Faculty of Computing

IT1120 – Introduction to Programming

Year 1 Semester 1 (2024)

Tutorial 02

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1. Write pseudo code to solve the below problems and convert to java programs

   (a) Find the sum and average of two numbers

```
MAIN

    DEFINE num1, num2, sum, average AS FLOAT

    INPUT num1

    INPUT num2

    sum = num1 + num2

    average = sum / 2.0

    PRINT sum, average

ENDMAIN
```

```
import java.util.Scanner;

public class SumAndAverage
{
   public static void main(String[] args)
   {
      // Define variables
      float num1, num2, sum, average;

      // Create a scanner object for input
      Scanner input = new Scanner(System.in);

      // Input two numbers
      System.out.print("Enter the first number: ");
      num1 = input.nextFloat();

      System.out.print("Enter the second number: ");
      num2 = input.nextFloat();

      // Calculate the sum of the two numbers
      sum = num1 + num2;

      // Calculate the average of the two numbers
      average = sum / 2.0;

      // Output the sum and average
      System.out.println("The sum of the two numbers is: " + sum);
      System.out.println("The average of the two numbers is: " + average);

   }
}
```

(b) Calculate the perimeter and area of a rectangle given the length and the width

```
MAIN

    DEFINE length, width, perimeter, area AS FLOAT

    INPUT length

    INPUT width

    perimeter = 2 * (length + width)

    area = length * width

    PRINT perimeter, area

ENDMAIN
```

```
import java.util.Scanner;

public class RectangleCalculator
{
   public static void main(String[] args)
   {
      // Define variables
      float length, width, perimeter, area;

      // Create a scanner object for input
      Scanner input = new Scanner(System.in);

      // Input the length of the rectangle
      System.out.print("Enter the length of the rectangle: ");
      length = input.nextFloat();

      // Input the width of the rectangle
      System.out.print("Enter the width of the rectangle: ");
      width = input.nextFloat();

      // Calculate the perimeter of the rectangle
      perimeter = 2 * (length + width);

      // Calculate the area of the rectangle
      area = length * width;

      // Output the perimeter and area
      System.out.println("The perimeter of the rectangle is: " + perimeter);
      System.out.println("The area of the rectangle is: " + area);

   }
}
```

(c) In a lab, the weight of 1000 seeds was found to be 5x10-5g. Calculate and print the weight of one seed.

```
MAIN

    DEFINE totalWeight, weightPerSeed AS FLOAT

    DEFINE numberOfSeeds AS INTEGER

    totalWeight = 5 * 10^-5

    numberOfSeeds = 1000

    weightPerSeed = totalWeight / numberOfSeeds

    PRINT weightPerSeed

ENDMAIN
```

```
public class SeedWeightCalculator
{
   public static void main(String[] args)
   {
      // Define variables
      float totalWeight, weightPerSeed;
      int numberOfSeeds;

      // Initialize values
      totalWeight = 5 * 0.00001;  // 5 * 10^-5 g (0.00001 is 10^-5)
      numberOfSeeds = 1000;

      // Calculate the weight of one seed
      weightPerSeed = totalWeight / numberOfSeeds;

      // Output the weight of one seed
      System.out.println("The weight of one seed is: " + weightPerSeed + " g");
   }
}
```

(d) Convert a temperature given in Fahrenheit into Celsius. Celsius = 5 * (Fahrenheit - 32) / 9

```
MAIN

  DEFINE fahrenheit, celsius AS FLOAT

  INPUT fahrenheit

  celsius = 5 * (fahrenheit - 32) / 9.0

  PRINT celsius

ENDMAIN
```

```
import java.util.Scanner;

public class TemperatureConverter
{
   public static void main(String[] args)
   {
      // Define variables
      float fahrenheit, celsius;

      // Create a scanner object for input
      Scanner input = new Scanner(System.in);

      // Input temperature in Fahrenheit
      System.out.print("Enter temperature in Fahrenheit: ");
      fahrenheit = input.nextFloat();

      // Convert Fahrenheit to Celsius
      celsius = 5 * (fahrenheit - 32) / 9.0;

      // Output the temperature in Celsius
      System.out.println("Temperature in Celsius: " + celsius);
   }
}
```

2. Enter the price of 1kg of rice and the no of kilograms you want to buy from the keyboard. Write pseudo code to find the amount you have to pay. The supermarket is giving 10% discount to the total bill. Modify the pseudo code and find the amount you have to pay after considering the discount.

   Test your program for the below test cases.

	Price of 1kg (Rs)	**No of kilograms**
Test case 1	250.00	5
Test case 2	550.00	2
Test case 3	650.00	4

```
MAIN

    DEFINE pricePerKg, totalAmount, discountAmount, finalAmount AS FLOAT

    DEFINE numberOfKg AS INTEGER

    INPUT pricePerKg

    INPUT numberOfKg

    totalAmount = pricePerKg * numberOfKg

    discountAmount = totalAmount * 0.10

    finalAmount = totalAmount - discountAmount

    PRINT "Total amount to pay after discount: ", finalAmount

ENDMAIN
```

3. An employee is paid an additional amount to his monthly salary as OT amount. Write pseudo code to input the monthly salary, no of OT hours and OT hourly rate from the keyboard and find the total salary.

Total salary = monthly salary + OT amount

Test your program for the below test cases

	Monthly salary (Rs)	**No of OT hrs**	**OT hourly rate (Rs)**
Test case 1	45000.00	10	800.00
Test case 2	55000.00	7	850.00

```
MAIN

    DEFINE monthlySalary, otHourlyRate, otAmount, totalSalary AS FLOAT

    DEFINE noOfOTHours AS INTEGER

    INPUT monthlySalary

    INPUT noOfOTHours

    INPUT otHourlyRate

    otAmount = noOfOTHours * otHourlyRate

    totalSalary = monthlySalary + otAmount

    PRINT "Total salary: ", totalSalary

ENDMAIN
```

4. Write a pseudocode to enter a rupee amount and print the number of 5000/=, 1000/=, 500/=, 200/=, 100/=, 50/=, 20/=, 10/=, 5/=, 2/=, 1/= notes and coins in that amount.

   e.g. Amount = 2754

   Your program should print

   5000 Notes - 0

   1000 Notes – 2

   500 Notes - 1

   200 Notes - 1

   100 Notes - 0

   50 Notes - 1

   20 Notes - 0

   10 Notes - 0

   05 Notes - 0

   02 Notes - 2

   01 Notes - 0

   Test your program

```
MAIN

  DEFINE amount, remainingAmount, num5000, num1000, num500,
num200, num100, num50, num20, num10, num5, num2, num1 AS INTEGER

  INPUT amount

  remainingAmount = amount

  num5000 = remainingAmount / 5000
  remainingAmount = remainingAmount % 5000

  num1000 = remainingAmount / 1000
  remainingAmount = remainingAmount % 1000

  num500 = remainingAmount / 500
  remainingAmount = remainingAmount % 500

  num200 = remainingAmount / 200
  remainingAmount = remainingAmount % 200

  num100 = remainingAmount / 100
  remainingAmount = remainingAmount % 100

  num50 = remainingAmount / 50
  remainingAmount = remainingAmount % 50

  num20 = remainingAmount / 20
  remainingAmount = remainingAmount % 20

  num10 = remainingAmount / 10
  remainingAmount = remainingAmount % 10
```

```
num5 = remainingAmount / 5
remainingAmount = remainingAmount % 5

num2 = remainingAmount / 2
remainingAmount = remainingAmount % 2

num1 = remainingAmount

PRINT "5000 Notes - ", num5000
PRINT "1000 Notes - ", num1000
PRINT "500 Notes - ", num500
PRINT "200 Notes - ", num200
PRINT "100 Notes - ", num100
PRINT "50 Notes - ", num50
PRINT "20 Notes - ", num20
PRINT "10 Notes - ", num10
PRINT "05 Notes - ", num5
PRINT "02 Notes - ", num2
PRINT "01 Notes - ", num1

ENDMAIN
```