

Name: _____

Date: _____

Question:	1	2	3	Total
Points:	10	10	30	50
Score:				

1. The program below is supposed to calculate the sum of first ten Fibonacci numbers F_0, F_1, \dots, F_9 but it doesn't do it right.

(a) (5 points) Describe exactly but briefly (a) what is the output of the program; (b) why the calculations are wrong:

(b) (5 points) Fix it such that the originally intended output is produced. What is it? (Use a red pen to indicate the changes in the code.)

```
#include <stdio.h>

#define N 10

int main(void) {
    int i, j, k;
    int p;

    k = 0; /* F[0] */
    j = 1; /* F[1] */
    int total = k + j;

    for(p = 2; p < N; p++){
        i = j + k; /* F[n] = F[n-1] + F[n-2] */
        int total = total + i;
        k = j;
        j = i;
    }
    printf(" Total: %5d\n", total);

    return(0);
}
```

2. (10 points) Create a dedicated GitHub account for code sharing and homework submissions in phys2200 class. Email the link to your Github repository to the instructor.

3. Recursive vs non-recursive functions

- (a) (10 points) Supplement the code below by writing **two** versions of the function that calculates Fibonacci number F_n – one recursive and one non-recursive one. (You are not allowed to change the code that is provided for you.)

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

#define N 45

long fibonacci(int);

int main(void)
{
    int i;
    long l;

    clock_t begin, end;
    double time_spent;
    begin = clock();

    for (i = 0; i < N; i++)
    {
        l = fibonacci(i);
        printf("%4d %20ld\n", i, l);
    }

    end = clock();
    time_spent = (double)(end - begin) / CLOCKS_PER_SEC;
    printf("%f sec\n", time_spent);

    return 0;
}
```

- (b) (10 points) Compare in time required for calculations by two versions of the program and explain briefly the difference:

- (c) (10 points) Push your code to your github repository and email the link to the instructor. Use the meaningful subject for your email.