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
1. (30 pts) Complete the following program to find if there are two numbers in the array whose sum is 10. For example, the array \{1, 2, 3, 4, 5, 6\} has 4 and 6 at index positions 3 and 5 with respectively with sum 10. If there are multiple pairs with sum 10, just print one of them.

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

int main()
{
    int i, j;
    double num[6];
    double sum = 10;
    int found = 0, first, second;

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

        if (found == 1)
            printf("num[%d] and num[%d] has desired sum", first, second);
        else
            printf("none of the pairs have desired sum\n");
    }
    return(0);
}
```
2. (20 pts) Trace the execution of the following program. What will be the final values of array $a$ printed?

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

int main()
{
    int a[5]={1,2,3,4,5};
    int i,j,temp;

    for (j=1; j<5; j++)
        for (i=0; i<5-j; i=i+2)
            {
                printf("%d %d
",i,i+j);
                temp = a[i];
                a[i] = a[i+j];
                a[i+j] = temp;
            }

    for (i=0; i<5; i++)
        printf("a[%d] = %d
",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+2*b);
}

int function2(int a)
{
    return(2*a+1);
}

int main()
{
    int i=2;
    int x;

    while (i<10)
    {
        if (i>5)
            x = function1(i+1,i+1);
        else
            x = function2(i+1)-i;
        printf("%d\n",x);
        i = i + 1;
    }

    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. Do not use `pow` function in your program.

$$
\sum_{i=1}^{n} \frac{1}{2^i} - \sum_{i=1}^{n} \frac{1}{3^i}
$$