

Midterm Exam

PROBLEM SOLVING IN C
(CSCE 105, SUMMER 2006)

URL: <http://www.cse.unl.edu/~cstrope/csce105su06/>

27th July, 2006

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Name :
Course No : **CSCE105**

1. (10 points)

Write a complete program that prints: (a) your name, (b) your instructors name, and (c) the date, each item on a separate line.

Answer Box:

2. (4 points) Which of the following is *not* a valid user defined identifier?
- (a) `one_fish`
 - (b) `2_fish`
 - (c) `redFish`
 - (d) `BLUEFISH`
3. (4 points) Which of the following expressions will *not* have a type of `double`?
- (a) `2 + 4/2`
 - (b) `2.0 + 3/4`
 - (c) `6 + 3.0/4`
 - (d) `(int)7.0 * 3 * 1.0`
4. (4 points) Which of the following lines of code would you use if you wanted to input a value with a decimal point (such as 1.2) from the user and store it in variable `x`?
- (a) `scanf("%lf", x)`
 - (b) `scanf("%d", &x)`
 - (c) `scanf("\d", &x)`
 - (d) `scanf("%lf", &x)`
5. (4 points) What will the following code fragment output?
- ```
int x = 5;
while(x < 9)
{
 printf("%d ", x);
}
```
- (a) 5 6 7 8
  - (b) 5 6 7
  - (c) 4 5 6 7 8
  - (d) 5 6 7 8 9

6. (4 points) You need an `if` statement that will compare `blah` to `bar`. If `blah` and `bar` are equal, it will increment the variable `count` by one. If they are not equal, then it should print “Not Equal”.

(a) 

```
if(blah == bar)
 printf("Not Equal\n");
else
 count++;
```

(b) 

```
if(blah <> bar)
 printf("Not Equal\n");
else
 count++;
```

(c) 

```
if(blah == bar)
{
 count++;
else
 printf("Not Equal\n");
}
```

(d) 

```
if(blah != bar)
 printf("Not Equal\n");
else
 count++;
```

7. (1 point each) Write a conditional statement that is equivalent to the English statements:

|                                                                                                                                                                                                                                                                                                                                                                                                           |  |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| <p>a. <math>x</math> is less than <math>y</math> and <math>y</math> is less than <math>z</math></p> <p>b. <math>x</math> and <math>y</math> are greater than or equal to <math>z</math></p> <p>c. <math>x</math> is in the range <math>z</math> to <math>y</math>, inclusive</p> <p>d. <math>\text{year}</math> is divisible by 4</p> <p>e. <math>x</math> is either equal to 8 or not greater than 1</p> |  |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|

8. (1 point each) Write the following equations in C:

|                                                                                                             |  |
|-------------------------------------------------------------------------------------------------------------|--|
| $\sqrt{x^2 + y^2}$<br>$\frac{3xy^2}{ 2z }$<br>$\frac{1}{x \sin x}$<br>$2^{3.14-x}$<br>$(x + \cos y)^{0.25}$ |  |
|-------------------------------------------------------------------------------------------------------------|--|

9. (1 point each) What is the value assigned to *val* after performing following declarations:

```
#define PI 3.14

int x = 5, y = 3;
double z = 1.5;
double val;
```

| Action Performed                               | Value of <i>val</i> |
|------------------------------------------------|---------------------|
| <i>val</i> = <i>x</i> + 2.2                    |                     |
| <i>val</i> = ( <i>x</i> / <i>y</i> )/ <i>z</i> |                     |
| <i>val</i> = <i>z</i> + 1/2                    |                     |
| <i>val</i> = <i>x</i> + <i>z</i> /2            |                     |
| <i>val</i> = (int) <i>z</i> *2.                |                     |

10. (5 points)

Write an **if-else** statement that compares the **double** variable **pH** with 7.0 and makes the following assignments to the **int** variables **neutral**, **base**, and **acid**:

| neutral | Base | Acid |                           |
|---------|------|------|---------------------------|
| 0       | 0    | 1    | if pH is less than 7.0    |
| 0       | 1    | 0    | if pH is greater than 7.0 |
| 1       | 0    | 0    | if pH is equal to 7.0     |

**Answer Box:**

11. (10 points) What does the following code print out?

```
int prod = 1, sum = 0;
int i = 0;

while(i <= 4) {
 sum += i;
 i += 2;
}

while(i < 5) {
 prod *= i;
 i++;
}

printf("%d\n", sum);
printf("%d\n", prod);
```

**Answer Box:**

12. (10 points) Write a `for` loop that will produce the following output (*Note the justification of the numbers*):

```
2
4
6
8
10
```

**Answer Box:**

## Programming Problems:

1. (10 points) Write a **switch** statement that assigns to the variable **lumens** the expected brightness of a standard light bulb whose wattage has been stored in **watts**. Use this table:

| Watts | Brightness (in Lumens) |
|-------|------------------------|
| 15    | 125                    |
| 25    | 215                    |
| 40    | 500                    |
| 60    | 880                    |
| 75    | 1000                   |
| 100   | 1675                   |

Assign -1 to **lumens** if the value of **watts** is not listed in the table.

2. (10 points) Write a complete program that takes as input a value **loudness**, and outputs the human perception of the noise levels, as follows:

| Loudness    | Perception    |
|-------------|---------------|
| 50 or lower | quiet         |
| 51–71       | intrusive     |
| 71–90       | annoying      |
| 91–110      | very annoying |
| above 110   | uncomfortable |

3. (10 points) Write a complete program that will take as input two numbers **lower\_bound** and **upper\_bound**, and finds and prints all of the perfect squares between these two numbers, along with the square root of the number. For example, for the user input **lower\_bound** = 50 and **upper\_bound** = 125, your program will output:

```

8 64
9 81
10 100
11 121

```

Make sure the output is lined up nicely. *HINT: Use a loop, and square the loop counter variable.*



| Question | Points | Score |
|----------|--------|-------|
| 1        | 10     |       |
| 2        | 4      |       |
| 3        | 4      |       |
| 4        | 4      |       |
| 5        | 4      |       |
| 6        | 4      |       |
| 7        | 5      |       |
| 8        | 5      |       |
| 9        | 5      |       |
| 10       | 5      |       |
| 11       | 10     |       |
| 12       | 10     |       |
| P1       | 10     |       |
| P2       | 10     |       |
| P3       | 10     |       |
| Total:   | 100    |       |