LAB ASSIGNMENTS

Object-Oriented Programming with C++

(CSE 3943)

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Lab Assignment-1

1. Programming Excerices on C++

1.1 In India the currency is made up of Rupee denominations Re. 1, Rs. 2, Rs. 5, Rs. 10, Rs. 50, Rs. 100, Rs. 500 and Rs. 2000. A bank is trying to find the number of notes of each denomination that the teller can give a customer for a certain amount of money, such that he has to handle minimum number of notes. Write a program to list out the number of notes of each denomination for an amount received through the keyboard.

Sample Run:
Enter the amount to be tendered:
23418
Denomination details:
2000 x 11 = 22000
500 x 2 = 1000
100 x 4 = 400
10 x 1 = 10
5 x 1 = 5
2 x 1 = 2
1 x 1 = 1

1.2 Write a program to find all such numbers up to 10000 which are equal to the sum of the factorial of their digits.

For Example: 145 is a curious number, as 1! + 4! + 5! = 1 + 24 + 120 = 145.

1.3 Write a program that determines the number of trailing zeros at the end of X! (X factorial), where X is an arbitrary number that is input through the keyboard. For instance, 5! is 120, so it has one trailing zero.

Sample Run:
Enter a non-negative number:
12
No. of zeros at the end of 12! = 2

1.4 A triplet of positive integers (a,b,c) is called a Cardano Triplet if it satisfies the condition:

$\sqrt[3]{(a+b\sqrt{c})} + \sqrt[3]{(a-b\sqrt{c})} = 1$

For example, (2,1,5) is a Cardano Triplet. Write a program to generate all Cardano Triplets that exist, such that (a + b + c) <= 100.

1.5 The Fibonacci sequence is defined by the recurrence relation:
F(n)= F (n - 1) + F (n - 2), where F(1) = 1 and F(2) = 1. Hence the first 12 terms will be:
F(1) = 1
F(2) = 1
F(3) = 2
F(4) = 3
F(5) = 5
F(6) = 8
F(7) = 13

F(8) = 21
F(9) = 34
F(10) = 55
F(11) = 89
F(12) = 144

The 12th term, F(12), is the first term to contain three digits. Write a program to find the index of the first term in the Fibonacci sequence to contain 10 digits?

1.6 An election is contested by five candidates. The candidates are numbered 1 to 5 and the voting is done by marking the candidate number on the ballot paper. Write a program to read the ballots and count the vote cast for each candidate using an array variable count. In case, a number read is outside the range 1 to 5, the ballot should be considered as a "spoilt ballot" and the program should also count the numbers of "spoilt ballots".

1.7 Write a program to print the following outputs using for loops.

1
22
333
4444
55555
- - - - - - and so on.

1.8 An electricity board charges the following rates to domestic users to discourage large consumption of energy:

For the first 100 units – 60P per unit
For the first 200 units – 80P per unit
For the first 300 units – 90P per unit

All users are charged a minimum of Rs. 50.00. If the total amount is more than Rs. 300.00, then an additional surcharge of 15% is added. Write a program to read the names of users and number of units consumed and print out the charges with names.