LAB RECORD

23CSE111 -Object Oriented programming

Submitted by

CH.SC.U4CSE24025 – **K.HARI CHANDANA**

BACHELOR OF TECHNOLOGY

IN

COMPUTER SCIENCE AND ENGINEERING

AMRITA VISHWA VIDYAPEETHAM

AMRITA SCHOOL OF COMPUTING

CHENNAI

Java Basics Programs

Example 1: **To Calculate Factorial Number**

Aim:

To write a Java program that calculates the factorial of a given number using iteration.

Algorithm:

1. Start
2. Define a method factorial(int n).
3. Initialize res = 1.
4. Use a loop from i = 2 to n to multiply res with i.
5. Return the result.
6. In main(), define an integer num = 5.
7. Call the factorial() method and display the result.
8. Stop

Code :

```
class Test {
   static int factorial(int n)
   {
      int res = 1, i;
      for (i = 2; i <= n; i++)
         res *= i;
      return res;
   }
     public static void main(String[] args)
   {
      int num = 5;
      System.out.println("Factorial of " + num + " is "
                  + factorial(5));
   }
}
```

OUTPUT:

```
C:\Users\HP\Desktop>javac fact.java

C:\Users\HP\Desktop>java fact.java
Factorial of 5 is 120
```

Example 2: To find palindrome Number

Aim:

To determine whether a given number is a palindrome.

Algorithm:

1. Start
2. Read an integer num.
3. Store num in originalNum.
4. Initialize reversedNum = 0.
5. While num is not zero:
    - Extract the last digit (remainder = num % 10).
    - Append it to reversedNum.
    - Remove the last digit (num /= 10).
6. If originalNum == reversedNum, print "Palindrome", else print "Not a Palindrome".
7. Stop

Code :

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

    int num = 3553, reversedNum = 0, remainder;

      int originalNum = num;
```

```
    while (num != 0) {
    remainder = num % 10;
    reversedNum = reversedNum * 10 + remainder;
    num /= 10;
   }

   if (originalNum == reversedNum) {
    System.out.println(originalNum + " is Palindrome.");
   }
   else {
    System.out.println(originalNum + " is not Palindrome.");
   }
  }
}
```

OUTPUT:

```
C:\Users\HP\Desktop>javac palindrome.java

C:\Users\HP\Desktop>java palindrome.java
3553 is Palindrome.
```

Example 3: Simple java Program to find Grade of Students

Aim:

To assign grades based on student marks using conditional statements.

Algorithm:

1. Start
2. Read student marks.
3. Compare marks:
    - >=90 → Grade A
    - 80-89 → Grade B

- 70-79 → Grade C
- 60-69 → Grade D
- <60 → Grade F

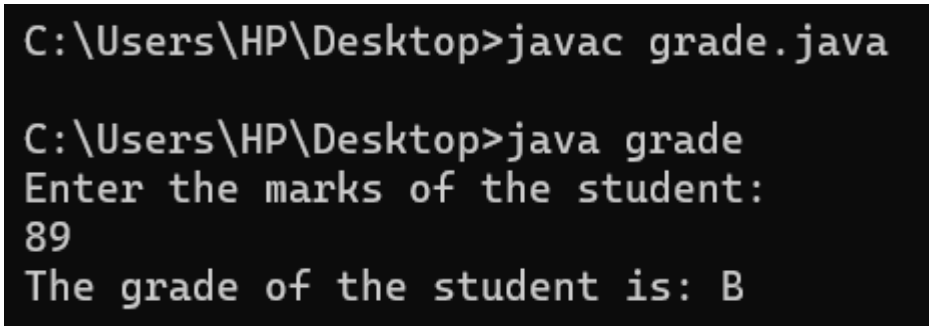
4. Print the grade.
5. Stop

Code:

```
import java.util.Scanner;


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


      Scanner scanner = new Scanner(System.in);


      // Prompt the user to enter marks
      System.out.println("Enter the marks of the student:");
      int marks = scanner.nextInt();
      String grade;
      if (marks >= 90) {
         grade = "A";
      } else if (marks >= 80) {
         grade = "B";
      } else if (marks >= 70) {
         grade = "C";
      } else if (marks >= 60) {
         grade = "D";
      } else {
         grade = "F";
      }
```

```
        System.out.println("The grade of the student is: " + grade)
        scanner.close();
    }
}
```

OUTPUT:



Example 4:A Simple Java Program to Convert Distance

Aim:

To convert distances between kilometers and miles.

Algorithm:

1) Start

2) Prompt user for conversion type (Km → Miles or Miles → Km).

3) Read the input distance.

4) If converting:

- Km to Miles: miles = km * 0.621371
- Miles to Km: km = miles / 0.621371

5) Display the converted value.

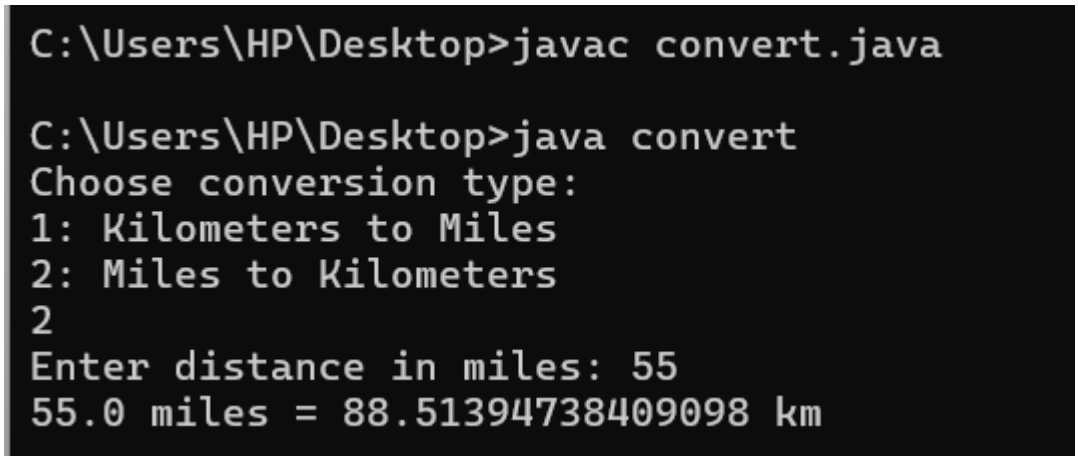
6) Stop

Code:

```
import java.util.Scanner;


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

```
        System.out.println("Choose conversion type:");
        System.out.println("1: Kilometers to Miles");
        System.out.println("2: Miles to Kilometers");
        int choice = scanner.nextInt();

        if (choice == 1) {
            System.out.print("Enter distance in kilometers: ");
            double kilometers = scanner.nextDouble();
            double miles = kilometers * 0.621371;
            System.out.println(kilometers + " km = " + miles + " miles");
        } else if (choice == 2) {
            System.out.print("Enter distance in miles: ");
            double miles = scanner.nextDouble();
            double kilometers = miles / 0.621371;
            System.out.println(miles + " miles = " + kilometers + " km");
        } else {
            System.out.println("Invalid choice.");
        scanner.close();
    }
}
```

OUTPUT:



Example 5: A Simple Java Program to Provide electricity bill Based on their Power consumption

Aim:

To compute electricity bill based on consumption slabs.

Algorithm:

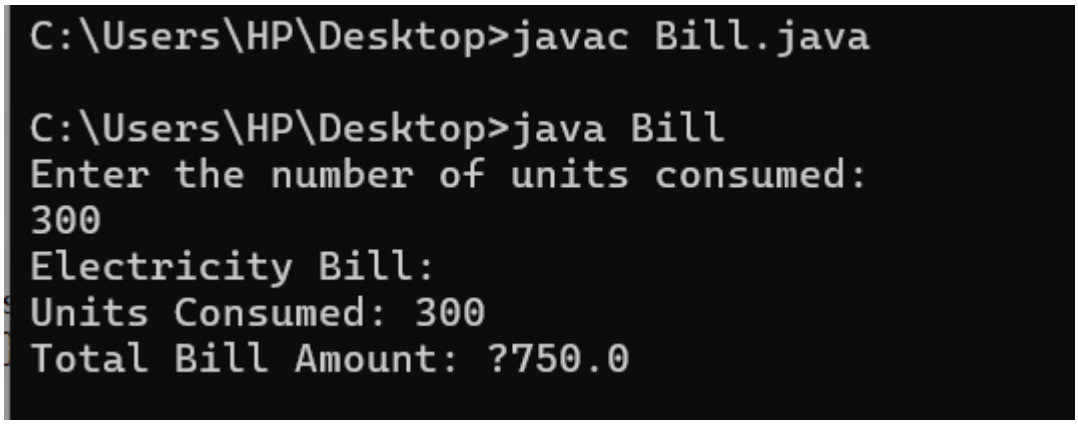
1. Start
2. Read units consumed.
3. Compute bill amount based on slabs:
    - ≤100 units: ₹1.50/unit
    - 101-200: ₹2.50/unit
    - 201-300: ₹3.50/unit
    - 300: ₹5.00/unit
4. Print the bill amount.
5. Stop

Code:

```
import java.util.Scanner;

public class Bill {
   public static void main(String[] args) {
      Scanner scanner = new Scanner(System.in);
      System.out.println("Enter the number of units consumed:");
      int units = scanner.nextInt();
      double billAmount;
      // Calculate the bill amount based on the unit slab
      if (units <= 100) {
         billAmount = units * 1.50;  // Rate: ₹1.50 per unit
      } else if (units <= 200) {
         billAmount = 100 * 1.50 + (units - 100) * 2.50;  // ₹2.50 for units above 100
```

```
        } else if (units <= 300) {
            billAmount = 100 * 1.50 + 100 * 2.50 + (units - 200) * 3.50;  // ₹3.50 for units above 200
        } else {
            billAmount = 100 * 1.50 + 100 * 2.50 + 100 * 3.50 + (units - 300) * 5.00;  // ₹5.00 for units above 300
        }
        System.out.println("Electricity Bill:");
        System.out.println("Units Consumed: " + units);
        System.out.println("Total Bill Amount: ₹" + billAmount);
    scanner.close();
    }
}
```

OUTPUT:



Example 6: To write a simple java program to print the person category based on age.

Aim:

To classify a person into categories: Child, Teenager, Adult, or Senior Citizen.

Algorithm:

1. Start
2. Read age input.
3. Determine category:

- <0 → Invalid
- 0-12 → Child
- 13-19 → Teenager
- 20-59 → Adult
- 60+ → Senior Citizen

4. Print the category.
5. Stop

CODE:

```
import java.util.Scanner;
class category{
 public static void main(String[] args) {
 Scanner scan = new Scanner(System.in);
 System.out.print("Enter the person's age: ");
 int age = scan.nextInt();
 String category;
 if (age < 0) {
 category = "Invalid age entered.";
 }
 else if (age <= 12) {
 category = "Child";
 }
 else if (age <= 19) {
 category = "Teenager";
 }
 else if (age <= 59) {
 category = "Adult";
 }
else {
```

```
 category = "Senior Citizen";
 }
 System.out.println("The person belongs to the
category: " + category);
 scan.close();
 }
}
```

OUTPUT:

```
C:\Users\HP\Desktop>javac category.java

C:\Users\HP\Desktop>java category
Enter the person's age: 18
The person belongs to thecategory: Teenager
```

7) Write a program to print calculate area of the triangle.

Aim:

To find the area of a triangle given base and height.

Algorithm:

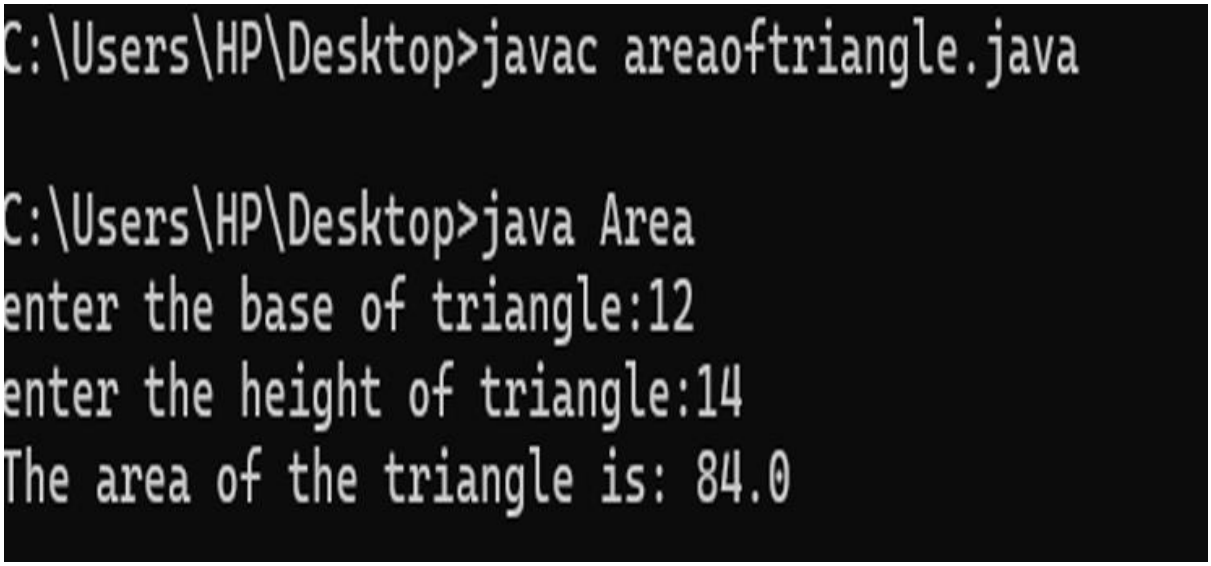
1. Start
2. Read base and height.
3. Compute area using 0.5 * base * height.
4. Print the area.
5. Stop

CODE:

```
import java.util.Scanner;
 class Area{ public static void main(String[] args){
 Scanner scanner=new Scanner(System.in);
System.out.print("enter the base of triangle:");
 double base=scanner.nextDouble();
 System.out.print("enter the height of triangle:");
```

```
double height=scanner.nextDouble();

 double area=0.5*base*height; System.out.println("The area of the triangle is: " + area);
scanner.close();

}

 }
```

OUTPUT:



8)To write a simple java program to implement currency.

Aim:

To convert USD to INR using a predefined exchange rate.

Algorithm:

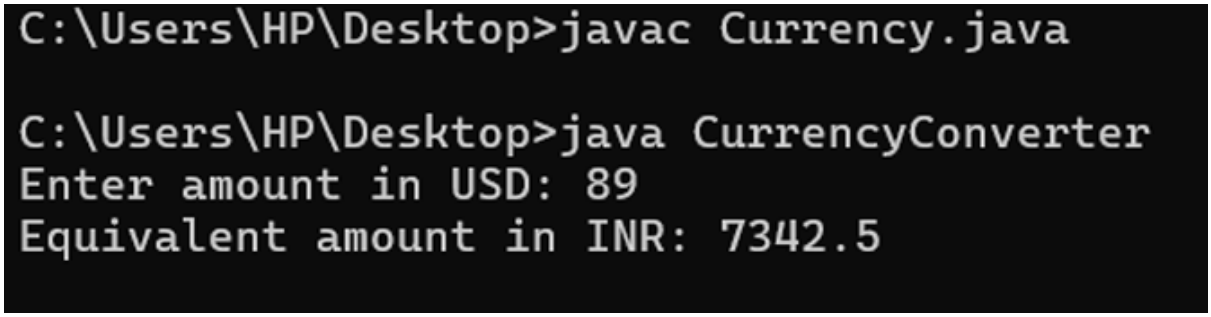
1. Start
2. Read amount in USD.
3. Multiply by exchange rate (82.5).
4. Print INR equivalent.
5. Stop

CODE:

```
import java.util.Scanner;

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

Scanner scanner = new Scanner(System.in);
```

```
System.out.print("Enter amount in USD: ");

double usd = scanner.nextDouble();

 double exchangeRate = 82.5;

double inr = usd * exchangeRate; System.out.println("Equivalent amount in INR: " + inr);
scanner.close();

}

 }
```

OUTPUT:



9) **Java Program to Find if a Given Year is a Leap Year**

Aim:

To determine if a given year is a leap year.

Algorithm:

1. Start
2. Read the year.
3. Check conditions:
    - If year % 400 == 0 → Leap Year
    - Else if year % 100 == 0 → Not a Leap Year
    - Else if year % 4 == 0 → Leap Year
    - Else → Not a Leap Year
4. Print the result.
5. Stop

CODE:

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

```
public class year {
	public static void main(String[] args)
	{
	int year;
	 System.out.println("Enter the year:");
		Scanner scn = new Scanner(System.in);
		year = scn.nextInt();
	if ((year % 400 == 0)|| ((year % 4 == 0) && (year % 100 != 0))) {
		System.out.println(year + " : Leap Year");
		}
		else {
		 System.out.println(year + " : Non - Leap Year");
		}
	}
}
```

OUTPUT:

```
C:\Users\HP\Desktop>java year
Enter the year:
2007
2007 : Non - Leap Year

C:\Users\HP\Desktop>java year
Enter the year:
2024
2024 : Leap Year
```

10) Write Java program to Find addition of N integer numbers

Aim:

To compute the sum of N user-inputted numbers.

Algorithm:

1. Start
2. Read N.
3. Initialize sum = 0.

4. Loop N times:
    - Read a number
    - Add to sum
5. Print the sum.
6. Stop

CODE:

```
import java.util.Scanner;
class sum
{
	public static void main(String[] args)
	{
		int n,num,sum = 0;
		Scanner sc = new Scanner(System.in);
		System.out.print("Enter the Limit :");
		n = sc.nextInt();
		for(int i=1; i<=n ; ++i)
		{
			System.out.printf("Enter Number %d :",i);
			num = sc.nextInt();
			sum = sum + num;
		}
		System.out.println("Sum of given Numbers : " + sum);
	}
}
```

OUTPUT:

```
C:\Users\HP\Desktop>javac sum.java

C:\Users\HP\Desktop>java sum
Enter the Limit :5
Enter Number 1 :8
Enter Number 2 :9
Enter Number 3 :0
Enter Number 4 :6
Enter Number 5 :9
Sum of given Numbers : 32
```