

COL 100. Minor 1 Exam

Friday August 24, 2018

Name:

Entry Number:

Group:

Notes:

- Total number of questions: 5. Max Marks: 20
- All answers should be written on the question paper itself.
- The last two sheets in the question paper are meant for rough work. If you run out of space, you can answer questions in this rough space. However, please clearly mention in the answer space for the appropriate question that we should look at the rough space for its answer.
- We will collect the question paper (including the last two sheets meant for rough work). We will not be collecting back any other rough sheets.

1. **Fibonacci Series:** In this problem, we will write a program to output the numbers in a Fibonacci series. A Fibonacci series starts with numbers 0 and 1, and the number at the i^{th} position ($i \geq 3$) is the sum of the numbers at the positions $i - 1$ and $i - 2$. For example, first few elements of a Fibonacci series are given as: 0, 1, 1, 2, 3, 5, 8, 13, 21, \dots and so on. Complete the following program to print the first n numbers of the Fibonacci series. [5 points]

```
#include <iostream>
#include "simpio.h";
using namespace std;

int main() {

    int n = getInteger("n?");

    for(-----) {

    }
}
```

2. **Sum Digits:** We would like to write a function *sumDigits(int n)* which inputs a positive integer n and returns the sum of the digits of n . For example, if $n = 356$, your function should return the value $3 + 5 + 6 = 14$. Complete the code below to achieve the above functionality. You can make use of the `%` (remainder) operator where $a\%b$ returns the remainder of dividing a by b where a and b both are integers, e.g., $6\%4 = 2$. [5 points]

```
//Function sumDigits - to sum the digits of a number
int sumDigits(int n){

    int sum=0;

    while(                ) {

        sum = sum + _____;

    }

}
```

3. We would like to write a program which (a) repeatedly inputs a number n from the user until the entered number is a positive odd number (b) prints the following pattern for the given value of n . For example, if $n = 7$, following pattern is printed. You can use the `getInteger()` function available in `simpio.h` or use `cin` (it is your choice). [4 points]

```
*
***
*****
*****
*****
***
*
```

Note that the middle row has 7 stars in the above pattern.

```
#include <iostream>
#include "simpio.h"
using namespace std;

int main() {
```

```
}
```

4. What will be the output of the following program? [3 points]

```
#include <iostream>
using namespace std;

int main() {
    int j=10;
    for (int i=0;i<j;j--) {
        int j=i++;
        cout<<j<<" ";
    }
    cout << endl;
}
```

You need to justify your answer by clearly stating which variable definition(s) does each usage of i and j bind (or refer) to. You should also justify the number of times the for loop will be executed.

5. What happens when the following code is executed? [3 points]

```
#include <iostream>
using namespace std;

int foo(int n) {
    if(n > n/2 + 2*3) {
        cout<<"Statement 1 is executed. n = "<<n<<endl;
    } else if((n>=4 || n<=12) && n!=7) {
        cout<<"Statement 2 is executed. n = "<<n<<endl;
        n = n/2 + 2;
    } else if(n%2 != 0) {
        cout<<"Statement 3 is executed. n = "<<n<<endl;
        n = n + 1;
    } else {
        cout<<"Statement 4 is executed. n = "<<n<<endl;
    }
    return n;
}

int main()
{
    int n =11;
    n = foo(n);
    while(n >= 4)
    {
        n = foo(n);
    }
    return 0;
}
```

Rough page 1

Rough page 2