a character literal.

`" "` is a string literal containing a space.

`'B'` is a character literal.

`" "` is another string literal containing a space.

`'C'` is a character literal.

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58. What will be the outputs when you compile and run the following program and explain your answer line by line?

```
public class Example{
public static void main(String asrg[]){
char a='a';
System.out.println(a=='\u0061');
System.out.println(\u0061=='\u0061');
System.out.println(\u0061==97);
\u0061='\u0041';
System.out.println('A'=='\u0041');
System.out.println(65=='\u0041');
System.out.println(65==a);
System.out.println('\u0041'==a);
}
}
```

Line 1>>> declares a `char` variable a and initializes it with the character 'a'. Line 2>>> compares the value of a (which is 'a') with the Unicode escape sequence `'\u0061'`, which represents the character 'a'. Since both are 'a', the comparison is true, so it prints `true`.

Line 3 >>> directly compares the Unicode escape sequence `'\u0061'` (which represents 'a') with itself. This comparison is also true, so it prints `true`.

Line 4>>> compares the Unicode escape sequence `'\u0061'` (which represents 'a') with the integer 97. Since 'a' has a Unicode value of 97, this comparison is true, so it prints `true`.

Line 5 >>> attempts to assign the Unicode escape sequence `'\u0041'` (which represents 'A') to the variable a. However, this is not valid in Java, and it will result in a compilation error because you cannot reassign a value to a variable declared as `final` (which is the default for variables of type `char`).

Line 5>>> compares the character 'A' with the Unicode escape sequence `'\u0041'`, which represents 'A'. This comparison is true, so it prints `true`.

Line 6>>> compares the integer `65` with the Unicode escape sequence `'\u0041'`, which represents 'A'. Since both have the same value, this comparison is true, so it prints `true`.

Line 7>>> compares the integer `65` with the value of a, which is 'a' (with a Unicode value of 97). These values are equal, so this comparison is true, and it prints `true`.

Line 8>>> compares the Unicode escape sequence `'\u0041'` (which represents 'A') with the value of a, which is 'a' (with a Unicode value of 97). These values are equal, so this comparison is true, and it prints `true`.

59. Complete the following program?

```
import java.util.*;
public class Example{
public static void main(String args[]){
Scanner input=new Scanner(System.in);
System.out.print("Input your age : ");
int age=input.nextInt();
System.out.println("Your current age is : "+age);
/* Do not modify before this line
* your are allowed to insert any code here to
* Increment the age by 10
* Do not modify after this line */
System.out.println("Your age after 10 years is : "+age);
}
}
```

```
        age = age + 10;
```

60. Complete the following program?

```
import java.util.*;
public class Example{
public static void main(String args[]){
Scanner input=new Scanner(System.in);
System.out.print("Input number 1 : ");
int num1=input.nextInt();
System.out.print("Input number 2 : ");
int num2=input.nextInt();
System.out.println(num1+" "+num2);
//----------- Do not modify before this line --------
/* Insert Java code(s) here to swap the two
* variables "num1" and "num2" as an example when you input 10 *
for num1 and 20 for num2, then the first output should be "10 20" *
and the second output "20 10" */
//------ Do not modify after this line ------------
System.out.println(num1+" "+num2);
}
}
```

```
        Int temp=num1;
        num1=num2;
        num2=temp;
```

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61. Write a Java program to print the area of the rectangle of sides 2 and 3 units respectively.

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

                double length = 2.0;
                double width = 3.0;
                double area = length * width;
                System.out.println("The area of the rectangle is: " + area );
                }
        }
```

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62. Write a program that prompts the user to input days, hours, minutes, and seconds it took a mail to reach a destination. The output is the total time in seconds for the mail to reach its Destination.

```
        import java.util.Scanner;

        public class Example{
                public static void main(String[] args) {
                Scanner scanner = new Scanner(System.in);
                System.out.print("Enter the number of days: ");
                int days = scanner.nextInt();

                System.out.print("Enter the number of hours: ");
                int hours = scanner.nextInt();
                System.out.print("Enter the number of minutes: ");
                int minutes = scanner.nextInt();

                System.out.print("Enter the number of seconds: ");
                int seconds = scanner.nextInt();
                int totalTimeInSeconds = (int) days * 24 * 60 * 60 + hours * 60 * 60 + minutes * 60
        + seconds;

                System.out.println("Total time in seconds: " + totalTimeInSeconds + " seconds");
                }
        }
```

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63. Write a program that prompts the user to input the length, width, and height of a box. The program then outputs the surface area and volume of the box.

```
import java.util.Scanner;

public class Example {
        public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);

        System.out.print("Enter the length of the box: ");
        double length = scanner.nextDouble();

        System.out.print("Enter the width of the box: ");
        double width = scanner.nextDouble();

        System.out.print("Enter the height of the box: ");
        double height = scanner.nextDouble();

        double surfaceArea = 2 * ((length * width) + (width * height) + (height * length));

        double volume = length * width * height;
        System.out.println("Surface Area of the Box: " + surfaceArea);
        System.out.println("Volume of the Box: " + volume);
        }
}
```

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64. Write a Java program that asks the user to enter the number of "widgets" they want to buy and the cost per widget. The program should then output the total cost for all the widgets. Use the “Scanner” class.

```
import java.util.Scanner;

public class Example{
        public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);

        System.out.print("Enter the number of widgets: ");
        int numberOfWidgets = scanner.nextInt();

        System.out.print("Enter the cost per widget: ");
        double costPerWidget = scanner.nextDouble();

        double totalCost = numberOfWidgets * costPerWidget;

        System.out.println("Total cost for " + numberOfWidgets + " widgets: $" +
totalCost);


        }
}
```

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65. You are tasked with writing a currency converter program in Java that can convert an amount
of money from Sri Lankan Rupees (LKR) to US Dollars (USD) and Euros (EUR). Use the following
exchange rates.

a. 1 USD = 200 LKR
b. 1 EUR = 220 LKR

```
import java.util.Scanner;
```

```
public class Example {
        public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);

        double usdRate = 200.0;
        double eurRate = 220.0;

        System.out.print("Enter an amount in Sri Lankan Rupees): ");
        double lkrAmount = scanner.nextDouble();

        double usdAmount = lkrAmount / usdToLkrRate;
        double eurAmount = lkrAmount / eurToLkrRate;

         System.out.println(lkrAmount + " LKR is approximately equal to:");
        System.out.println(usdAmount + " USD");
        System.out.println(eurAmount + " EUR");
}
}
```

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66. Write a Java program to calculate a customer's bill for a shopping cart. The program should take the following input using the Scanner class:

- The total quantity of items in the cart.
- The price of the item.

```
import java.util.Scanner;

public class Example {
        public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);

        System.out.print("Enter the total quantity of items in the cart: ");
        int quantity = scanner.nextInt();

        System.out.print("Enter the price of each item: $");
        double pricePerItem = scanner.nextDouble();

        double totalBill = quantity * pricePerItem;
        System.out.println("Total bill amount: $" + totalBill);

        }
    }
```

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67. Write a Java program that takes a number as input and prints its multiplication table up to 10 as below.

Input a number: 5
Expected Output :
5 x 1 = 5
5 x 2 = 10
5 x 3 = 15
..........
5 x 10 = 50

```
    import java.util.Scanner;

    public class Example {
        public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);

        System.out.print("Input a number: ");
        int number = scanner.nextInt();

        System.out.println("Expected Output:");

        for (int i = 1; i <= 10; i++) {
        int result = number * i;
        System.out.println(number + " x " + i + " = " + result);
        }

        }
    }
```

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