CS 1713
Introduction to Computer Programming II
Midterm

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NAME:__________________________________________

Instructions
1. Do all of the 4 problems
3. You have 50 minutes for the exam
4. Show all your work
5. Do not separate midterm papers

Easy

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<th>Difficulty Level</th>
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1. (30 pts) Complete the following program to find the *difference* of a set of numbers in an array. Difference of a set of numbers is the difference between largest element and smallest element in the set. For example, the array \{2, 4, 6, 3, 9, 10\} has difference of 8 since largest element is 10 and smallest element is 2 resulting in difference of 10-2=8.

```c
#include <stdio.h>
#include <math.h>

int main()
{
    int i;
    double num[6];
    double max;
    double min;
    double difference;

    printf("Enter 6 doubles\n");
    for (i=0; i<6; i++)
        scanf("%lf",&num[i]);

    printf("Difference is %lf\n",difference);
    return(0);
}
```
2. (20 pts) Trace the execution of the following program. What will be the final values of array \texttt{a} printed?

```
#include <stdio.h>
#include <stdlib.h>

int main()
{
    int a[7]={1,2,4,8,16,32,64};
    int i;

    for (i=1; i<6; i=i+2)
        if (i<4)
        {
            a[i] = (a[i-1]+a[i+1])/2;
            a[i-1] = a[i]+1;
        }
        else
        {
            a[i] = a[6-i];
            a[i-1] = a[i]-1;
        }

    for (i=0; i<7; i++)
        printf("a[%d] = %d\n",i,a[i]);
}
```
3. (20 pts) What is the output of the following program? Show all your work for partial credit.

```c
#include <stdio.h>

int function1(int a, int b)
{
    return((a-1)*(b+1)/2);
}

int main()
{
    int i;
    int x;

    for (i=2; i<10; i=i+1)
    {
        if (i>10)
            x = function1(i,i-1);
        else
            x = function1(i-1,i);
        printf("%d\n",x);
    }

    return(0);
}
```
4. (30 pts) Write a **complete program** to compute the following expression. Read the value of $n$ from the user and write a **single loop** to evaluate the expression

$$\sum_{i=1}^{n} \frac{1}{i} + \sum_{i=1}^{n} \frac{1}{2*i}$$