

Homework 3

PROBLEM SOLVING IN C
(CSCE 105, SPRING 2006)

URL: <http://www.cse.unl.edu/~cstrobe/csce105s06/>

Due on 27th March, 2006

10th March, 2006

Name :
Course No : **CSCE105**

Instructions:

You must use some document processing package (e.g. L^AT_EX or MS Word) to write your homework submissions. If you are using Word, you must use **Courier New** font, with **font size 10**. To turn off the AutoCorrect options in Word, go to the Tools menu, AutoCorrect option, and uncheck the necessary options (particularly “Capitalize first letter of sentences”).

Homework submissions MUST be stapled!!

Failure to staple your homework will result in a deduction of 5 points and the possibility of losing some portions of the homework assignment.

Homework submissions will include:

1. The cover page (this page, Don't forget to write your name),
2. The written portion of the homework (*Problems 1–6*), formatted as above
3. The programming portion of the homework (*Problems 7–10*, each program printed on a separate page, formatted as above), and
4. the grade sheet as on the last page.

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;
}
```

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.

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);
```

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.

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**.

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 1 2
0 2 4
```

8. (10 points)

Write a program that reads numbers from a file named **numbers.dat**. Your program will compute the average of all of the numbers in the file, and print that to the screen. Because you don't know how many numbers will be in the file, you will have to implement this with a loop that reads until the end of the file.

9. (10 points)

Write a program that determines how long it will take a town's 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. Your 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
```

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