CSCI 13500 Midterm Fall 2021   EMPLID

NAME: FIRST LAST

SEAT   ROW   NUMBER

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++?

   (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.

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

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

   (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;
```

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

(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.

(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.

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.

(2.2) Read codes and write output.

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

int main()
{
    int a = 11;
    int b = 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;
    }
}
```

(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)?

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".

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 $\frac{a+5}{3(b-a)}$.