

Final Exam

PROBLEM SOLVING IN C
(CSCE 105, SPRING 2006)

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

Due on 2nd May, 2006

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1. (15 points)

- (a) Create an enumerated type that contains (1) your first name, (2) your last name, and (3) the last name of your instructor. Name this enumerated type `CSE105_t`. Just writing your first name, last name, and instructor's last name is worth 5 points.

Answer Box:

- (b) In the code below, declare the variable `first_name` of the enumerated type, and set the variable equal to your first name. Finally, in the space below the program, write down what is printed by the `printf` statement.

```
first_name =  
  
;   
  
printf("My first name is %d\n",first_name);
```

What is printed?

2. (25 points)

The following program sorts the character array **grades** into alphabetical order, starting with the a's, then b's, etc.

```
#include <stdio.h>

int main() {
    int i,j;
    char grades[5] = { 'b', 'a', 'c', 'a', 'd' };

    for(i = 0; i < 5; i++) {
        for(j = i; j < 5; j++) {

            if(

                ) {

                    Swap(

                );

            }
        }
    }

    return 0;
}
```

- (a) Write the function **Swap** that will take two output parameters, and swap the contents of each memory location into the other.

Answer Box:

- (b) Fill in the **if** statements condition, i.e. the condition necessary for the **Swap** routine to be used.

- (c) Use the following table to show the contents of the array `grades` after each execution of the `Swap` routine.

Array subscript:

[illegible]

3. (15 points)

X		
O	X	O
X	X	O

```
char tic_tac_toe[3][3];
```

- (a) Above is a tic-tac-toe board, followed by its corresponding multi-dimensional array variable declaration. A game is currently in progress, and the bold **X** marks the last move. This move was made when player X entered the integers 2 0 into the program, where the corresponding code for the move is:

```
printf("Player X: What is your next move? ");
scanf("%d%d",&i,&j);
```

It is now O's turn to make a move. In the box below, enter the two numbers that will win the game for player O at the prompt given by the following code:

```
printf("Player O: What is your next move? ");
scanf("%d%d",&i,&j);
```

- (b) Since the game was won, we now have to clear the tic-tac-toe board. Write nested-**for** loops to clear the tic-tac-toe board. Be sure to declare all variables that you use.

4. (20 points)

- (a) Declare two strings, `sentence` and `major`, and initialize `sentence` to say:

I am majoring in:

Next, initialize `major` to your major, making it `general studies` if your major is undeclared.

Answer Box:

- (b) Use a `<string.h>` library function to concatenate these two strings, and store the concatenated string in `sentence`. Finally, write a `printf` statement that will output the string, and write what the final output will look like.

Answer Box:

5. (20 points)

Write a function, called `string-length`, that takes as input a single string, which calculates and returns the length of the string as an integer. **YOU MAY NOT** use the function `strlen()` provided by the `<string.h>` library, even though the function you are writing mimics the function `strlen`.

Answer Box:

6. (5 points) Given the following program:

```
#include <stdio.h>
void func1(int var1);
void func2(int *var2);
int  var = 5;

int main() {
    int var1=0, var2=0;

    func2(&var2);
    func1(var1);
    func2(&var - var1);

    printf("var:  %d\n",var);
    printf("var1: %d\n",var1);
    printf("var2: %d\n",var2);
    return 0;
}

void func1(int var1) {
    int var2 = 7;
    var1 = var2 - var;
}

void func2(int *var2) {
    *var2 = var;
}
```

Write what is printed out by the three `printf`'s in the `main` program.

Answer Box:

Question	Points	Score
1	15	
2	25	
3	15	
4	20	
5	20	
6	5	
EC	5	
Total:	100	