CSCI 135 136 MIDTERM EXAM 1

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TOTAL POINTS

98 / 100

QUESTION 1

18 pts

1.1 3 / 3

✓ **+ 3 pts** Correct

+ 1.5 pts attempt

+ 0 pts Incorrect

+ 0 pts Blank

1.2 3 / 3

✓ **+ 3 pts** Correct

+ 2 pts partial credit

+ 1.5 pts partial credit

+ 0 pts Incorrect

+ 0 pts Blank

1.3 3 / 3

✓ **+ 3 pts** Correct

+ 2 pts Partial credit

+ 1 pts attempt

+ 0 pts Incorrect

+ 0 pts Blank

1.4 3 / 3

✓ **+ 3 pts** Correct

+ 2.5 pts did not name file executable

+ 2 pts Partial credit

+ 1 pts Attempt

+ 0 pts Incorrect

+ 0 pts Blank

1.5 3 / 3

✓ **+ 3 pts** Correct

+ 1.5 pts Partial credit

+ 0 pts Blank/Incorrect

1.6 3 / 3

✓ **+ 3 pts** Correct

+ 2.5 pts names file something other than executable

+ 2 pts answer has " < input.txt"

+ 1.5 pts wrong arrow used (>>/<</> instead of <)

+ 1 pts attempt

+ 0 pts Blank/incorrect

QUESTION 2

2 9 / 9

✓ **+ 9 pts** Correct

+ 8 pts uses one of the appropriate cmath functions, uses some other method for the other function

+ 6 pts set up's correct cmath functions, but error in final calculations

+ 5 pts not using the cmath functions at all for either the numerator or, but uses standard C++ operations to try and get the answer.

+ 4 pts writes pseudocode instead of proper C++ syntax, but is appropriate to retrieving the answer

+ 1 pts Tried something

+ 0 pts Blank/unrelated answer

QUESTION 3

15 pts

3.1 5 / 5

✓ **+ 5 pts** Correct

+ 1 pts !Paperback

+ 1 pts year_published > 1195

+ 1 pts year_published < 2015

+ 1 pts 1st &&

+ 1 pts 2nd &&

+ 1 pts Attempted something

- 0.5 pts Nonsense or blank

+ **0 pts** blank

3.2 5 / 5

✓ + **5 pts** Correct

+ **1 pts** paperback

+ **1 pts** year_published

+ **0.8 pts** letter e

+ **0.8 pts** index of last character

+ **0.8 pts** 1st &&

+ **0.8 pts** 2nd &&

- **0.5 pts** Nonsense

+ **1 pts** something atempted

+ **0 pts** Blank

3.3 5 / 5

✓ + **5 pts** Correct

+ **4.6 pts** Mistake only for indeces

+ **0.8 pts** 1st &&

+ **0.8 pts** 2nd &&

+ **0.8 pts** !paperback

+ **0.8 pts** >=2010

+ **0.8 pts** or

+ **0.3 pts** B

+ **0.3 pts** C

+ **0.3 pts** Index for B

+ **0.3 pts** Index for C

- **0.5 pts** Grammatical error

+ **0 pts** Blank

+ **0.5 pts** Something attempted

+ **0 pts** Click here to replace this description.

QUESTION 4

4 16 / 18

+ **4 pts** a) Correct

+ **3 pts** a) at least 50 % of the output is correct

+ **4 pts** b) Correct

✓ + **0 pts** a) Incorrect

✓ + **3 pts** b) only one correct formal parameter is underlined

+ **0 pts** b) Incorrect

✓ + **3 pts** c) correct

+ **0 pts** c) incorrect

✓ + **3 pts** d) correct

+ **0 pts** d) incorrect

✓ + **4 pts** e) correct

+ **0 pts** e) incorrect

✓ + **3 pts** f) correct

+ **2.5 pts** Made an attempt

+ **0 pts** f) incorrect

QUESTION 5

5 17 / 17

✓ + **2 pts** // define count

int count;

✓ + **2 pts** // initialize count to zero

count = 0;

✓ + **2 pts** // use of loop

✓ + **2 pts** // loop variable starts from zero

int i = 0

✓ + **2 pts** // loop variable ends at s.length() - 1

i < s.length() OR i <= s.length() - 1

✓ + **1 pts** // increment loop variable by 1

i++

✓ + **2 pts** // check if s[i] is 'a'

if (s[i] == 'a') OR if (s.substr(i, 1) == 'a')

✓ + **2 pts** // increment count

count++;

✓ + **2 pts** return count;

+ **0 pts** Blank

QUESTION 6

6 23 / 23

✓ + **5 pts** Repeat prompt (while or do-while loop).

✓ + **7 pts** Nested for loops.

✓ + **3 pts** if ((i + j) % 2 == 0).

✓ + **1.5 pts** cout << X (with if or else).

✓ + **3 pts** else (meaning if ((i + j) % 2 == 1)).

✓ + **1.5 pts** cout << O (with if or else).

✓ + **2 pts** Correct cout << endl (between 2 for loops).

+ **2 pts** Something.

+ **0 pts** Blank/Incorrect.

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1. Write the following Linux terminal instructions:

(a) Compile a program called `code.cpp` into an executable file with a default name.

```
g++ code.cpp
```

(b) Run this executable.

```
./a.out
```

(c) Run this executable with input redirection from the text file `input.txt` .

```
./a.out < input.txt
```

(d) Compile the same program `code.cpp` into an executable file called `executable` .

```
g++ -o executable code.cpp
```

(e) Run the executable `executable` .

```
./executable
```

(f) Run the executable `executable` with input redirection from the text file `input.txt` .

```
./executable < input.txt
```

2. Write a function `double foo(double n, double k)` that calculates:

$$\frac{(1+n)^k}{\sqrt{k+1}}$$

```
#include <cmath>
#include <iostream> etc;
using namespace std;
double foo(double n, double k) {
    double a;
    a = (pow((1+n), k)) / (sqrt(k+1));
    return a;
}
```

pow((1+n),k)/sqrt
(k+1)

3. Suppose your program has the following declarations to represent information about a book:

```
string title;
int year_published;
bool paperback; //true if paperback, false if hardcover
```

Write C++ logical conditions corresponding to each of the following sets. Your answers should be as compact as possible and cover all cases.

(a) All hardcover published after 1995 and before 2015.

(! paperback) && (year_published >1995 && year_published <2015);

(b) All paperback books, published last year, whose title ends with the letter 'e' ("Rye", "The Joke", etc).

int a = title.length();
(paperback) && (year_published == 2019) && (title.substr(a-1, 1));

(c) All hardcover books, whose title starts with the letter 'B' or letter 'C', published in 2010 or later.

string x = title;
(! paperback) && (title.substr(x[0],1) == "B" || title.substr
title.substr(x[0],1) == "C") && (year_published >= 2010);

4. (18%) Consider the following program fragment:

```
void foo(int x);

int main() {
    int y = 1;  //SPECIAL LINE
    for (int i = 0; i < 2; i++) {
        foo(y);
        cout << y << " ";
    }
    return 0 ;
}

void foo(int x) {
    static int s = 1;
    s = s + 1;
    x = x + s;
    cout << x << " ";
}
```

0,1

3

0   1

s= 2   s = 3
x = 1+2=3 x = 3+3
= 3   = 6

3   6

(b) Underline all formal parameters in the program.

(c) Circle all actual arguments in the program.

(d) Draw a dashed box around all prototypes in the program.

(e) Draw a solid box around the scope of the variable declared on //SPECIAL LINE ?

(f) What is the value of variable s at the end of program execution - just before the main() function returns?

3.

5. Write a function: int count_a(string sentence) that counts all occurrences of the letter 'a' in the string sentence .

```
int count_a(string sentence);

int main()
{
    string sentence = "a man, a plan, a canal - panama!";
    int count = count_a(sentence);
    cout << count << endl;
    return 0;
}

int count_a(string s) {
        int total = 0;
        count_s = s.length();
        for (int i = 0; i < count_s; i++) {
            if (s.substr(i,1) == "a") {
                total = total + 1;
            }
        }
        return total
}
```

6. Write a program that asks the user for a positive integer side length. If they enter an illegal value, they must be prompted to enter a good one until they do. It then displays a rectangle of the given side length, made up of a checkerboard of **X**'s and **O**'s. For example, if the side length is 5, the program should display:

```
X O X O X
O X O X O
X O X O X
O X O X O
X O X O X
```

```cpp
{
    int , i, j, side;

    cout << "Enter a side length: ";
    cin >> side;

    do {
        cout << "Enter a corrected positive integer! ";
        cin >> side
    }
    while (side <= 0);

        for (i = 0; i < side; i++) {
            for (j = 0; j < side; j++) {
                if ((i % 2 == 0 && j % 2 == 0) || (i%2 >= 1
                                            && j%2 >= 1)) {
                    cout << "X";
                }
                else {
                    cout << "O";
                }
            }
            cout << endl;
        }
            return 0;
}
```