1) (24 points) **Show what is printed by the following segments of code (assume all appropriate header files, etc. are included):**

a)

```
int start = 10, end = 21;

while (start < end && end > 19) {
    cout << start<< '\t' << end << endl;
    start++;
    end--;
}
    cout << start << '\t' << end << endl;
```
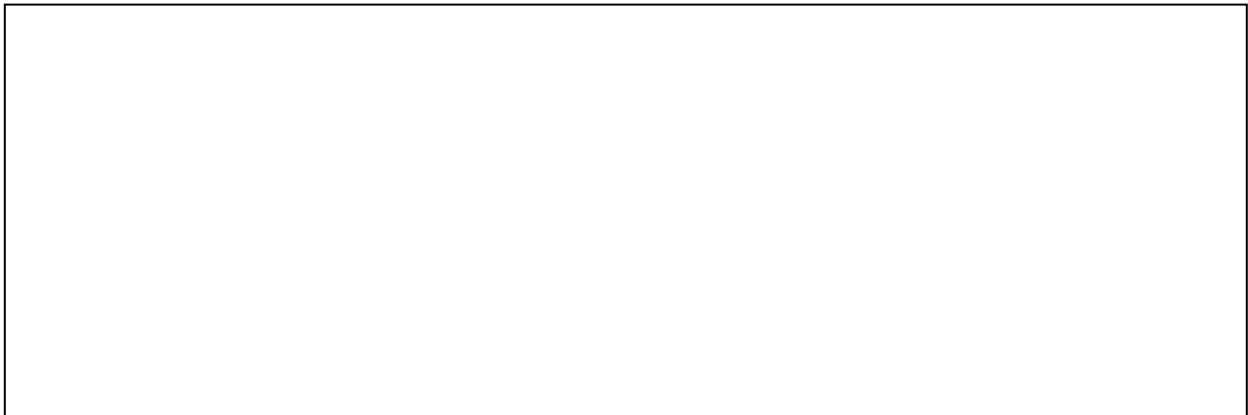

b)

```cpp
int semesterCredits[6] = { 10, 14, 16, 15, 12, 11};
int i;
int course = 3;

for (i = 0; i < 6; i++)
{
    cout << semesterCredits[i] << " - ";
    if (semesterCredits[i] < 12)
    {
        cout << "\nAdd for full time status!\n";
        semesterCredits[i] += course;
    }
}

cout << endl;
for (i = 0; i < 6; i++)
    cout << semesterCredits[i] << " # ";
```

c)

```cpp
char word[20] = "Holidays!";
int x;
x = strlen(word);
if (word[3] == 'i' || x == 18)
      cout << "-----\n";
else
      cout << 'X' << endl;
if (6 > 15 && 45 % 3 == 1 || 'Y' > 'a')
      cout << "******\n";
else
      cout << 'O' << endl;
cout << word << ' ' << x << endl;
```

2) Matching (8 points)

_____ a. Source code

_____ b. `int bb[10][3];`

_____ c. Prototype

_____ d. Algorithm

_____ e. ASCII

_____ f. Reference parameter

_____ g. Debug

_____ h. Object code

1. a step-by-step plan to solve a given problem or task

2. numeric code for representation of characters

3. two dimensional array

4. commands to be compiled or assembled into an executable computer program

5. Using an &, an address is sent to the function

6. code produced by a compiler

7. a header or library file

8. declaration of a function that gives its name and types of parameters without the body of the function

9. convert the source code file into the machine readable code that a CPU can execute

10. identify and remove errors from computer software

3) (10 points) Given the following two declarations:

```cpp
double firstArray[90];
double secondArray[90];
```

Assume that firstArray is filled with values. Write the C++ code that assigns secondArray all the values of firstArray (so that after your code executes, both hold the same exact values!)

4) Given the following code:

```
1    #include <iostream>
2    using namespace std;

3    void printALot(int, char &);
4    int main()
5    {
6        char symbol = '*';
7        int number = 4;
8        cout << symbol << '\t' << number << '\t' << symbol <<endl;
9        printALot(number, symbol);
10       cout << symbol << '\t' << number << '\t' << symbol << endl;
11
12
13   }
14   void printALot(int x, char & c)
15   {
16       int i;
17       x++;
18       for (i = 0; i < x; i++)
19            cout << c;
20       cout << endl;
21       if (x < 6)
22            c = '%';
23   }
24
```

a) (8 points) What is printed by the code above?

b) (2 points) Which line(s) in the code above contains function headers?

c) (2 points) Which line(s) contains function prototypes?

d) (2 points) Which parameter(s) is a reference parameter?

Name:_____

5)

Write a value returning function named `sumRange` that takes two **int** parameters. The function returns the sum of all the integers between the first and the second parameters. For example, if the two parameters are 6 and 12, the function returns 63 (which is 6 + 7 + 8 + 9 = 10 + 11 + 12). YOU MAY ASSUME THAT THE VALUE OF THE FIRST PARAMETER IS LESS THAN THE VALUE OF THE SECOND.

    a) (2 points) Give the function prototype:

    b) (2 points) Give an example of the function call (from main):

    c) (10 points) Write the function definition (header and body):

6)

a) (3 points) Four tutors work for three days each week in CSI's tutoring center. The table below stores one row for each tutor, keeping track of the number of hours that the tutor worked each day.   For example, the first row shows that the tutor worked 4.5 hours one day, 5 hours the second day, and 5.5 hours the third day.

4.5	5	5.5
1.5	3.5	3
3	4.5	4
2.5	2.5	4.5

Give a declaration (you don't have to put in the values) for the two-dimensional array above.

.

b) (7 points) Assume that the values in the array above changed. Write code to print out how many times any tutor worked more than 4 hours in a day (**in other words, how many entries in the array are greater than 4**).

Name:_____

7) (20 points)

Write a complete C++ program that accomplishes the task indicated below. Use good form by including comments and meaningful identifiers. Be accurate with the syntax -- as if you were typing the program on the computer.

Assume that there is a file on disk named *animals.txt* that contains information about all the animals in the Bronx Zoo. Each line contains a name of an animal (a string with no spaces), a count for that type of animal in the zoo and a character indicating whether the animal is endangered or not ('y' means yes and 'n' means no).

Aardvark	3	y
AfricanWildDog	2	n

.
.

The first line means that the Bronx Zoo has 3 Aardvarks and it is an endangered species. The second line means that there are 2 African Wild Dogs in the Bronx Zoo and they are NOT endangered.

Write the program with the assumption that you do not know how many lines are in the list. You may assume that there are no spaces in the animal names.

Write a C++ program that will do the following:

   <i> Open the file

   For each line of data, you must:

   <ii> Read in the line of data from the file

   <ii> Call a value returning function `attention` that returns `true` if the animal needs immediate attention. An animal needs immediate attention if it is endangered and there are less than 10 in the zoo. (The function `attention` takes two parameters.) Make sure that you **write the code** for this function.

   ---Compute the total number of animals (TOTAL NUMBER OF ANIMALS, NOT NUMBER OF LINES IN THE FILE) in the zoo.

   -- Compute the total number of animals that need special attention.

   ---Print the output so that it is organized as on the next page. (Of course there will be more lines, because this is shown only for the first two lines above, and we don't know HOW many lines are in the file). All printing is done in the `main` function.

Name:_____

ANIMAL	AMOUNT	NEEDS ATTENTION
Aardvark	3	yes
AfricanWildDog	2	no

There are 5 animals in the zoo.
There are 3 animals that need special attention.