Daffodil International University

Department of Computing and Information System

Course Name: Structure Programming
Course Code: CIS122 & CIS122L

Solve Problem Using *'for'* loop

Problem 1: Multiplication Table

Surjo and Muhimer ID, they are two good friends. And they know C programming fairly well. Surjo knows basic math operations and operators, he also knows the multiplication table. And he is teaching Muhimer ID how the multiplication table works.

$2 \times 1 = 2$,

$2 \times 2 = 4$

$10 \times 5 = 50$

After that Muhimer ID knows how multiplication table works. So, Surjo challenge Muhimer Id to to solve a really simple problem. The problem starts by taking input n $(1 \leq n \leq 10)$. Muhimer ID job is to make a multiplication table. After getting the value the odd row values are multiply by 2 then subtract 1 from the total value. Same as even row, the even rows value is multiplying by 3 then subtract 1 form the value. And all the values are store in array size 10 $(data[10])$.

$6 \times 1 = 11$
$6 \times 2 = 35$
$6 \times 3 = 35$
$6 \times 4 = 71$
$6 \times 5 = 59$
$6 \times 6 = 107$
$6 \times 7 = 83$
$6 \times 8 = 143$
$6 \times 9 = 107$
$6 \times 10 = 179$

Input: Input an integer number n $(1 \leq n \leq 10)$

Output: Calculate the above calculation and store in array. And print the sum and average of the calculated value. And print the value except the range $(100\ to\ 150)$. Generate the output like below. So, your job is to help Muhimer ID to solve the problem.

Test Case:

Sample Input	Sample Output
6	$6 \times 1 = 6$ $6 \times 2 = 12$ $6 \times 3 = 18$ $6 \times 4 = 24$ $6 \times 5 = 30$ $6 \times 6 = 36$ $6 \times 7 = 42$ $6 \times 8 = 48$ $6 \times 9 = 54$ $6 \times 10 = 60$ Sum of Calculated Value: 830 Average of Calculated Value: 83 Adjust Result: $11 \rightarrow 35 \rightarrow 35 \rightarrow 71 \rightarrow 59 \rightarrow 83 \rightarrow 179 \rightarrow$

Problem 2: Fun with Pattern

Draw the pattern and print the sum and average

Test Case:

Sample Input	Sample Output
	$*1*$ $*22*$ $*333*$ $*4444*$ $*55555*$ $*666666*$ Sum of pattern = 91 Average of patterns = 15.167

Problem 3: Factorial Sum

We all know how to calculate factorial. If we want to calculate $6!$ Then the process is $6 \times 5 \times 4 \times 3 \times 2 \times 1$. Take two input $(1 \leq n1, n2 \geq 10)$ calculate the both number factorial. If the number one factorial result is between $(1 \geq result \leq 100)$ then multiply by 2 then subtract 2 if the number is $(101 \geq result \leq 600)$ then divide by 3 then add 5 and finally the number is $(result > 600)$ then print ***'the number is out of bound'***.

Input: Take 2 number

Output: Print the number two factorial result and number one calculation result

Test Case:

Sample Input	Sample Output
Number One: 5 Number Two: 6	Number One Factorial Result = 45 Number Two Factorial Result = 720
Number One: 6 Number Two: 3	Number One Factorial Result = the number is out of bound Number Two Factorial Result = 6
Number One: 4 Number Two: 9	Number One Factorial Result = 46 Number Two Factorial Result = 362880

Problem 4: Arrange Number

Elam knows how to change the value of 2 variables, so she is teaching Jannatul how to do it or how it works.

$$int\ a = 20;$$
$$int\ b = 30;$$

$$int\ temp = a$$
$$a = b$$
$$b = temp$$

$int\ temp = a$ → $int\ temp = 20; (a = 20)$

$a = b$ → $a = 30; (b = 30)$

$b = temp$ → $b = 20; (temp = 20)$

$$a = 30;$$
$$b = 20;$$

Seeing Elma's talent, Jannatul told Elma that a random data was arranged in an ascending order.

$int\ data[5] = \{5,2,6,-3,0\}$

1st Pass:

5	2	2	2	2
2	5	5	5	5
6	6	6	-3	-3
-3	-3	-3	6	0
0	0	0	0	6

2nd Pass:

2	2	2	2
5	5	-3	-3
-3	-3	5	0
0	0	0	5
6	6	6	6

3rd Pass

2	-3	-3
-3	2	0
0	0	2
5	5	5
6	6	6

4th Pass:

-3	-3
0	0
2	2
5	5
6	6

The total data size was 5 but the number of pass was 4 that means $5 - 1 = 4\ [n - 1]$, so outer iteration was $(n - 1)$ and inner iteration was $(n - i - 1)$ why $(n - i - 1)$ because as we can see in every outer iteration the inner one also decreasing by the number of i.

Input: First take n number to take $(data_0,\ data_1 \ldots . data_{n-1})$ numbers of data

Output: Rearrange the thumber to sorted

Test Case:

Sample Input	Sample Output
Enter the total numbers size: 5 Input 1 number: 5 Input 2 number: 2 Input 3 number: 6 Input 4 number: -3 Input 5 number: 0	Sorted Data: $-3 \rightarrow 0 \rightarrow 2 \rightarrow 5 \rightarrow 6$

Problem 5: Power of Rose and Love

Mira travels to the university using the same road every day. She travels the same route twice a day. A boy named Ratul follows her every day. Gradually Ratul started liking her and brought a flower for her every day.

In this way, Ratul gives 7 flowers to Meera in a week. On the first day of the next week, he brings the same number of flowers as he had given till yesterday and one flower every day.

Thus, Ratul brought flowers for $'n'$ months. While studying at Ratul DIU, he knows that rose flowers are available in Golapgram village at affordable prices. So, he went to the Golapgram village and bought each rose for 2 Tk only. Since he buys roses every day, the rose grower gives him a 10 percent discount on the total monthly purchase.

One day they decide to get married. On the wedding day, they brought the same number of flowers as they had bought in $'n'$ months. (For example, if you buy 10 flowers in 3 months, the wedding day will be $[10 + 10 = 20]$ flowers.) To make that day more special, he also bought 5 tuberoses at the price of 5 Tk each and 2 gajra at 10 Tk each.

Input: Number of months $1 \leq n \leq 8$

Outputs: Calculate and print the total of flowers he bought for Mira, except gajra flower also how much the total flowers cost.

Test Case:

Sample Input	Sample Output
Total Numbers of month: 2	Total Flowers he bought = 3575 Total Flowers cost = 7017.00

Solve Problem Using *'While'* loop

Problem 1: Calories Sort Path (While)

Ruhi loves to eat. So, after some time, she got sick; after going to the hospital, her doctor advised her to eat less and maintain a proper diet. Her doctor suggests eating 200 calories not more then. Ruhi comes from the computer science department. She wants to experiment with 200 calories. So, she went to her advisor, sir, and her sir make a question for her.

The problem is reaching 200 calories to least moves. How many (few) steps can be taken to get 200 calories? The logic is that the number must start with 1, and on each move, you can double your calories or add 1 with your calories.

Input: Take an integer number n $10 \leq n \leq 1000$

Output: Use loop and above logic to reach n and print the short path/number of moves

Test Case:

Sample Input	Sample Output
Enter the number for least moves: 200	Total moves: 79

Problem 2: Reverse Square Root

Take integer n inputs from user and declare data array with the size of n and take input from users. Input must be positive. If user puts any negative input then your program will take another input for that position. Finally store the value in reverse order and print them.

Input: The first line of input is an integer N ($N < 50$), that indicates the total number of test cases. Each case is an integer number X ($X >= 0$).

Output: Print the square root in reverse order and calculate the sum of all square root values.

Test Case:

Sample Input	Sample Output
Enter the number for total values: 5 Input 1 number: 9 Input 2 number: 60 Input 3 number: -9 Input 3 number: 3 Input 4 number: 88 Input 5 number: -56 Input 5 number: 77	$data[0] = 8.77$ $data[1] = 9.38$ $data[2] = 1.73$ $data[3] = 7.75$ $data[4] = 3$ Sum of data: 30.63

Problem 3: Divisible Fun

Print all numbers which are divisible by 13 between the user given range.

Test Case:

Sample Input	Sample Output
Starting Number: 1 Ending Number: 30	Divisible Data: $13 \rightarrow 26 \rightarrow 39 \rightarrow 52 \rightarrow$

Problem 4: Divisible Fun

Take input n from user. This n represents the number of total numbers of input. That means the array size. After taking the input your job is to check number, if the number is positive even then you should print **'Positive Even'** if it was negative even the you should print **'Negative Even'** same process goes to odd calculation, if positive odd then **'Positive Odd'** else **'Negative Odd'.** However, if the number was 0 then you should print **'Empty'.**

Test Case:

Sample Input	Sample Output
Enter the number for total values: 7 Input 1 number: 9 Input 2 number: 60 Input 3 number: -9 Input 4 number: 0 Input 5 number: 88 Input 6 number: -56 Input 7 number: -44	$data[0] = 9 \rightarrow \ Positive\ Odd$ $data[1] = 60 \rightarrow Positive\ Even$ $data[2] = -9 \rightarrow Negative\ Odd$ $data[3] = 0 \rightarrow Empty$ $data[4] = 88 \rightarrow Positive\ Even$ $data[5] = -56 \rightarrow Negative\ Odd$ $data[6] = -44\ Negative\ Even$

Problem 4: Reverse Decreasing

Write a program to fill the array with n to 0

Input: Integer number n

Output: Print the value as mention below and print them until the value become 0

Sample Input	Sample Output
Enter the number = 500	$data[0] = 500$ $data[1] = 250$ $data[2] = 125$ $data[3] = 62.5$ $data[4] = 31.25$ $data[5] = 15.625$ …..

Solve Problem Using *'Do While'* loop

Problem 1: Power Up

Read an integer from user and do multiplication for 10 times and print the values. After printing the values ask user to do more operation, if user press **'Y' / 'y'** that means user want more operation if user press or input **'N' / 'n'** that means user want to quit the program. But you have to do at least one operation.

Sample Input	Sample Output
Enter the number = 6	6, 12, 18, 24, 30, 36, 42, 48, 54, 60 Do you want more operation (y/n): n
Enter the number = 6 Enter the number = 5	6, 12, 18, 24, 30, 36, 42, 48, 54, 60 Do you want more operation (y/n): y 5, 10, 15, 20, 25, 30, 35, 40, 45, 50 Do you want more operation (y/n): n

Problem 2: Positive Attitude Checker

Parvez has a positive attitude. So, he wants to check the status of the rest of his friends. So, he divided the results into 3 parts. If it is greater than 0, then 'positive', if it is below 0 air, then 'negative' and if 0 air is equal, then 'value less'. Write a program for this scenario. And give user choice for further calculation.

Sample Input	Sample Output
Friends Status: 5	Positive Attitude Do you want more operation (y/n): n
Friends Status: -3 Friends Status: 0	Negative Attitude Do you want more operation (y/n): y Value Less Person Do you want more operation (y/n): n

Problem 3: Make a Simple Calculator

Write a program for a simple calculation, For example:

1. Addition
2. Subtraction
3. Multiplication
4. Modules/Reminder

Input: Input two number, numberOne and numberTwo

Output: Do the calculation for at least one time and after calculation ask user to do more or not.

Sample Input	Sample Output
Input Number One: 20 Input Number Two: 30 1. Addition 2. Subtraction 3. Multiplication 4. Modules/Reminder Enter your choice: 1	Addition: 20 + 30 = 50 Do you want more (1 for 'Yes', 2 For 'No'): 2

Problem 4: Groceries Market

Dipto needs some groceries, so, go to the market and ask sales man for available product.

1. Fish – 150/-
2. Meat – 200/-
3. Carrot – 30/-
4. Pumpkin – 20/-
5. Tomato – 40/-
6. Potato – 10/-

Help Dipto to add product to his inventory and calculate the total cost.

Sample Input	Sample Output
1. Fish – 150/- 2. Meat – 200/- 3. Carrot – 30/- 4. Pumpkin – 20/- 5. Tomato – 40/- 6. Potato – 10/- Add Product: 1 Want to add more (y/n): y Add Product: 5 Want to add more (y/n): y Add Product: 2 Want to add more (y/n): n	The total product he purchased: 3 items. The total cost of the all products: 390 Tk.

Problem 5: Simple Even Odd Sum

You need to take input from user until the user input 0. Check if the number is even then you need to multiply by 2 and add 3 if the number is odd then you need to multiply by 3 and subtract 5 from it.

Sample Input	Sample Output
2 3 5 6 7 0	Sum Of Even and Odd: 54