Full Name: _____    Gannon Identification Number: _____

# ECE 111: Introduction to C and C++ Programming
## Spring 2023, Second Examination
## Gannon University (GU)
## April 13, 2023

**Please do not turn the page until you are informed.**

Rules:
- The exam is closed-book, closed-note, closed shared calculator, and closed electronics.
- Please stop promptly at **5:00 PM**.
- There are **20 points** total, distributed **evenly** among **2** questions.

| Question | Maximum | Earned |
|:---:|:---:|:---:|
| **1** | 10 | |
| **2** | 10 | |

Advice:
- Read questions carefully. Understand a question before you start writing your answer.
- Write down thoughts and intermediate steps so you can get partial credit. Clearly circle your final answer.
- The questions are not necessarily in order of difficulty. **Skip around.** Make sure you get to all the problems.

Wishing you the best of luck,
**Dr. Shayan (Sean) Taheri**

**Question 1. (10 points)** Complete the following items on **Repetition Control Structures**, **User-Defined Simple Data Types**, **Namespaces**, and the **String Type**.

**A.** Suppose that the user input is **20 -16 -5 15 6 0**. What is the output of the following <u>segment of code</u>?

```
int num;
int temp = 0;
cin >> num;
while (num != 0)
{
      if (num % 2 == 0)
            temp = temp + num;
      else
            temp = temp - num;
      cin >> num;
}
cout << "temp = " << temp << endl;
```

**B.** Answer the following questions.

▪ Is the following statement a valid C++ enumeration type? Why?

```
enum romanNumerals {I, V, X, L, C, D, M};
```

▪ What is the final content of **domesticCars** in the following segment? Why?

```
enum cars {FORD, GM, TOYOTA, HONDA};
cars domesticCars = FORD;
domesticCars = domesticCars + 1;
```

▪ What is the value, if any, of the expression, "**BANANA <= KIWI**" in the following segment of code if it was included? What is the final output of this code? Provide the reason(s) for both cases.

```
enum fruitType {ORANGE, APPLE, BANANA, GRAPE, STRAWBERRY,
      MANGO, GUAVA, PINEAPPLE, KIWI};
fruitType fruit;
for (fruit = BANANA; fruit < PINEAPPLE; fruit++)
      cout << static_cast<int>(fruit) << ", ";
cout << endl;
```

**Question 2. (10 points)** Complete the following items on **User-Defined Functions**.

**A.** Consider the following program. What is the output if the input is **4  11**?

```cpp
#include <iostream>
#include <cmath>
#include <iomanip>
using namespace std;
void trackVar(double& x, double y);
int main()
{
    double one, two;
    cout << fixed << showpoint << setprecision(2);
    cout << "Enter two numbers: ";
    cin >> one >> two;
    cout << endl;

    trackVar(one, two);
    cout << "one = " << one << ", two = " << two << endl;
    trackVar(two, one);
    cout << "one = " << one << ", two = " << two << endl;
    return 0;
}
void trackVar(double& x, double y)
{
    double z;
    z = floor(x) + ceil(y);
    x = x + z;
    y = y - z;
    cout << "z = " << z << ", ";
}
```

**B.** Consider the following functions. What is the output of each of the following program segment?

```cpp
int hidden(int num1, int num2)
{
      if (num1 > 20)
            num1 = num2 / 10;
      else if (num2 > 20)
            num2 = num1 / 20;
      else
            return num1 - num2;
      return num1 * num2;
}
int compute(int one, int two)
{
      int secret = one;
      for (int i = one + 1; i <= two % 2; i++)
            secret = secret + i * i;
      return secret;
}
cout << hidden(30, 20) << " " << compute(10, hidden(30, 20)) << endl;
```