

National University of Computer and Emerging Sciences



Program: BS (CS)

Module: Programming Fundamentals

Class: CS19-E

Lab: 02

Agenda: Problem Solving (Flowcharts)

Problem #1:

A program is required to prompt the operator for the maximum and minimum temperature readings on a particular day, accept those readings, calculate and display to the screen the simple average temperature

Problem #2:

Calculate your two children monthly pocket money, based upon Rs.75 per year old.

Problem #3:

Create a very simple calculator that reads three numbers, add them together, and prints their total

Problem #4:

Problem Description: Display whether a student passed or failed a subject depending on his/her marks in that subject. Inputs: mark = 75 Correct results: Grade = "Pass"
Inputs: mark = 50 Correct results: Grade = "Pass" Inputs: mark = 49 Correct results: Grade = "Fail"

Problem #5:

Design an algorithm which calculates the quantity of paint required to paint a large cube. The quantity is dependent on two things i.e., size of the cube and coverage rate of a paint (the area painted by a gallon of paint). The algorithm should accept length of cube, and paint coverage rate from the user. The algorithm should then calculate and display the quantity of paint required in gallons to paint the whole cube

Problem #6:

Design an algorithm which takes radius of circle from the user, calculates and displays circumference of the circle

Problem #7:

The program should take hourly pay rate and numbers of hours worked by the employee within the week from the user. The program should then calculate and print the weekly pay on the screen. The weekly pay is calculated by multiplying the employees hourly pay rate with the number of hours worked up to 40 hours. If an employee worked more than 40 hours, weekly pay equal the employee's pay rate times 40 hours, plus 1.5 times the employee's regular pay rate times the number of hours worked above 40

Problem #8:

The rate of mowing a 200m X 200m lawn is 200 Rs. Write an algorithm that calculates the rate of mowing of any square shaped lawn having any arbitrary area by taking in the length of the lawn and the rate of mowing the lawn.

Problem #9:

An algorithm is required to calculate the bill for an item purchased from a store. The sales person shall be asked to enter item name, item category, unit price, quantity. The printed bill should contain the item name, quantity purchased, price of the item, sale tax amount and total amount to be paid by the customer. The store has four different categories of items on sale. A sale tax is deducted from the customer based on the category of the item purchased. There is no sale tax on category A items, 3% on category B items, 5% of category C items, and 7% of category D items.

Problem #10:

An algorithm is required to calculate amount of paint required in gallons to paint a room excluding window, door and floor areas. Different paint brands have different coverage rate. Brand having code 1 has coverage 100 square feet per gallon, Brand 2 has 150 sq ft/gallon, 3 has 200 sq ft/gallon, 4 has 225 sq ft/gallon, 5 has 250 sq ft/gallon. Assume that the room will always have one door and one window. The algorithm should take paint brand code, length, width, and height of the room in feet from the user. It should also take the length and width of door and window in feet. The algorithm should display the paint required in gallons to paint a room.

Problem #11:

An algorithm is required to calculate the bill for an item purchased from a store. The sales person shall be asked to enter item name, item category, unit price, quantity. The printed bill should contain the item name, quantity purchased, price of the item, sale tax amount and total amount to be paid by the customer. The store has four different categories of items on sale. A sale tax is deducted from the customer based on the category of the item purchased. There is no sale tax on category 1 items, 3% on category 2 items, 5% of category 3 items, and 7% of category 4 items.

Problem #12:

Every day, a weather station receives 15 temperatures expressed in degrees Fahrenheit. A program is to be written that will accept each Fahrenheit temperature, convert it to Celsius and display the converted temperatures to the screen. After 15

temperatures have been processed, the words 'All temperatures processed' are to be displayed on the screen.

Problem #13:

Write an algorithm that should take 10 numbers from the user. The algorithm should calculate and print average of these numbers. Modify above algorithm so that any number greater than 100 should be ignored, i.e. should not be considered for average.

Problem #14:

Write an algorithm that should take marks obtained by 15 students from the user. Every student is studying five subjects. Total marks for all subjects are 50. The algorithm should calculate and print percentage of marks of every student. It should also give at the end average percentage of these students.

Problem #15:

An algorithm is required to read from a file and print a series of names and exam scores for students enrolled in a mathematics course. The class average is to be computed and printed at the end of the report. Scores can range from 0 to 100. The last record contains a blank name and a score of 999 and is not to be included in the calculations.

Problem #16:

Design an algorithm that will read two numbers and a mathematical operator from the screen. The algorithm is then to display the two numbers, the mathematical operator and the computed result on the screen. Your algorithm is to repeat processing until a sentinel operator # is entered. The value of the mathematical operator should be +, -, *, /, or #. In case any other value, display an error message and no calculation is performed. If the mathematical operator is +, compute the sum of the two numbers. If the mathematical operator is -, compute the difference (first minus second). If mathematical operator is *, compute the product of the two numbers. If mathematical operator is /, and the second number is not zero compute the quotient (first divided by second).

Problem #17:

An algorithm is required that will read a file of student records, and select and print only those students enrolled in a course unit named Basics of Programming. Each

student record contains student number, name, address, postcode, gender, and course unit number. The course unit number for Basics of Programming is 18500.

Problem #18:

Design an algorithm that will read a file of employee records containing employee number, employee name, hourly pay rate, regular hours worked, and overtime hours worked. The algorithm for each employee's record should calculate and print the employee's total pay. It should print a total payment amount at the end of the report. The pay is calculated by multiplying the employees hourly pay rate with the number of hours worked. Hourly pay rate for overtime hours worked is 1.5 times the employee's hourly pay rate.

Problem #19:

The outer circle colored in black encloses the inner circle colored white. Write an algorithm that takes input from the user the circumference of the outer circle and circumference of the inner circle and then calculate and display on the screen the area of the inner circle and diameter of the outer circle.