CS 161 Exam I Fall 2019 Form 1

Please put your <u>full name, and ID number</u> on the top-right. Make sure they are READABLE!!!

You have 50 minutes to finish the test, good luck :)

Part I: True (T) / False (F), put T/F on the line next to the question number (20 pts, 2 pts each)

_____ 1. Suppose **a, b, c**, and **d** are integers, then
    if (! (a <= b || b > c && c != d)) is equivalent to
    if (a > b && b <= c || c == d)

_____ 2. C++ is a high-level programming language, and it is case sensitive.

_____ 3. If a new value is stored in a variable, it replaces whatever value was previously there.

_____ 4. The number of bytes of memory used by a variable depends on its type.

_____ 5. It is possible to have a function with no parameters and have multiple return statements.

_____ 6. Every include directive statement **(#include <...>)** must be followed by **using namespace std;**

_____ 7. Executable code is computer code that contains no errors.

_____ 8. The following two C++ statements perform the same operation:
    income = profit + salary – deduction;
    profit + salary – deduction = income;

_____ 9. The types of parameters are optional in the function declaration.

_____ 10. When a loop is nested inside another loop, the inner loop goes through all its iterations of each iteration of the outer loop, but both inner and outer loop must be the same type of loop.

Part II: Multiple Choices. Put your answer on the line next to the question number (30 pts, 3 pts each)

_____ 1. If you have the following statement in your program,
    #define YEAR 2019
    then which of the following statement is ILLEGAL?
    A. **cout << YEAR;**
    B. **int year = YEAR;**
    C. **YEAR++;**
    D. **if (YEAR)**

2. Given the following code fragment, what are ① - ⑤, respectively?

```
double circle_area (int radius);        ①
int main{                               ②
    double area = circle_area (⑤);      ③
    return 0;                           ④
}
double circle_area(int radius){         ⑤
    return 3.14159 * radius * radius;
}
```

   A. function declaration, parameter, function call, argument, function definition
   B. function definition, parameter, function declaration, argument, function call
   C. function call, argument, function definition, parameter, function declaration
   D. function declaration, argument, function call, parameter, function definition

_____ 3. Which of the following is NOT true of the **&&** operator?
   A. It is the logical AND operator.
   B. It returns true if either operand is true.
   C. It is a binary operator.
   D. It uses short circuit evaluation

_____ 4. Two different variables in the same program may have the same name
   A. Never. A program cannot have two variables with the same name.
   B. if the second one is initialized with a different value than the first one.
   C. if the second one is never declared.
   D. if they have different scope.

_____ 5. Which of the following is a valid variable name?
   A. **num-of-cars**
   B. **4years**
   C. **_cars**
   D. **bool**

_____ 6. The statement **int a = 1; int b = (--a)++;**
   A. This doesn't work.
   B. Assign **b** the value 1, and change the value of **a** to 1.
   C. Assign **b** the value 0, and change the value of **a** to 1.
   D. Assign **b** the value 0, and change the value of **a** to 2.

_____ 7. Suppose **str = "Hello World"**. The output of the following statement is
   cout << str.length() << " " << str.at(5) << endl;
   A. **10**
   B. **10 o**
   C. **11**
   D. **11 o**

_____ 8. Which of the following will give you the range from 6.05 to 8.10, inclusive?
      A. `float num = (rand() % 6 + 5)* 0.01 + rand() % 3 + 6;`
      B. `float num = (rand() % 5 + 6)* 0.01 + rand() % 2 + 7;`
      C. `float num = (rand() % 6 + 5)* 0.01 + rand() % 2 + 7;`
      D. `float num = (rand() % 5 + 6)* 0.01 + rand() % 3 + 6;`

_____ 9. Which of the following statement is TRUE?
      A. Both `cin` and `getline` will ignore leading whitespaces when reading user inputs.
      B. `cin` reads a single word, while `getline` reads a line of input.
      C. If `cin` fails, then `cin.fail()` will return a value 0.
      D. You may use `getline` and store the user input into a char variable, i.e.
        `getline(cin, var);` where var is a `char`.

_____ 10. If you need to write a function that will compute the number of characters in a sentence, which would be an appropriate function declaration?
      A. `char count_char(char sentence);`
      B. `void count_char(string sentence);`
      C. `int count_char(string sentence);`
      D. `string count_char(char sentence);`

Part III: Short Answer. (50 pts)

1. (10 pts, 2 pts each) A `long` type variable is an **8-byte** whole number data type. Based on what you've learned in class, use **exact number** or **equation** to represent:

   1) How many bits in a byte? _____

   2) Max of a signed long: _____

   3) Min of a signed long: _____

   4) Max of an unsigned long: _____

   5) In C++, what number will you get if you add 1 to the <u>maximum value of an unsigned long</u>?

2. (40 pts, 4 pts each) Assume the code fragment is embedded in an otherwise correct and complete program. Trace through the code, and write your answer in blank space.
   1) What is the output of the following statement?
      `cout << (float) (pow(3, 2) * (9 % 4)) / 2 + (int)(2.5) << endl;`

2) What is the output of the following code?

```
float value = 100.0;
cout << "value" << endl;
```

3) Given the following code fragment, and an input value of 0, what is the output?

```
int num;
cout << "Enter a value: ";
cin >> num;
if (num=0)
        cout << "num is 0" << endl;
else
        cout << "num is not 0" << endl;
```

4) What is the output of the following code fragment?

```
int i = 2;
switch(i)
{
        case 0:   i = 10; break;
        case 1:   i = 20; break;
        case 2:   i = 30;
        default: i = 40;
}
cout << i << endl;
```

5) What is the output of the following code?

```
int count = 1, num = 25;
while (count < 20)
{
        num--;
        count++;
}
cout << num << endl;
```

6) How many times will the following loop display **Hello**?

```
for (int i = 0; i * i <=100; i++)
        cout << "Hello" << endl;
```

7) How many times will the following loop display **Nesting**?

```cpp
for (int i = 0; i < 10; i++)
    for (int j = 5; j > i; j--)
        cout << "Nesting" << endl;
```

8) How many times will the following loop display **play game**?

```cpp
int check = -1;
do
{
    cout << "play game" << endl;
}while (check == 1);
```

9) How many times will the following loop display **Loop**?

```cpp
int i = 7, j = 3;
while (--i > ++j)
    cout << "Loop" << endl;
```

10) What is the value returned by the following function?

```cpp
int function ()
{
    int num = 20;
    num += 5;
    return num;
    num *= 2;
}
```

Extra Credit: (10 pts, 2 pts each)

_____ 1. True (T) / False (F): If a task can be done using if/else, then it also can be done using switch.

2. What will the following code print?

```
int n = 2019;
if (n > 2000)
{
        int n = 4;
        cout << --n << endl;
}
for (int n = 0; n < 1; n++)
        cout << n << endl;
        cout << n << endl;
```

_____ 3. What is the output after the following fragment of code executes?

```
unsigned int x=0;
do{
        x++;
} while (x > 0);
cout << x << endl;
```

A. **0**
B. **1**
C. **10**
D. Infinite loop, print nothing

4. Given the following function:

```
int fun(int num){
        return (num > 5 ? num-2 : num+5);
}
```

what is the output of the following statement?

```
cout << fun(fun(6)) << endl;
```

5. What's the first name of one of our TAs :)