Programming lab assignment

Lab manual 4, task 1 – 3

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Section A

Task 1

Write a program in C++ that prints the numbers from 1 to 150 except the multiples of 10, make use of the continue statement.

```cpp
1  //-----------------------------------------------------------------------------------------------------
2  // This code was written by Faizan Ahmad 476602 section A, this code is for the home tasks 1/3 found in the Lab manual 4.
3  #include<iostream>
4  using namespace std;
5  int main() {
6
7      //Task 1
8      //Write a program that prints the numbers 1 to 150 except the multiples of 10, make use of the continue statment.
9
10     int y=1;
11
12     for ( int x=0; x<150; x++ ) {//the limits are defined and so the loop will run 149 times
13
14         if ( x % 10 == 0 ) { //this first if statment checks if the integer x is a multiple of 10 or not.
15             continue; //if true then the continue function skips this number and moves on to the next loop.
16         }
17         else {   // if not then the number is outputted.
18             cout<<x<<", ";
19         }
20
21     }
22     return 0;
23 }
```

For this task I used a for loop that checks all the numbers from 1 to 150 and finds the numbers divisible by 10. If a multiple of 10 is detected then the if statement is true which mean the continue; function is activated thus skipping that number.

```
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, 5
1, 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, 9
8, 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 0.1455 seconds with return value 0
Press any key to continue . . .
```

Task 2

Write a C++ program to find the sum of digits of a number. The sum of digits means adding all the digits of any number, for example, we take any number like 358. Its sum of all digits is 3+5+8=16.

```cpp
//---------------------------------------------------------------------------------------------------------------------
//This code is written by Faizan Ahmad 476602 section A, the code covers task 2 from the lab manual 4.

#include<iostream>
using namespace std;
int main() {

    //Task 2
    //Write a C++ program tp find the sum of digets of a number.
    //The sum of the digits means adding all the digits of any number, for example, we take any number like 348. its sum of all digits
    //is 3 + 5 + 8 = 16

    int x, y, sum=0; //i used integer because the input must be a integer to work.
                     //moreover during the calculation process it will be helpful to use int

                     //the 3 integers defined are x(which is out input), y is the remainder and sum is the final product of the digits
    cout<<"Enter the Number: "<<endl; // simple prompt that asks for an integer input
    cin>>x;
    while(x>0)       //i used while because the code should stop once ive reached the last digit.
    {
                     //to explain the following set of equations i'll take input example 365, first of all y = x%10 means the remainder when 365 is
                     //divided by 10, (365 % 10 = 5) hence our first sum is 0 + 5 = 5, then we divide x by 10 leaving us with 36.5 however because 36.5 is not
                     //an integer the code only reads 36 this is what we want since now we can loop the code and find the remainder of 36 % 10 = 6
                     //this loop goes on until we reach 3 / 10 = 0.3, this is read by the code as 0 and since our while condition was x>0 the code breaks.
        y = x%10;
        sum = sum+y;
        x = x/10;
                     //by the end we have 5 + 6 + 3 = 14
    }
    cout<<"Sum of Digits = "<<sum; // the output is the sum of all the digits 'sum'
    cout<<endl;
    return 0;
}
```

For this code an input value x is taken, x is then divided by 10 and the remainder is checked. The remainder is the last digit of x. by dividing x by 10 we go onto the next digit. The code loops until all the digits have been determined and summed (I recommend reading the comments in the code as it provides a more concise explanation with an example.

```
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, 5
1, 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, 9
8, 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 0.1455 seconds with return value 0
Press any key to continue . . .
```

Task 3

Write a code that determines if an input number is a prime number or not.

```cpp
//---------------------------------------------------------------------------------------------------------------------
//This code was written by Faizan Ahmad 476602 section A, Task 3 lab manual 4
#include<iostream>
using namespace std;
int main () {
//Task 3
//The following code checks if a number is a prime number or not.
    int x, y; // the integers defined are x (input number) and y (the number that is used in the calculations).

    cout<<"Enter a number"<<endl; //simple input promt
    cin>>x;

    if (x == 1 || x == 0) { //this first if checks if the input is 0 or 1, 0 and 1 are neither composite nor prime numbers.
        cout<<"Your number is neither a prime number nor a composite number";
    }

    for ( y = 2; y = x/2; y++ ) { //using 'for' we use the conditoon y=2 till y = x/2, the reasion behind using x/2 as our final limit is because
                                  //y/2 is the greatest number that can produce our input when multiplied by 2

        if ( x % y == 0 ) {       // this condition checks all the y values between the limits if they can divide x with no remainder.
            cout<<"Your number is a composite number";

        }
        else {                    // this else is exicuted if the prevous 'if' statment failed.
            cout<<"Your number is a prime number";

        }
    break;                        // break used to stop the loop once an output is detected.
    }

    return 0;
}
```

This code uses an initial 'if' statement that detects if the input is 1 or 0 since these numbers are not prime numbers or composite numbers. Next using a for loop input x is divided with all the numbers y (y=2 , y=x/2), then once an output is determined the code stops because of the break; function.

C:\Users\Personal\Desktop\Lab manual 4 Home tasks\Lab manual 4 task 3.exe

```
Enter a number
5784
Your number is a composite number
--------------------------------
Process exited after 5.882 seconds with return value 0
Press any key to continue . . .
```