

CSC 382

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Project # 1

Source code in c++

```
#include <iostream>
#include <string>
#include <time.h>
#include <ctime>
#include <iomanip>

using namespace std;

int const max = 13;
//recursive algo
int FiboR(int n);
//Non recursive algo
int FiboNR(int n);

int main() {

    clock_t time_req;

    int fibNums[max] = { 0,5,10,15,20,25,30,35,40,45,46,47,48 };

    int fibValuesR[max];
    float fibTimesR[max];

    int fibValuesNR[max];
    float fibTimesNR[max];

    cout << endl << "This program will compute the time (in seconds) difference between
a Recursive and Non-Recurisve Fibonacci sequence" << endl;
    cout << endl << endl << flush;

    system("pause");
    system("cls");

    cout << left << setw(25) << "INTEGER" << setw(25) << "FiboR(seconds)" << setw(25)
<< "FiboNR(seconds)" << setw(25) << "Fibo_Value_R" << setw(25) << "Fibo_Value_NR" <<
endl;
```

```

cout << "-----" << endl;
//3 for loops was not intentional but code kept breaking, so I separated
//everything.

//recursive
for (int i = 0; i < max; i++) {

    time_req = clock();

    fibValuesR[i] = FiboR(fibNums[i]);

    time_req = clock() - time_req;

    fibTimesR[i] = time_req;

}

//Non recursive
for (int i = 0; i < max; i++) {

    time_req = clock();

    fibValuesNR[i] = FiboNR(fibNums[i]);

    time_req = clock() - time_req;

    fibTimesNR[i] = time_req;

}

//output
for (int i = 0; i < max; i++)
{
    cout << left << setw(25) << fibNums[i] << setw(25) << (float)fibTimesR[i] /
CLOCKS_PER_SEC << setw(25) << (float)fibTimesNR[i] / CLOCKS_PER_SEC << setw(25) <<
fibValuesR[i] << setw(25) << fibValuesNR[i] << endl;
}

}

//recursive algo
int FiboR(int n) {
    if (n == 0 || n == 1)
        return(n);
    else
        return(FiboR(n - 1) + FiboR(n - 2));
}

//Non recursive iterative algo
int FiboNR(int n) {
    if (n <= 1) {
        return n;
    }
    int fibo = 1;
    int fiboPrev = 1;

```

```

    for (int i = 2; i < n; ++i) {
        int temp = fibo;
        fibo += fiboPrev;
        fiboPrev = temp;
    }
    return fibo;
}

```

Output

Microsoft Visual Studio Debug Console

INTEGER	FiboR(seconds)	FiboNR(seconds)	Fibo_Value_R	Fibo_Value_NR
0	0	0	0	0
5	0	0	5	5
10	0	0	55	55
15	0	0	610	610
20	0.001	0	6765	6765
25	0.005	0	75025	75025
30	0.06	0	832040	832040
35	0.736	0	9227465	9227465
40	7.732	0	102334155	102334155
45	81.409	0	1134903170	1134903170
46	131.597	0	1836311903	1836311903
47	229.29	0	-1323752223	-1323752223
48	345.377	0	512559680	512559680

C:\Users\Haysus\source\repos\Fibonacci Lab 1 CSC382\Debug\Fibonacci Lab 1 CSC382.exe (process 23064) exited with code 0. Press any key to close this window . . .