Name:	Date Performed:

Objective:

In this project, you will learn how to interface C with x86-32 assembly language. C will be used to handle input and output while the x86-32 will be used to handle the processing. During demo, the group should show the distinction clearly in the source code.

You will have to research on how C interface with Assembly. The NASM primer should give you a brief guide to jumpstart your research.

Groupings: minimum of 1, maximum of 3 per group. Group member should be within the section. Please sign-up at CANVAS. No sign-up no grade.

Print and bring rubrics during demo. No Rubrics, No Demo

Project specifications:

Integration of all previous projects (plus one new project) via main menu program in C. See Figure 1 below. For choices 1-4, the input is a DNA string (see figures 2-5). DNA string is terminated with "." The maximum string length is 41, including the terminator.

For choice 5 (see figure 6), the input is an integer. Fibonacci sequence is defined as Fn = Fn-1 + Fn-1. Thus F(6) is 1,1,2,3,5,8.

Fibonacci sequence is used in genetics to determine the reproduction of a population of a species. In 1202, Leonardo Fibonacci of Pisa came up with a mathematical exercise regarding the reproduction of a population of rabbits. He made the following simplifying assumptions about the population:

- The population begins in the first month with a pair of newborn rabbits.
- Rabbits reach reproductive age after one month.
- In any given month, every rabbit of reproductive age mates with another rabbit of reproductive age.
- Exactly one month after two rabbits mate, they produce one male and one female rabbit.
- Rabbits never die or stop reproducing.

*** Write a C program to generate the main menu, ask for input, pass parameters and call x86-32 assembly language. It will also get parameter from x86-32 assembly language in order for the C program to generate the output. Don't forget to do all error checking.
***Write an x86-32 assembly language for each process module. The input should come from C and the output should be passed back to C.
***All C main programs and all assembly language modules should be integrated into one executable file"
*** In the sample run below, italics are user inputs while bold-face are output

```
                    Main Menu
          1. Perform DNA Frequency Count
          2. Perform DNA Reverse Complement
          3. Perform Reverse Palindrome Test
          4. Perform DNA Pop Count
          5. Perform Genetic Fibonacci Sequence
          6. Exit
             Enter your choice:
```

Figure 1. Main Menu options

```
Task to be performed: DNA Frequency Count
Enter DNA string: ACGT.
DNA Length: 4
Frequency of A: 1
Frequency of C: 1
Frequency of G: 1
Frequency of T: 1
Press any key to return to main menu …
```

Figure 2. DNA Frequency Count

```
Task to be performed: DNA Reverse Complement
Enter DNA string: ACGTA.
Reverse Complement: TACGT
Press any key to return to main menu …
```

Figure 3. DNA Reverse Complement

```
Task to be performed: DNA Reverse Palindrome Test
Enter DNA string: ACGT.
Is the DNA string a reverse Palindrome? Yes
Press any key to return to main menu …
```

Figure 4. DNA Reverse Palindrome Test

```
Task to be performed: DNA POP Count
Enter DNA string: ACGT.
POPCOUNT: 12
Press any key to return to main menu …
```

Figure 5. DNA Pop Count

```
Task to be performed: Genetic Fibonacci Computation
Enter month: 6
Fibonacci sequence is 1,1,2,3,5,8
```

Figure 6. Genetic Fibonacci Sequence

Submission: December 4, 2016 (Sunday). Upload (a) source codes (C and assembly) and (b) executable file (.exe) via CANVAS
Demo: December 6 and December 7 during classtime
Note: ***NO CREDIT will be given if the group failed to show the I/O in C and the processing in assembly***
Filename: Grp#.?
Example: Grp10.asm (if multiple files then Grp10_1.asm, Grp10_2.asm,etc.); Grp10.exe
****Note: First line of your source code should contain group members and section (example: ;Cruz, Miguel; Cruz, Juan; Cruz, Fernando S11)**

COMPASM

Group #: _____
Group Members: _____
Section: _____

Rubrics:

1.) C main menu and choice and full integration	10 pts.	
2.) Error checking: menu choice, null input, correct input, no terminator, etc.	10 pts.	
3.) Fibonacci sequence	30 pts.	
4.) DNA frequency count	10 pts.	
5.) DNA reverse complement	10 pts.	
6.) DNA reverse palindrome test	10 pts.	
7.) DNA POP Count	10 pts.	
8.) Follow all instructions (filename, source code, etc.)	10 pts.	
***No clear separation of C and assembly tasks, no credit		