

CS110T: Programming Language1

Lab 2: Java basics I



Lab Objectives:

In this lab, the students will practice:

- Program debugging
- Creating, compiling and running a simple Java program.
- Define variables of different data types and use constants.
- Write a Java program using pseudocode, and a flowchart.
- printing output.

Lab Exercise 1: Program Debugging (1)

Problem Description: The following program does not compile. Fix all the compilation errors so that the program will compile successfully (9 errors).

```
// Lab Exercise 3: Java1.java
// Identifying and Correcting Errors

public Class
{
    // main method begins execution of Java application
public static void main( string args[] );
{
    system.out.println("Programming is","an exercise in learning
how to learn");
    System.out.print(learning is never done without errors ")
} // end of Java1 class
```

1. Class → class Java1 (class name and proper syntax)
2. string → String (capital S)
3. args[] → String[] args (proper array syntax)
4. Removed semicolon after main method declaration
5. system → System (capital S)
6. Fixed string concatenation (removed comma, made it one string)
7. Added missing quotation mark in second print statement
8. Fixed closing brace alignment
9. Added proper class closing brace

Lab Exercise 2: Code writing (1)

Write a Java code based on the following pseudocode



A. Calculate the Total Cost of Items in a Shopping Cart Pseudocode:

1. Declare `itemPrice` as a double
2. Declare `quantity` as an int
3. Declare `itemName` as a String
4. Declare `itemCategory` as a char
5. Initialize `itemPrice` to 15.99
6. Initialize `quantity` to 3
7. Initialize `itemName` to "T-Shirt"
8. Initialize `itemCategory` to 'C' (C stands for Clothing)
9. Declare `totalCost` as a double
10. Set `totalCost` to `itemPrice * quantity`
11. Print `itemName`
12. Print `itemCategory`
13. Print `itemPrice`
14. Print `quantity`
15. Print `totalCost`

```
public class ShoppingCart {  
    public static void main(String[] args) {  
        double itemPrice = 15.99;  
        int quantity = 3;  
        String itemName = "T-Shirt";  
        char itemCategory = 'C';  
        double totalCost = itemPrice * quantity;  
  
        System.out.println(itemName);  
        System.out.println(itemCategory);  
        System.out.println(itemPrice);  
        System.out.println(quantity);  
        System.out.println(totalCost);  
    }  
}
```

B. Calculate the Total Cost of Fuel for a Road Trip Pseudocode:

1. Declare `fuelPricePerLiter` as a double
2. Declare `fuelNeeded` as a double
3. Declare `tripDescription` as a String
4. Declare `tripType` as a char
5. Initialize `fuelPricePerLiter` to 1.25
6. Initialize `fuelNeeded` to 40.0
7. Initialize `tripDescription` to "Weekend Road Trip"
8. Initialize `tripType` to 'R' (R stands for Road Trip)
9. Declare `totalFuelCost` as a double
10. Set `totalFuelCost` to `fuelPricePerLiter * fuelNeeded`
11. Print `tripDescription`
12. Print `tripType`
13. Print `fuelPricePerLiter`
14. Print `fuelNeeded`
15. Print `totalFuelCost`

```
public class RoadTrip {  
    public static void main(String[] args) {  
        double fuelPricePerLiter = 1.25;  
        double fuelNeeded = 40.0;  
        String tripDescription = "Weekend Road Trip";  
        char tripType = 'R';  
        double totalFuelCost = fuelPricePerLiter * fuelNeeded;  
  
        System.out.println(tripDescription);  
        System.out.println(tripType);  
        System.out.println(fuelPricePerLiter);  
        System.out.println(fuelNeeded);  
        System.out.println(totalFuelCost);  
    }  
}
```



C. Calculate the Total Salary of an Employee Pseudocode:

1. Declare `hourlyRate` as a double
2. Declare `hoursWorked` as an int
3. Declare `employeeName` as a String
4. Declare `employeeType` as a char
5. Initialize `hourlyRate` to 20.5
6. Initialize `hoursWorked` to 40
7. Initialize `employeeName` to "Alice Johnson"
8. Initialize `employeeType` to 'F' (F stands for Full-time)
9. Declare `totalSalary` as a double
10. Set `totalSalary` to `hourlyRate * hoursWorked`
11. Print `employeeName`
12. Print `employeeType`
13. Print `hourlyRate`
14. Print `hoursWorked`
15. Print `totalSalary`



```
public class EmployeeSalary {  
    public static void main(String[] args) {  
        double hourlyRate = 20.5;  
        int hoursWorked = 40;  
        String employeeName = "Alice Johnson";  
        char employeeType = 'F';  
        double totalSalary = hourlyRate * hoursWorked;  
  
        System.out.println(employeeName);  
        System.out.println(employeeType);  
        System.out.println(hourlyRate);  
        System.out.println(hoursWorked);  
        System.out.println(totalSalary);  
    }  
}
```

Lab Exercise 3: Code writing (2)

Problem Description: For the pseudocode problem you wrote (in Lab 1 - Exercise 2) write the java code to implement it.

we need a program that will calculate the area of three shapes: Rectangle, Tringle and Circle. Knowing that:

- Rectangle area = first * second
- Tringle area = first /2 * second
- Circle area = π * (first*first)

1- Define these variables:

First = 5, second = 3.5, π = 3.14

2- Print the area of each shape in a separate line use format specifiers to display only 2 decimal integers of the result.

The output should look something like the following:

```
run:
The area of the rectangular = 17.5
The area of the triangle = 8.75
The area of the circle = 78.53
```

```
public class ShapeAreas {
```

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

```
int first = 5;
```

```
double second = 3.5;
```

```
double pi = 3.14;
```

```
double rectangleArea = first * second;
```

```
double triangleArea = (first / 2.0) * second;
```

```
double circleArea = pi * (first * first);
```

```
System.out.printf("Rectangle area: %.2f%n", rectangleArea);
```

```
System.out.printf("Triangle area: %.2f%n", triangleArea);
```

```
System.out.printf("Circle area: %.2f%n", circleArea);
```

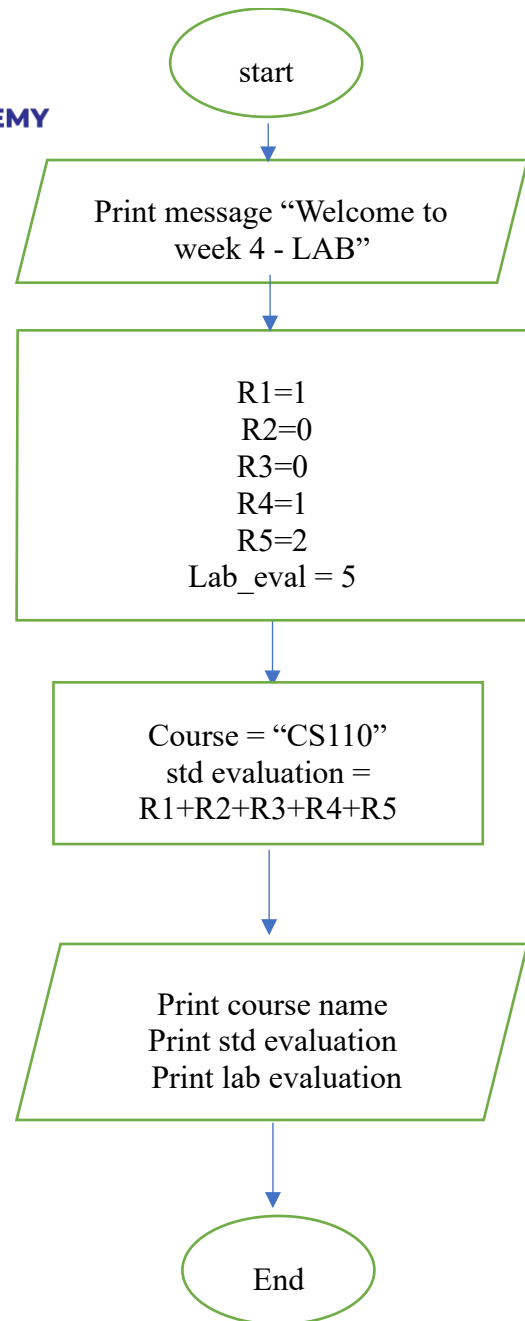
```
}
```

Lab Exercise 4: Code writing (3)

Problem Description: Write a Java program that implements lab evaluation from this flow chart. (Assume that rubric point are R1=1, R2=0, R3=0, R4=1, R5=2, lab evaluation = 5)

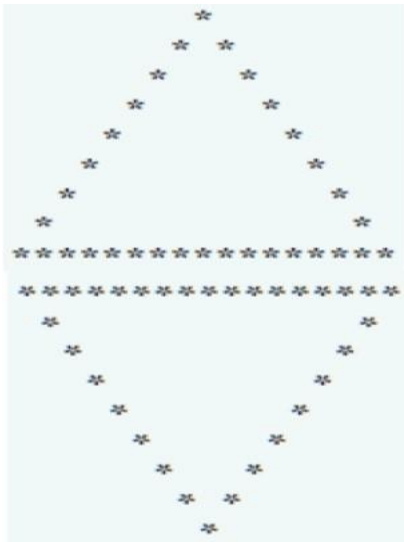
Output example:
Welcome week4 – LAB
Course CS110
your lab evaluation is 4.0 out of 5

```
public class LabEvaluation {  
    public static void main(String[] args) {  
        System.out.println("Welcome to week 4 -  
LAB");  
  
        String course = "CS110";  
        int R1 = 1, R2 = 0, R3 = 0, R4 = 1, R5 = 2;  
        int stdEvaluation = R1 + R2 + R3 + R4 + R5;  
        int labEvaluation = 5;  
  
        System.out.println("Course: " + course);  
        System.out.println("Your lab evaluation is "  
+ stdEvaluation + " out of " + labEvaluation);  
    }  
}
```



Assignment Problems:

1- Write a Java program that prints the following shape:



```
public class ShapePrinter {  
    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(" *");  
    }  
}
```



Problem Description: What is the expected output of the following program:

```
public class Homework
{
    public static void main (String args[])
    {
        System.out.println("Teachers can open the door, but you must enter
it yourself. \t\t Chinese proverb");
        System.out.println("Edition"+2+5);
    }
}
```

Teachers can open the door, but you must enter it yourself.
Chinese proverb
Edition25

2- **Problem Description:** The following code segment does not compile. Fix all the compilation errors so that the program will compile successfully.

```
// Find the Syntax errors and Correct them

public class Java Application
{
    public static void main[string[] args]
    {
        System.Out.print( ` lab practice );
        System.out.println("Just keep " , "practicing"); }
}
```

// Corrected program

```
public class JavaApplication {
    public static void main(String[] args) {
        System.out.print(" lab practice ");
        System.out.println("Just keep practicing");
    }
}
```

3- Problem Description: The following program has syntax errors. Correct them.

```
public class ProgAWithErrors
{
    Public static main (String [] args)
    {
        Int one, two;
double Num1; Num2;

        one = 18;
two ="apple";
three = 3;

        Num1 = 25.5;
        Num2 = Num1 * three;

System.out.printf("%s \t %f \t %s\n",one,
Num1,Num2, (Num2/3) );
    }}

```

```
public class ProgAWithErrors {
    public static void main(String[] args) {
        int one, two, three;
        double Num1, Num2;
        one = 18;
        two = 0;
        three = 3;
        Num1 = 25.5;
        Num2 = Num1 * three;
        System.out.printf("%d \t %.1f \t %.1fn", one, Num1, Num2);
    }
}
```

