

Full Name: \_\_\_\_\_ Gannon Identification Number: \_\_\_\_\_

**ECE 111: Introduction to C and C++ Programming**  
**Spring 2023, First Examination**  
**Gannon University (GU)**  
**February 23, 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 **2:10 PM**.
- There are **30 points** total, distributed **evenly** among **3** questions.

Question	Maximum	Earned
1	10	
2	10	
3	10	

Advice:

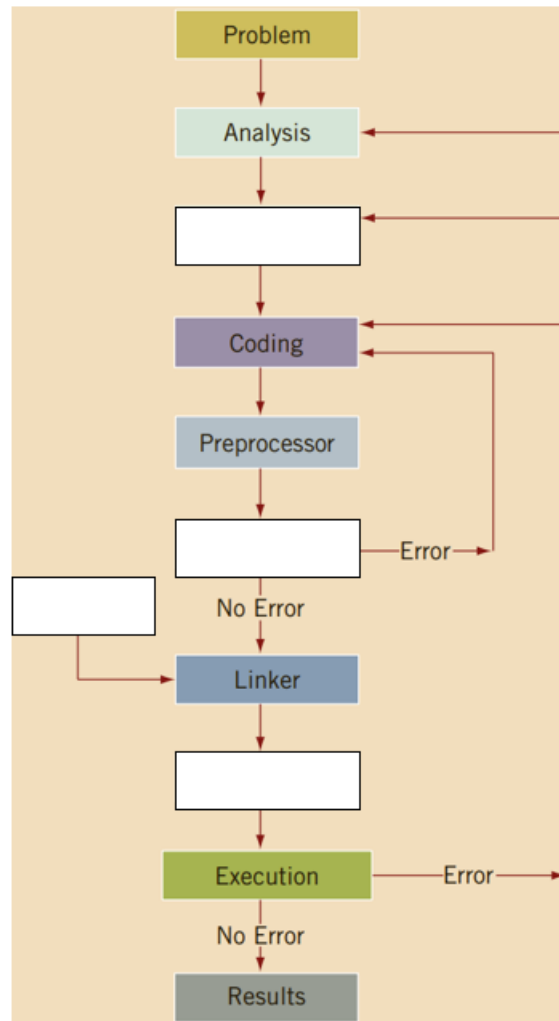
- Read questions carefully. Understand a question before you start writing your answer.
- Write down thoughts and intermediate steps so you can get partial credit. Clearly circle your final answer.
- The questions are not necessarily in order of difficulty. **Skip around.** Make sure you get to all the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

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

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**Question 1. (10 points)** Complete the following items.

- A. Explain the terms, “**Programming**” and “**Algorithm**”.
- B. Fill out the empty boxes in the following figure and **explain** the completed computational flow.
- C. Write an algorithm to find the perimeter and area of a rectangle.



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**Question 1. (Cont.)**

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**Question 2. (10 points)** Complete the following items.

**A. Mark** the following statements as **True** or **False**.

- If **a = 4;** and **b = 3;**, then after the statement **a = b;** the value of **b** is erased. → **True | False**
- If the input is **7** and **x** is a variable of type **int**, then the statement **cin >> x;** assigns the value **7** to **x**. → **True | False**
- In C++, all variables must be initialized when they are declared. → **True | False**
- Suppose **x = 5**. After the statement **y = x++;** executes, **y** is **5** and **x** is **6**. → **True | False**
- Suppose **a = 5**. After the statement **++a;** executes, the value of **a** is still **5** because the value of the expression is not saved in another variable. → **True | False**

**B. Write C++ statements** (i.e., only statements and not the whole codes) that accomplish the following independent items. Declare additional variables, if necessary.

- Declare and initialize a **double** variable **z**, and assign **'G'** to a **char** variable **chVar** based on the user input. Next, convert the value of the **double** variable **z** to an integer value to be assigned to an **int** variable **x**.
- Swap the contents of the **int** variables **x** and **y**.
- Suppose **x** and **y** are **double** variables. Output the contents of **x**, **y**, and the expression **x + 12 / y - 18**.

**C. Suppose x, y, and z** are **int** variables and **w** and **t** are **double** variables. What value is assigned to each of these variables after the last statement (i.e., after the 6th statement) executes?

1st. **x = 8;**  
2nd. **y = x + 3;**  
3rd. **z = x \* y + 2 \* x;**  
4th. **x = z - y % 4;**  
5th. **w = 2.5 \* z - x;**  
6th. **t = w / 2 + 13 / 4 - y % 5;**

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**Question 2. (Cont.)**

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**Question 3. (10 points)** Write two equivalent, complete, and small programs in C++ language with your own flexibility and using the following **two different statements**.

- “**if . . . else**”, to be used in your first program.
- “**Conditional Operator (?:)**”, to be used in your second program.

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**Question 3. (Cont.)**