CS 2073
Computer Programming with Engineering Applications
Assignment 3
Due Wednesday October 17

1. (100 pts) Write a single program that computes the value of the following expressions using loop statements. Read the value of n from the user and compute the left hand side using the specified loop. Use the formula on the right hand side to test the result. Use the same value of n for computation of all the results and display the results.

   (a) Compute the following using a *for* loop

   $$\frac{1}{2} + \frac{1}{2^2} + \ldots + \frac{1}{2^n} = \sum_{i=1}^{n} \frac{1}{2^i} \quad = \quad 1 - \frac{1}{2^n}$$

   (b) Compute the following using a *while* loop

   $$1 * 2 + 2 * 3 + \ldots + n * (n+1) = \sum_{i=1}^{n} i(i+1) \quad = \quad \frac{n(n+1)(n+2)}{3}$$

   (c) Compute the following using a *do-while* loop

   $$\frac{1}{1*2} + \frac{1}{2*3} + \ldots + \frac{1}{n*(n+1)} = \sum_{i=1}^{n} \frac{1}{i(i+1)} \quad = 1 - \frac{1}{n+1}$$

   Sample execution of the program is given below

```
Enter n:
8
For Loop
  Loop Result = 0.996094
  Formula = 0.996094
While Loop
  Loop Result = 240.000000
  Formula = 240.000000
Do while Loop
  Loop Result = 0.888889
  Formula = 0.888889
```

Submit your program electronically using the blackboard system

The program you submit should be your own work. Cheating will be reported to office of academic integrity. Both the copier and copiee will be held responsible.