CSCI 13500 Midterm Fall 2021 [redacted]

NAME: FIRST LAST [redacted]

SEAT ROW F NUMBER 111

1. (30 points) Answer the following questions.

   (1) What is the value of 6 / 5 * r * r * r when variable r is 2 in C++?

   0.4
   5 | 6.0

   6/5 x 2 x 2 x 2 The return value is 3.2

   if double: .4 x 2 x 2 x 2
   = .8 x 2 x 2 = 1.6 x 2 = 3.2

   (2) Declare function foo whose input parameter is int and return is a string. You just need to write the function header, no implementation is needed.

```
std::string some_function (int num) {
    // some code
}
```

   (3) Write code to generate a random int in [100, 300].

```
(int)(Math.Random() * (300 - 100));
```

   (4) Given array of strings as follows
   string greetings[] = {"Hello", "Morning", "Hi"};
   What is the value for greetings[2].length()?
   (0, 1, 2 & index)

   The value for greetings[2].length() = 2

   (5) Suppose we generate a.out, and we would like redirect the input from console to a file called data.txt. What is the command?

(6) What is the output of the following code?

```
int value = 1;
for (int i = 1; i < 6; i += 2)
    value *= i;

cout << value;
```

value = 15

Output: 15

value	i	
1	1	+2
1	3	+2
3	5	+2
15	7	

(7) Write code to declare an array of int with size 100, call it **scores**. Initialize each element by 0.

```
int scores[100];
for(int i=0; i<100; i++){
    scores[i] = 0;
}
```

(8) What is the output of the following code?

```
for (int i = 0; i < 3; i++)   ← increasing by 1
{
    for (int j = 0; j < 3; j++)   ← increasing by 1
        if (i % 2 == j % 2)
            cout << "X";
        else cout << "O";

    cout << endl;
}
```

output: XOOOXOOOX

i	j	
0	0	X
0	1	O
0	2	O
1	0	O
1	1	X
1	2	O
2	0	O
2	1	O
2	2	X

(9) Write a condition to represent that both x and y are in the range of [0, 100], where both ends are included. Suppose x and y are properly declared and initialized.

~~if(x>=0 && x<=100 && y>=0 && y<=100)~~

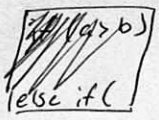
```
if(x>=0 && x<=100)
if(y>=0 && y<=100)
```

(10) Suppose n is an int, write code to throw away its last digit? For example, suppose n is 21, after your code, n should be 2.

```
int tenth_Place = n/10;   ← This will give you number that's are in the tenth place.
```

2. (30 points) Short answer questions

(2.1) Given three integers a, b and c, properly declared and initialized, write code to find out the largest number.



~~if(a>b) {~~
~~if(a>c) {~~
~~// (some code) (a is larger)~~
~~}~~
~~else~~
~~// (c is larger)~~
~~else if(b>a)~~
~~if(b>c)~~
~~// (b is larger~~

```
if(a>b && a>c){
  // a is larger
}
else if(b>a && b>c){
  // b is largeler
}
else{
  // c is larger
}
```

(2.2) Read codes and write output.

```
void foo(int& a, int& b);

int main()
{
  int a = 11;
  int b = 6;
     // 11  6
  foo(a, b);
  cout << "a = " << a << endl;
  cout << "b = " << b << endl;

  int c = 8;
  int d = 2;

  foo(c, d);
  cout << "c = " << c << endl;
  cout << "d = " << d << endl;

  return 0;
}

void foo(int& a, int& b)
{
  int temp;
  if (a % b != 0)
  {
    temp = a;
    a = b;
    b = temp;
  }
}
```

a	b	temp
11	6	0
6	11	11

11 % 6 = 5 ≠ 0

c	d	temp
8	2	0

8 % 2 = 0 ✓ = 0

out put:
a = 6
b = 11
c = 8
d = 2

(2.3) Read code and answer questions.

```
string foo(int num)
{
  string result = "";
  do {
    result = to_string(num % 2) + result;
      //to_string convert an int to the corresponding string
    num /= 2;
  } while (num != 0);

  return result;
}
```

What are the return for foo(6) and foo(8)?

num = 6
result = ""
000

6%2 = 0
6/2 = 4
4/2 = 2
2/2 = 0

foo(6) returns 000

foo(8) returns 0000

3. (20 points) **Define a function**, for a given string str, return a string whose letters are the even-index letters in str with the same order. That is, suppose str is "abc", then return "ac".

```
std::string even_Index(std::string str){
    std::string evenLetters = "";
    for(int i=0; i<str.length(); i++){
        if(i%2==0){
            evenLetters += str[i];
        }
    }
    return evenLetters;
}
```

4. (20 points) Write code inside main function, no need to include libraries.
   (1) Enter two numbers a and b, which can contain decimals.
   (2) If a is larger than or equal to b, then calculate and output to the screen result of $\sqrt{a-b} + b^a$.
   (3) Otherwise, calculate and print $\frac{a+5}{3(b-a)}$.

```
double firstEquation(double a, double b){
    double Squar_Root = Sqrt(a-b);
    double power = pow(b,a);
    return Squar_Root + power;
}

double Second equation(double a, double b){
    double addingFive = a+5;
    double diff_Times = 3 * (b-a);
    double final_answer = addingFive / diff_Times;
    return final_answer;
}
```

```
int main(){
    double a;
    double b;
    std::cin >> a;
    std::cin >> b;
    if (a>=b){
        double first = Sqrt(a-b);
        double last = pow(b,a);
        std::cout << first +last << "\n";
    }
    else {
        double first = a+5
        double last = (b-a) * 3;
        std::cout << first / last << "\n";
    }
    return 0;
}
```

Note: I included both this and the other to make sure I hit the key points.

```
int main(){
    double a = 2.8;
    double b = 3.1;
    if(a>=b){
        std::cout << "your answer is: " << firstequation(a,b) << "\n";
    }
    else
        std::cout <<
```

```
int main(){
    double a;
    double b;
    std::cout << "enter value for a: "
    std::cin >> a;
    std::cout << "enter value for b: "
    std::cin << b;
    if(a>=b){
        std::cout << "your value is:" << firstequation(a,b) << "\n";
    }
    else {
        std::cout << "your value is:" << secondequation(a,b) << "\n";
    }
    return 0;
}
```

CSCI 13500 midterm f21 v1 (purple)

TOTAL POINTS

73 / 100

QUESTION 1

30 pts

1.1 0 / 3

- **0 pts** Correct

✓ **- 3 pts Incorrect**

1.2 3 / 3

✓ **- 0 pts Correct**

- **3 pts** Incorrect

1.3 0 / 3

- **0 pts** Correct

✓ **- 3 pts Incorrect**

1.4 3 / 3

✓ **- 0 pts Correct**

- **3 pts** Incorrect

1.5 0 / 3

- **0 pts** Correct

✓ **- 3 pts Incorrect**

1.6 3 / 3

✓ **- 0 pts Correct**

- **3 pts** Incorrect

1.7 3 / 3

✓ **- 0 pts Correct**

- **3 pts** Incorrect

1.8 0 / 3

- **0 pts** Correct

✓ **- 3 pts Incorrect**

1.9 0 / 3

- **0 pts** Correct

✓ **- 3 pts Incorrect**

1.10 0 / 3

- **0 pts** Correct

✓ **- 3 pts Incorrect**

QUESTION 2

30 pts

2.1 8 / 10

- **0 pts** correct
- **0.5 pts** Click here to replace this description.

✓ **- 2 pts minor errors**

- **4 pts** Click here to replace this description.
- **6 pts** Click here to replace this description.
- **10 pts** no solution

You need to store the largest value or print it to keep track of the largest value

2.2 10 / 10

✓ **- 0 pts Correct**

- **2 pts** incorrect values of 2 variables
- **1.5 pts** incorrect value of b
- **4 pts** no values for 2 values
- **7.5 pts** one output only
- **10 pts** no answer
- **10 pts** Click here to replace this description.

2.3 3 / 10

- **0 pts** Correct
- **2 pts** one variable incorrect
- **4 pts** reverse order (110, 1000)
- **6 pts** concatenation , don't add like int

✓ **- 7 pts Click here to replace this description.**

- **10 pts** Click here to replace this description.

QUESTION 3

3 20 / 20

✓ **- 0 pts** Correct

- 20 pts no solution or not correct completely

- 5 pts Click here to replace this description.

- 5 pts no repetition statement

- 3 pts no distinction between even and odd

- 2 pts does not return value or correct value

- 2 pts invalid input parameter

- 2 pts incorrect return type

- 1 pts incorrect method name

- 1 pts wrong return type

- 18 pts only correct method

- 4 pts Click here to replace this description.

- 15 pts Click here to replace this description.

- 1 pts Click here to replace this description.

QUESTION 4

4 20 / 20

- 0 pts Correct

- 20 pts no submission of Problem 4

- 2.5 pts Need to initialize a and b. Variable a is larger than or equal to b should be a >= b. Need to have ; after val = ...

- 1 pts a is larger than b should be a >= b. Expression b^a should be pow(b, a).

- 0.5 pts double int is not a correct type

- 0.5 pts b =< a should be b <= a

- 1 pts sqrt(a-b) + pow(b-a); is not a statement

- 0.5 pts elsif: is not a keyword in c++

- 0.5 pts (a+5)/(3*(b-a)) is not a statement

- 1 pts no declaration of variable num.

- 0.5 pts (3)(b-a) should be 3 * (b-a)

- 1 pts There should be a () around 3 * (b-a)

- 2 pts No declaration of input parameter in function foo.

- 1 pts No call function foo in main function.

- 2 pts need to initialize a and b in main function.

- 0.5 pts else if (a < b) should be just else, otherwise, compiler might complain that no return in all possible branch. Computer does not know that (a >= b) and (a < b) will cover all possible a and b.

- 1 pts There should be a pair of curly parentheses to include else-body since it has more than one statement.

- 0 pts sqrt(a+5) in prompt should be (a+5)

- 0 pts miss } for else-body.

- 1 pts need to declare variable result.

- 0.5 pts 3(b-a) should be 3 * (b-a)

- 0.5 pts a is larger than b is written as a >= b in C++, not the mathematics larger than or equal symbol.

- 0.5 pts Mistake / with % in else part.

- 0.5 pts else part is an expression, not a statement.

- 1.5 pts Not to return a double number in main function, which can only return an int. You can just print out values.

- 0.5 pts operator between 3 and (b-a) should be *

- 0 pts It is not a good idea to change values of a or b by those expressions.

- 0.5 pts type x should be double, not int.

- 0.5 pts type of result should be double, not int.

- 1 pts There should a be {} to enclose if- or else-body if it has more than one statement.

- 0.5 pts a, b should be double type, not int

- 0.5 pts sum1 should be double type, not int.

- 0.5 pts only a and b need to be input, no other variables.

- 1 pts declaration of a and b as double type is not correct, it should be double a, b;

- 1 pts answer and answer2 should be double type.

- 0.5 pts unmatched () in if-body

- 0 pts missing } in if-body

- 1.5 pts In else-body, it should be (a+5)/(3*(b-a))

- 1 pts b^a should be pow(b, a)

- 0 pts cin b should be cin >> b;

- 1 pts If should be if, and Else should be else, variables should match case.

- 1 pts Need to print out result

- 1 pts No ; after condition unless you do not want to do anything in if- or else-body.

- 0.5 pts if(a >= b) and if (a <= b) are not mutually exclusive.

- 3 pts formula is not in C++ syntax.

- 1.5 pts formula for (a + 5) / (3 * (b-a)) is not correct.

- **0.5 pts** Variable to hold result should be double, not int.
- **0 pts** Enter values for a and b using console, not directly initialied.
- **1 pts** result should be declared outside if- or else-body.
- **0.5 pts** statement needs to be ended by ;
- **0.5 pts** Need to have () around a + 5
- **0.5 pts** a, b, and other variables should be declared in main function. When you use a and b in variable first and second, a and b are not initialized yet.
- **3 pts** if- part statement is not for (a >= b), missing part for else
- **0.5 pts** pow(b, 3) should be pow(b, a)
- **0.5 pts** power(b, a) should be pow(b, a)
- **1 pts** cout << "z"; is not the same as cout << z;
- **1 pts** b*b should be pow(b, a);
- **0.5 pts** x is not int.

✓ **- 0 pts new line character is \n, not /n.**

- **0 pts** else if (a < b) can be simplified as else
- **0.5 pts** cin >> a, b; should be cin >> a >> b;