National University of Computer and Emerging Sciences

Post Lab Manual

for

Programming Fundamentals

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Post-Lab Manual:

Objectives:

- To make students understand use of nested if/else
- To make students continue practice if/else for decision making problems
- To make students identify common logical errors

Questions:

Q:1

Write a program that calculates and displays a person's body mass index (BMI). The BMI is often used to determine whether a person with a sedentary lifestyle is overweight or underweight for his or her height. A person's BMI is calculated with the

following formula:

$$\textbf{BMI} = \textbf{weight} \times 703 / \textbf{height}^2$$

where weight is measured in pounds and height is measured in inches. The program should display a message indicating whether the person has optimal weight, is under weight, or is overweight. A sedentary person's weight is considered to be optimal if his or her BMI is between 18.5 and 25. If the BMI is less than 18.5, the person is considered to be underweight. If the BMI value is greater than 25, the person is considered to be overweight.

Q:2

You often need to convert Rupees into coins of 5, 2, and 1 as your younger brother often asks you for some money in coins, to put them in his moneybox. Your brother can ask you for any amount of money like 33 Rupees or 54 Rupees etc. So you need to develop a program, which takes the amount of money in terms of rupees and then computes a mix of coins of 5, 2 and 1 against that money. Remember that you may not always have enough coins. So the program should be able to covert the money into the coins available. For example, if you don't have the coins of 5-rupees, then for 7 rupees the program should compute a mix of 2-rupees and 1-rupee coins, i.e. 3 coins of 2-rupees and one coin of 1-rupee. For this program, assume that you always have enough number of 1-rupee coins against any amount of money. The program should also take as input the number of 5-rupees and 2-rupees coins available. The program should display the amount of money in terms of numbers of 5-rupees coins, 2-rupees coins and 1-rupee coins.

1. Write a C++ program for this problem and then compile and execute it.

2. Test your program with the inputs specified in the table below and find out what does program display as output.

Input			Output		
Amount of Money	5-rupees coins available	2-rupees coins available	Number of 5-rupees coins	Number of 2-rupees coins	Number of 1-rupee coins
33	8	1	6	1	1
33	2	2	2	2	19
55	12	12			
55	8	7			
42	9	0			
42	5	0			

Q:3

Write a program that computes the cost of a long distance call. The cost of the call is determined according to the following rate schedules.

a. A call made between 8:00 AM and 6:00 PM is billed at a rate of 6 rupees per minute.

b. A call made before 8:00 AM or after 6:00 PM is charged at a rate of 3.75 rupees.

According to this schedule, if a call starts at any time between 8:00 AM and 6:00 PM, and it ends after 6:00 PM then it will be charged at the rate of 6 rupees per minute for the time before 6:00 PM and for the rest of the time the rate will be 3.75 rupees per minute.

For example:

If a call starts at 5:55 PM and ends at 6:05 PM then the charges on this call will be 48.75 (30 rupees for first 5 minutes and 18.75 rupees for rest of the time).
Similarly,

if a call starts at the time before 8:00 AM but ends after 8:00 AM then it will be charged at the rate of 3.75 rupees for the time before 8:00 AM and for remaining minutes after 8:00 AM the rate will be 6 rupees per minute.

For example:

If a call starts at 7:49 AM and ends at 8:01 AM the charge on that call will be 47.25 rupees (41.25 for first 11 minutes and 6 rupees for last minute).

The input to the program will consist of the time the call started, and the length of call in minutes. The output will be the cost of call. The time is to be input in 24-hours notation, so the time 1:30 PM is input as 13:30. The time will be input using two variables of type int, one used for hour and other used for minutes. The number of the minutes for length of the call will also be input as a value of type int.