Lab 2
EET 340
Introduction to Computer Organization and Architecture

For Loop

1. Write an assembly program and simulate it using `ARMSim` or `online editor` to calculate the sum of first 10 natural numbers. The resulting sum will be contained on Register R9. Comment each line of the codes. You should name the file as `Lab2A.S`

Hints:

- The sum of first 10 natural numbers is 1+2+3+4+5+6+7+8+9+10 = 55
- The corresponding C++ code has been given below. You can simply convert the C++ code to assembly code.
- See the example/sample code on the "Lab Tutorials" section.

`C++ source code:`

```
#include <iostream>
using namespace std;
int main()
{
    int i,sum=0;
    for (i = 1; i <= 10; i++)
    {
       sum=sum+i;
    }
     cout << "The sum of first 10 natural numbers: "<<sum << endl;
}
```

```
C++ Sample output:
The sum of first 10 natural numbers: 55
```

While Loop

2. Write an assembly program and simulate it using `ARMSim` or `online editor` to calculate the sum and average of 8 even numbers between 2 to 16, inclusively. The resulting sum and average will be contained on the registers R8 and R9, respectively. Comment each line of the codes. You should name the file as `Lab3.S`

Hints:

- The sum of the 8 even numbers is 2+4+6+8+10+12+14+16 = 72

- The corresponding C++ code has been given below. You can simply convert the C++ code to assembly code.
- You can implement division operation using LSR instruction. LSR instruction effectively divide the contents of a register by 2^i.
- See the example/sample code on the "Lab Tutorials" section.

C++ source code:

```
#include <iostream>
using namespace std;
int main()
{
    int i=2, average, sum=0, count = 0;
    while (i<=16)
    {
        sum=sum + i;
        i=i+2;
    }

    average = sum/8;
    cout<<"Sum: "<<sum<<endl;
    cout<<"Average: "<<average<<endl;

    return 0;
}
```

C++ Sample output:

```
Sum: 72
Average: 9
```

SUBMISSION PROCEDURE

You can upload `Lab2A.S` **and** Lab 2B.S **files on Canvas.**

Using an online editor, you can simply copy your code on notepad/text files. You can submit your notepad/text files. Please do not send me your code in pdf.