Homework 3

Problem Solving in C
(CSCE 105, Summer 2006)
URL: `http://www.cse.unl.edu/~cstrope/csce105su06/`

Due on 28th July, 2006

~~*24th July, 2006*~~

Name :
Course No : **CSCE105**

1. (10 points) Where possible, write the equivalent for the following statements using compound assignment operators. If it is not possible to rewrite using compound assignment operators, say so.
   - (a) x = x + 2;
   - (b) z = z + r * m;
   - (c) m = m * y + 1;
   - (d) x = x - (a + b - c);
   - (e) total = 5 * total;

2. (10 points) What is displayed by the following code fragment when the user inputs the value 16?

```
scanf("%d", &n);
ev = 1;
while(ev <= n){
printf("%d\n", ev);
ev += n % ev + 2;
}
```

Answer Box:

3. (10 points) In class we saw how to use a for loop to compute the product of all numbers from 1 to 100. Take that for loop and convert it so that it computes the product of all even numbers from 1 to 100.

Answer Box:

4. (10 points)

Correct the syntax and logic of the following code fragments.

(a) This fragment is supposed to print all numbers starting at 5 and counting down to 1.

```
do
count = 5;
printf("%d\n", count);
count = count - 1;
while count > 0;
```

(b) This fragment is supposed to print all multiples of 5 from 0 to 100.

```
for sum = 0;
sum < 100;
sum += 5;
printf("%d\n", sum);
```

Answer Box:

5. (10 points)

   Write a function called `sum_range` that takes two arguments `x` and `y`. This function will return the sum of all integers between `x` and `y`. You must write this function using either a `for` loop or a `while` loop.

Answer Box:

6. (10 points)

   Write a program fragment that first asks the user to enter an integer value and store it in a variable called `base`. Then write a `do-while` loop that keeps asking the user to enter another value until the user enters a value that is a multiple of `base`.

   Answer Box:

7. (10 points)

   Write a program that asks the user to enter a number, and then displays the multiplication table for all numbers from 0 to the number they entered. This should be done with nested for loops. For example, if the user enters 3, they should see:

```
0 0 0 0
0 1 2 3
0 2 4 6
0 3 6 9
```

8. (10 points)

   Once again, we want to find the complement of a DNA molecule! However, this time the DNA molecule is **huge**. The number of nucleotides may also be unknown. For this reason, you will have to implement this with a loop that reads until the end of the file. After reading from "`DNA.dat`" and printing the complement out to "`DNA_complement.dat`", you should also print the number of nucleotides that you have read from the file. To test your program, you can download HIV.dat from the examples from class website. *Note: Because of the size of the files, you will also have to take care of two more cases besides 'A', 'C', 'G', and 'T': These are ' ' and '\n'. These two cases should be ignored. This means that they should not count towards the number of nucleotides, as well.*

9. (10 points)

   Write a program that determines how long it will take a towns population to reach a certain number. Your program will ask the user for two values - a starting population and an ending population. Assuming that the population increases by 10 percent each year, your program should use a loop to determine how many years it will take for the population to surpass the specified ending population. Output this result to the user.

10. (10 points)

    Write a program to display a Celsius to Fahrenheit conversion table. Ask the user to enter two values - the bottom and top of a range. You program will then display the conversion of all temperatures between those two values that are multiples of 10. The conversion should be done in a function called `fahrenheit`. For example, if the user enters `3` and `44`, your program should display the following:

    ```
    Celsius Fahrenheit
    10 50
    20 68
    30 86
    40 104
    ```

EC I have written a small program, number.o, that is an executable. Thus, you cannot know what is inside of this program. Directions for this problem will be given in class.

Question	Points	Score
1	10	
2	10	
3	10	
4	10	
5	10	
6	10	
7	10	
8	10	
9	10	
10	10	
EC	10	
Total:	100	