NUST-SMME-

CS-114 Fundamentals of Programming Lab Report #04

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BE-ME15 Section: - A

Lab Manual 4 Home task- Loops (part 1)

TASK1: -

Q. Write a program in C++ that prints the numbers from 1 to 150 except the multiples of 10

```cpp
1    #include<iostream>
2    using namespace std;
3    int main(){
4
5      cout<<"Task 1:-"<<endl;
6      //A for loop is used to run the first 150 natural numbers.
7      for (int b=1; b<=150; b++)
8      {
9        //An if-continue statemet is used to skip multiples of 10.
10       if(b%10==0)
11       continue;
12       //continue skips the next output line and again runs the loop
13       cout<<b<<" ";
14
15     }
16
17   //end of task 1
```

In order to print out the numbers 1 to 150, I ran a loop. Moreover, a continue statement has been added inside the loop to skip multiples of 10 I.e., if the remainder when the number is divided by 10 is 0 then continue the loop without displaying the output. Hence this way all numbers except multiples of 10 are printed.

TASK2: -

Q. Write a C++ program to find the sum of digits of a number.

```cpp
19   cout<<" "<<endl;  //finding sum of the digits of a number
20   cout<<"Task 2:-"<<endl;
21   int num, a; //declared num and a as integers
22   cout<<"Please enter your number"<<endl;
23   cin>>num;
24   //if-else statement to diffrenciate between positive and negative integers
25   if(num>=0){
26   //loop in order to find value of each digit by mathematical operations inside the loop and adding the values each time
27   for(int i; i>0, i++;)
28   {
29
30   a = a + num%10;
31   //the remainder of a number when divided by 10 will be equal to the value of the 1st digit from the right
32   num = num/10;
33   //as num is declared as an int variable, so decimal is not considered after division by 10
34   //the loop will function up until the num has 1 digit left
35   if(num<=0)
36   {break;}  //the loop breaks and output a is displayed
37   }
38   cout<<"The sum of the digits of the number is:-"<<endl;
39   cout<<a<<endl;
40   }
41   //my code only works for non-negative numbers.
42   //to make this work for negative integers, the absolute value function will have to be introduced
43   else {cout<<"Please enter a non-negative number"<<endl;
44   }
45   //end of task 2
```

The sum of the digits of the number is 'a' and each time the loop runs, the value of the next digit gets added into 'a'. The 1st digit of the number from the right is equal to the remainder of the number when divided by 10. After finding the 1st digit the number is then divided by 10 to reduce the number of digits. As number is declared as integer, the value after decimal is ignored (eg. 36.9=36), this way the reduction of digits occurs, the loop is then repeated for the next digit and the value 'a' keeps on adding the value of digits in it up until the number has no digit value left (it becomes equal to 0). The loop breaks when all digit values have been added up (num<=0) and the value of 'a' is displayed as output. My code does not work for negative integers.

TASK3: -

Q. Write a C++ program to check whether a number is prime or not

```
47    cout<<"Task 3:- "<<endl;  //to check whether a number is prime or not
48    int p, q;
49    cout<<"Please enter your number:-"<<endl;
50    cin>>p;
51    //an if-else statment is used for number that are neither prime nor composite (integers less than and equal to 1)
52    if(p<=1){cout<<"Your number is neither prime nor composite";}
53    else {
54    //after all positive numbers greater than 1 are separated, a loop is made to find the reminder of a number when divided to each possible number
55    for(int n=2; n<=p/2, n++;)
56    {
57    q=p%n;
58    //if remainder at any moment becomes equal to 0, this means number is composite
59    if(q==0)
60    {cout<<"Your number is composite"<<endl;
61    break;}  //break ends the loop
62    if(n<=p/2)
63    continue; //continue the loop wihtout displaying output in order to check for all values and remainders
64    //if all remainders are not equal to 0, then the following output will be displayed
65    cout<<"Your number is prime"<<endl;
66    break;
67    }
68    }
69    //end of task 3
70    return 0;
71    }
```

In order to check if input number is prime or not, first an if else statement is used to check whether number is less than or equal to 1, since these numbers come under" Neither prime nor composite". Then, a loop is made that checks if remainder is 0 when the number is divided by all possible unique integers. If the remainder never equals 0 for all given iterations, then the number is declared as prime by the code, or else the number is declared" composite" if remainder equals 0 at any point and the loop breaks at that point.

OUTPUTS: -

```
Task 1:-
1 2 3 4 5 6 7 8 9 11 12 13 14 15 16 17 18 19 21 22 23 24 25 26 27 28 29 31 32 33 34 35 36 37 38 39 41 42 43 44 45 46 47
48 49 51 52 53 54 55 56 57 58 59 61 62 63 64 65 66 67 68 69 71 72 73 74 75 76 77 78 79 81 82 83 84 85 86 87 88 89 91 92
93 94 95 96 97 98 99 101 102 103 104 105 106 107 108 109 111 112 113 114 115 116 117 118 119 121 122 123 124 125 126 127
 128 129 131 132 133 134 135 136 137 138 139 141 142 143 144 145 146 147 148 149
---------------------------------
Process exited after 0.1282 seconds with return value 0
Press any key to continue . . .
```

```
Task 2:-
Please enter your number
3452
The sum of the digits of the number is:-
14
Task 3:-
Please enter your number:-
123
Your number is composite


----------------------------------
Process exited after 12.84 seconds with return value 0
Press any key to continue . . . |
```