Faculty of Computing

IT1120 – Introduction to Programming

Year 1 Semester 1 (2024)

Tutorial 06

Question 1

a) Write a pseudocode to display the grade of a student.

You should enter marks for four subjects and find the average. The grades are assigned as follows:

Marks	Grade
100-75	Distinction
74-50	Credit
49-0	Fail

```
MAIN

    DEFINE marks, total AS INTEGER
    DEFINE average AS FLOAT
    DEFINE grade AS STRING

    total = 0

    FOR i = 1 TO 4
        PRINT "Enter marks for subject ", i, ": "
        INPUT marks
        total = total + marks
        i = i + 1
    NEXT

    average = total / 4.0

    IF average >= 75 THEN
        grade = "Distinction"
    ELSE IF average >= 50 THEN
        grade = "Credit"
    ELSE
        grade = "Fail"
    ENDIF
```

```
    PRINT "The average marks are: ", average
    PRINT "The grade is: ", grade

ENDMAIN
```

b) Modify your program to display the grades of three students

Sample output:

Student 1:
Enter marks : 50 55 67 60
Grade is : Credit

Student 2:
Enter marks : 80 75 77 79
Grade is : Distinction

Student 3:
Enter marks : 32 45 48 12
Grade is : Fail

c) Test your program

```
MAIN
    DEFINE marks, total, studentNumber AS INTEGER
    DEFINE avarage AS FLOAT
    DEFINE grade AS STRING


    FOR studentNumber = 1 TO 3
        total = 0
        PRINT "Student ", studentNumber, ":"
        PRINT "Enter marks : "

        FOR i = 1 TO 4
            INPUT marks
            total = total + marks
            i = i + 1
        NEXT

        average = total / 4.0

        IF average >= 75 THEN
            grade = "Distinction"
        ELSE IF average >= 50 THEN
            grade = "Credit"
        ELSE
```

```
            grade = "Fail"
        ENDIF

        PRINT "Grade is: ", grade
        studentNumber = studentNumber + 1
    NEXT

ENDMAIN
```

Question 2

a) Write a java program to display the below figure

$$$$$
$$$$$
$$$$$
$$$$$

```
public class Q2a
{
   public static void main(String[] args)
   {
      // Define the number of rows and columns
      int rows = 4;
      int columns = 5;

      // Loop through each row
      for (int i = 0; i < rows; i++)
      {
         // Loop through each column
         for (int j = 0; j < columns; j++)
         {
            // Print the dollar sign
            System.out.print("$");
         }
         // Move to the next line after printing all columns in a row
         System.out.println();
      }
   }
}
```

b) Write a java program to display numbers from 1 – 5 and display the stars as shown below

1 - *
2 - * *
3 - * * *
4 - * * * *
5 - * * * * *

```
public class Q2b
{
   public static void main(String[] args)
   {
      // Define the maximum number
      int maxNumber = 5;

      // Loop through each number from 1 to maxNumber
      for (int i = 1; i <= maxNumber; i++)
      {
         // Print the number
         System.out.print(i + " - ");

         // Print the stars
         for (int j = 0; j < i; j++)
         {
            System.out.print("* ");
         }

         // Move to the next line after printing the stars
         System.out.println();
      }
   }
}
```

c) Write a java program to display below pattern

```
55555
4444
333
22
1
```

```
public class NumberPattern
{
  public static void main(String[] args)
  {
    // Loop through each line
    for (int i = 5; i > 0; i--)
    {
      // Loop to print the numbers
      for (int j = 0; j < i; j++)
      {
        System.out.print(i);
      }
      // Move to the next line after printing the numbers
      System.out.println();
    }
  }
}
```

Question 3

SunSet supermarket has decided to give a 5% discount to the total bill amount during the festive season. Discount is given only to the customers who pay the bill in cash.

Write a pseudocode to enter the total bill amount from the keyboard and calculate the discount and the amount to be paid.

Program should ask the user to enter the mode of payment. Mode of payment can be either cash (C) or other (O). Allow the user to enter only 'C' and 'O' and display error message "Payment type < *modeofpayment* > is not valid" for any other mode of payment.

```
MAIN

    DEFINE totalBillAmount, discount, amountToBePaid AS FLOAT
    DEFINE modeOfPayment AS CHARACTER

    // Input total bill amount
    PRINT "Enter the total bill amount: "
    INPUT totalBillAmount

    // Input mode of payment
    PRINT "Enter the mode of payment (C for cash, O for other): "
    INPUT modeOfPayment

    IF modeOfPayment == 'C' THEN
        // Calculate discount
        discount = totalBillAmount * 0.05
        // Calculate amount to be paid
```

```
    amountToBePaid = totalBillAmount - discount
    // Output results
    PRINT "Discount: ", discount
    PRINT "Amount to be paid: ", amountToBePaid
  ELSE IF modeOfPayment == 'O' THEN
    // No discount
    amountToBePaid = totalBillAmount
    // Output result
    PRINT "Amount to be paid: ", amountToBePaid
  ELSE
    // Invalid payment type
    PRINT "Payment type ", modeOfPayment, " is not valid"
  ENDIF

ENDMAIN
```

Modify the program to enter the total bill of 5 customers and display the total discount given by the supermarket.

```
MAIN
   DEFINE totalBillAmount, discount, amountToBePaid, totalDiscount AS FLOAT
   DEFINE modeOfPayment AS CHARACTER
   DEFINE customer AS INTEGER

   // Initialize total discount
   totalDiscount = 0

   FOR customer = 1 TO 5
      // Input total bill amount for each customer
      PRINT "Enter the total bill amount for customer ", customer, ": "
      INPUT totalBillAmount

      // Input mode of payment for each customer
      PRINT "Enter the mode of payment for customer ", customer, " (C for cash, O for other): "
      INPUT modeOfPayment

      IF modeOfPayment == 'C' THEN
         // Calculate discount
         discount = totalBillAmount * 0.05
         // Update total discount
         totalDiscount = totalDiscount + discount
```

```
        // Calculate amount to be paid
        amountToBePaid = totalBillAmount - discount
        // Output results
        PRINT "Discount for customer ", customer, ": ", discount
        PRINT "Amount to be paid by customer ", customer, ": ", amountToBePaid
    ELSE IF modeOfPayment == 'O' THEN
        // No discount
        amountToBePaid = totalBillAmount
        // Output result
        PRINT "Amount to be paid by customer ", customer, ": ", amountToBePaid
    ELSE
        // Invalid payment type
        PRINT "Payment type ", modeOfPayment, " for customer ", customer, " is not valid"
    ENDIF

    customer = customer + 1
  NEXT

  // Output total discount given
  PRINT "Total discount given by the supermarket: ", totalDiscount

ENDMAIN
```

Write three test cases and test your program

- **Test Case 1:**
  - **Inputs:**
    - Customer 1: Total bill = 100, Mode of payment = C
    - Customer 2: Total bill = 200, Mode of payment = O
    - Customer 3: Total bill = 150, Mode of payment = C
    - Customer 4: Total bill = 250, Mode of payment = O
    - Customer 5: Total bill = 50, Mode of payment = C
  - **Expected Output:**
    - Discount for customer 1: 5.00
    - Amount to be paid by customer 1: 95.00
    - Amount to be paid by customer 2: 200.00
    - Discount for customer 3: 7.50
    - Amount to be paid by customer 3: 142.50
    - Amount to be paid by customer 4: 250.00
    - Discount for customer 5: 2.50
    - Amount to be paid by customer 5: 47.50
    - Total discount given by the supermarket: 15.00

- **Test Case 2:**
  - **Inputs:**
    - Customer 1: Total bill = 120, Mode of payment = C
    - Customer 2: Total bill = 80, Mode of payment = C
    - Customer 3: Total bill = 200, Mode of payment = O
    - Customer 4: Total bill = 300, Mode of payment = C
    - Customer 5: Total bill = 60, Mode of payment = O
  - **Expected Output:**
    - Discount for customer 1: 6.00
    - Amount to be paid by customer 1: 114.00
    - Discount for customer 2: 4.00
    - Amount to be paid by customer 2: 76.00
    - Amount to be paid by customer 3: 200.00
    - Discount for customer 4: 15.00
    - Amount to be paid by customer 4: 285.00
    - Amount to be paid by customer 5: 60.00
    - Total discount given by the supermarket: 25.00

Test Case 3:

- **Inputs:**
    - Customer 1: Total bill = 150, Mode of payment = O
    - Customer 2: Total bill = 75, Mode of payment = C
    - Customer 3: Total bill = 90, Mode of payment = C
    - Customer 4: Total bill = 130, Mode of payment = O
    - Customer 5: Total bill = 200, Mode of payment = C
- **Expected Output:**
    - Amount to be paid by customer 1: 150.00
    - Discount for customer 2: 3.75
    - Amount to be paid by customer 2: 71.25
    - Discount for customer 3: 4.50
    - Amount to be paid by customer 3: 85.50
    - Amount to be paid by customer 4: 130.00
    - Discount for customer 5: 10.00
    - Amount to be paid by customer 5: 190.00
    - Total discount given by the supermarket: 18.25