

CSCI 13500 midterm f21 v1 (purple)

TOTAL POINTS

100 / 100

QUESTION 1

30 pts

1.1 3 / 3

- ✓ - **0 pts** Correct
- **3 pts** Incorrect

✓ - **0 pts** Correct

- **3 pts** Incorrect

1.2 3 / 3

- ✓ - **0 pts** Correct
- **3 pts** Incorrect

1.10 3 / 3

- ✓ - **0 pts** Correct
- **3 pts** Incorrect

1.3 3 / 3

- ✓ - **0 pts** Correct
- **3 pts** Incorrect

QUESTION 2

30 pts

1.4 3 / 3

- ✓ - **0 pts** Correct
- **3 pts** Incorrect

2.1 10 / 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

1.5 3 / 3

- ✓ - **0 pts** Correct
- **3 pts** Incorrect

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.

1.6 3 / 3

- ✓ - **0 pts** Correct
- **3 pts** Incorrect

2.3 10 / 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.

1.7 3 / 3

- ✓ - **0 pts** Correct
- **3 pts** Incorrect

1.8 3 / 3

- ✓ - **0 pts** Correct
- **3 pts** Incorrect

1.9 3 / 3

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.
- 12 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 $a \geq b$. Need to have ; after val = ...
 - 1 pts a is larger than b should be $a \geq b$.
- Expression b^a should be $\text{pow}(b, a)$.
 - 0.5 pts double int is not a correct type
 - 0.5 pts b <= a should be b <= a
 - 1 pts $\sqrt{a-b} + \text{pow}(b-a)$; 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

$\geq b$) 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 $a \geq b$ 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 $\text{pow}(b, a)$

- 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($a \geq b$) and if ($a \leq b$) 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 $(a \geq b)$, 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;

NAME: FIRST LAST

SEAT 5 ROW



NUMBER

5

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++?

$$1 \cdot 2 \cdot 2 \cdot 2 = 8$$

$$1 * 2 * 2 * 2 =$$

$$4 + 2 \\ 1 * 8 = 8$$

- (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.

String foo(int num);

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

```
strand (time(NULL));
```

```
int value = rand() % (300-100+1) + 100; //generated random int
```

// Value is random int (generated) // stored in value

- (4) Given array of strings as follows

```
string greetings[] = {"Hello", "Morning", "Hi"};
```

What is the value for greetings[2].length()?

`greetings[2] → "Hi".length() = 2`

greeting[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?

• /a.out < data.txt

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

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

```
cout << value;
```

15

$$\begin{array}{l} 1 \quad \text{val} * i = 1 \\ 3 \quad 1 \cdot 3 = 3 \\ 5 \quad 3 \cdot 5 = 15 \end{array}$$

$$\begin{array}{l} 1 \quad 1 \cdot 1 = 1 \\ \downarrow \\ 3 \quad 1 \cdot 3 = 3 \\ \downarrow \\ 5 \quad 3 \cdot 5 = 15 \end{array}$$

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

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

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

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

```
cout << endl;
```

```
}
```

for loop

$$\begin{array}{ll} i=0 & 1 \% 2 == 0 \% 2 \\ i=1 & 1 == 0 \quad \text{false} \\ i=2 & \end{array}$$

$\boxed{\begin{array}{ccc} X & O & X \\ O & X & O \\ X & O & X \end{array}}$

$$\begin{array}{l} 2 \% 2 == 0 \% 2 \\ 0 == 0 \end{array}$$

$$0 \leq y \leq 100$$

(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.

$((x \leq 100) \& (x \geq 0)) \& ((y \leq 100) \& (y \geq 0))$.

*(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.

$n /= 10;$

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.

```
int max; //largest number
if ((a>b)&&(a>c)) {
    max = a;
} else if ((b>a)&&(b>c)) {
    max = b;
} else {
    max = c;
}
```

```
cout << "Largest number: ";
cout << max << endl;
```

(2.2) Read codes and write output.

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

```
int main()
```

```
{
```

```
int a = 11;
```

```
int b = 6;
```

```
foo(a, b);
```

```
cout << "a = " << a << endl;
```

6

```
cout << "b = " << b << endl;
```

```
int c = 8;
```

```
int d = 2;
```

```
foo(c, d);
```

```
cout << "c = " << c << endl;
```

8

```
cout << "d = " << d << endl;
```

2

```
return 0;
```

```
}
```

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

```
{
```

```
int temp;
```

```
if (a % b != 0)
```

```
{
```

```
temp = a;
```

```
a = b;
```

```
b = temp;
```

```
}
```

```
}
```

11, 6

$(11 \% 6 \neq 0) \checkmark$

temp = 11

a = 6;

b = 11;

8, 2

$(8 \% 2 \neq 0) \times$

0

K = 8
b = 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)?

$$\begin{array}{l} (6 \% 2) + "0" = "0" \\ \text{num} / 2 \rightarrow 3 \\ \boxed{\text{foo}(6) = "110"} \end{array} \quad \begin{array}{l} (3 \% 2) + "1" = "10" \\ \text{num} / 2 \rightarrow 1 \\ (1 \% 2) + "10" = "110" \\ 1 / 2 = 0 \text{ //end} \end{array}$$

$$\begin{array}{l} (8 \% 2) + "0" = "0" \\ \text{num} / 2 \rightarrow 4 \\ 4 / 2 \\ (2 \% 2) + "00" = "000" \\ \text{num} / 2 \rightarrow 1 \\ 1 / 2 \end{array}$$

$$\begin{array}{l} (4 \% 2) + "0" = "00" \\ \text{num} / 2 \rightarrow 2 \\ 2 / 2 \\ (1 \% 2) + "000" = "1000" \\ \text{num} / 2 \rightarrow 0 \text{ //end} \end{array}$$

$$\boxed{\text{foo}(8) = "1000"}$$

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".

```
String even (String str) {  
    int len = str.length();  
    String output = "";  
    for (int i=0; i < len; i+=2) {  
        output += str[i];  
    }  
    return output;  
}
```

4. (20 points) Write code inside main function, no need to include libraries.

- (1) Enter two numbers a and b, which can contain decimals \Rightarrow double
(2) If a is larger than or equal to b, then calculate and output to the screen result of
 $\sqrt{a-b} + b^a$. $a \geq b \quad (a \geq b)$
(3) Otherwise, calculate and print $\frac{a+5}{3(b-a)}$.

```
double result;
double a;
double b;
cout << "Enter a: ";
cin >> a;
cout << "\nEnter b: ";
cin >> b;

if (a >= b) {
    result = ((sqrt(a - b)) + (pow(b, a)));
} else {
    result = ((a + 5) / (3 * (b - a)));
}

cout << "The result is: " << result << endl;
```