**Faculty of Computing**

IT1120 – Introduction to Programming

Year 1 Semester 1 (2024)

# Tutorial 06

## Question 1

1. 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:



1

|  |  |
| --- | --- |
| **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**

**import java.util.Scanner;**

**public class Q1a**

**{**

**public static void main(String[] args)**

**{**

**// Create a Scanner object for input**

**Scanner sc = new Scanner(System.in);**

**// Define variables**

**int marks, total;**

**double average;**

**String grade;**

**// Initialize total**

**total = 0;**

**// Loop to get marks for 4 subjects**

**for (int i = 1; i <= 4; i++)**

**{**

**System.out.print("Enter marks for subject " + i + ": ");**

**marks = sc.nextInt();**

**total += marks; // Add marks to total**

**}**

**// Calculate average**

**average = total / 4.0;**

**// Determine grade based on average**

**if (average >= 75)**

**{**

**grade = "Distinction";**

**}**

**else if (average >= 50)**

**{**

**grade = "Credit";**

**}**

**else**

**{**

**grade = "Fail";**

**}**

**// Output results**

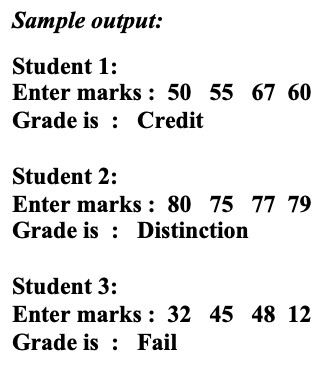
**System.out.println("The average marks are: " + average);**

**System.out.println("The grade is: " + grade);**

**}**

**}**

1. Modify your program to display the grades of three students



1. 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**

**import java.util.Scanner;**

**public class Q1b**

**{**

**public static void main(String[] args)**

**{**

**// Create a Scanner object for input**

**Scanner sc = new Scanner(System.in);**

**// Define variables**

**int marks, total, studentNumber;**

**double average;**

**String grade;**

**// Loop through each student**

**for (studentNumber = 1; studentNumber <= 3; studentNumber++)**

**{**

**// Initialize total for each student**

**total = 0;**

**System.out.println("Student " + studentNumber + ":");**

**System.out.print("Enter marks for 4 subjects: ");**

**// Input marks for 4 subjects**

**for (int i = 1; i <= 4; i++)**

**{**

**marks = sc.nextInt();**

**total += marks; // Add marks to total**

**}**

**// Calculate average**

**average = total / 4.0;**

**// Determine grade based on average**

**if (average >= 75)**

**{**

**grade = "Distinction";**

**}**

**else if (average >= 50)**

**{**

**grade = "Credit";**

**}**

**else**

**{**

**grade = "Fail";**

**}**

**// Output grade**

**System.out.println("Grade is: " + grade);**

**}**

**}**

**}**

## Question 2

1. 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();**

**}**

**}**

**}**

1. 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();**

**}**

**}**

**}**

1. Write a java program to display below pattern

55555

4444

333



2

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

**import java.util.Scanner;**

**public class Q3**

**{**

**public static void main(String[] args)**

**{**

**// Create a Scanner object for input**

**Scanner sc = new Scanner(System.in);**

**// Define variables**

**float totalBillAmount, discount, amountToBePaid, totalDiscount;**

**char modeOfPayment;**

**int customer;**

**// Initialize total discount**

**totalDiscount = 0;**

**// Loop through each customer**

**for (customer = 1; customer <= 5; customer++)**

**{**

**// Input total bill amount for each customer**

**System.out.print("Enter the total bill amount for customer " + customer + ": ");**

**totalBillAmount = sc.nextFloat();**

**// Input mode of payment for each customer**

**System.out.print("Enter the mode of payment for customer " + customer + " (C for cash, O for other): ");**

**modeOfPayment = sc.next().charAt(0);**

**if (modeOfPayment == 'C')**

**{**

**// Calculate discount**

**discount = totalBillAmount \* 0.05f;**

**// Update total discount**

**totalDiscount += discount;**

**// Calculate amount to be paid**

**amountToBePaid = totalBillAmount - discount;**

**// Output results**

**System.out.println("Discount for customer " + customer + ": " + discount);**

**System.out.println("Amount to be paid by customer " + customer + ": " + amountToBePaid);**

**}**

**else if (modeOfPayment == 'O')**

**{**

**// No discount**

**amountToBePaid = totalBillAmount;**

**// Output result**

**System.out.println("Amount to be paid by customer " + customer + ": " + amountToBePaid);**

**}**

**else**

**{**

**// Invalid payment type**

**System.out.println("Payment type " + modeOfPayment + " for customer " + customer + " is not valid");**

**}**

**}**

**// Output total discount given**

**System.out.println("Total discount given by the supermarket: " + totalDiscount);**

**}**

**}**