

# CSCE 20004 – Programming Foundations I

## Programming Project Report

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**Academic Integrity Statement:** I pledge that I have neither given nor received unauthorized help on this programming assignment.

### Problem Statement:

- Describe the goals of the programming assignment.
  - Make a simple multiple-choice exam, that tests a user's understanding of arithmetic operations and variable assignments. The program evaluates the user's answers, provides feedback for each question, calculates the overall score, and determines your grade.
- What are the program inputs?
  - the users response to each question
  - 5 questions
- What are the program outputs?
  - Feedback for each question
  - users total score
  - user's grade total
- What error handling was required?
  - N/a

### Design:

- Describe the design decisions you made.
  - I used cout and cin for input/output, if-else statements for evaluation, and an integer variable for score tracking.
- What data structures did you use?
  - Simple variables (int, float, and char) to store question-related data and user responses.
- What algorithms did you use?
  - A sequential process to display questions, read user input, validate answers, and calculate the total score.
  - Conditional checks (if-else) to determine if the user's answer was correct.
- What were pros/cons of choices above?
  - Pros:
    - The implementation was straightforward and beginner-friendly, ensuring clarity in both code and functionality.
  - Cons:
    - The use of hardcoded questions limits flexibility. A more scalable approach would use arrays or vectors to store questions and answers, allowing iteration.

### Implementation:

- Describe your implementation process.
  - o I start with figuring out what variables I need, then I do any math I need to do, and finally I put it all together
- What sample code did you start with?
  - o grade 4
    - `// Calculate letter grade`
    - `if (Average >= 90)`
    - `Grade = 'A';`
    - `else if (Average >= 80)`
    - `Grade = 'B';`
    - `else if (Average >= 70)`
    - `Grade = 'C';`
    - `else if (Average >= 60)`
    - `Grade = 'D';`
    - `else`
    - `Grade = 'F';`
- How did you extend or adapt this code?
  - o I only used one part of the code to calculate the grade portion
- What was your development timeline?
  - o I started off by getting my questions and solving them, then I wrote a little diagram of what I need my program to do, then I tried to make a version with just the first problem, and just did the same with the rest of the problems
- Document your AI prompts and AI answers.
  - o **Can you give me 5 questions like this Consider the following C++ code: `float num1 = 4.2; int num2 = 3; int result = num1 * num2;` What is the value of the variable result? a) 12.6 b) 12 c) 13 d) 7.2 e) none of above Enter your answer:**
  - o ChatGPT said:
  - o ChatGPT
  - o **Here are 5 similar C++ code questions to test your understanding of type casting, arithmetic operations, and assignments:**
  - o \_\_\_\_\_
  - o **Question 1**
  - o **Consider the following C++ code:**
  - o `cpp`
  - o `CopyEdit`
  - o `float num1 = 5.5;`
  - o `int num2 = 2;`
  - o `int result = num1 / num2;`
  - o

o What is the value of the variable **result**?

- a) 2.75
- b) 2
- c) 3
- d) 5
- e) none of the above

Enter your answer:

o \_\_\_\_\_

o Question 2

o Consider the following C++ code:

```
o cpp
o CopyEdit
o double num1 = 8.9;
o int num2 = 4;
o int result = num1 + num2;
o
```

o What is the value of the variable **result**?

- a) 12.9
- b) 12
- c) 13
- d) 8
- e) none of the above

Enter your answer:

o \_\_\_\_\_

o Question 3

o Consider the following C++ code:

```
o cpp
o CopyEdit
o int num1 = 7;
o float num2 = 3.5;
o int result = num1 * num2;
o
```

o What is the value of the variable **result**?

- a) 24.5
- b) 24
- c) 25

- d) 21
  - e) none of the above
- Enter your answer:

☐ \_\_\_\_\_

☐ Question 4

- ☐ Consider the following C++ code:

☐ cpp  
☐ CopyEdit  
☐ `float num1 = 10.0;`  
☐ `float num2 = 3.0;`  
☐ `int result = num1 / num2;`  
☐

- ☐ What is the value of the variable `result`?

- a) 3.333
  - b) 3
  - c) 4
  - d) 10
  - e) none of the above
- Enter your answer:

☐ \_\_\_\_\_

☐ Question 5

- ☐ Consider the following C++ code:

☐ cpp  
☐ CopyEdit  
☐ `int num1 = 6;`  
☐ `float num2 = 2.5;`  
☐ `int result = num1 - num2;`  
☐

- ☐ What is the value of the variable `result`?

- a) 3.5
  - b) 3
  - c) 4
  - d) 6
  - e) none of the above
- Enter your answer:

- o \_\_\_\_\_
- o Let me know if you'd like explanations or answers for any of these!
- o 40
- o You said:
- o Can you make them ramp up in difficulty
- o ChatGPT said:
- o ChatGPT
- o Sure! Here's a revised set of 5 questions that gradually increase in difficulty, starting with straightforward type casting and moving toward more complex concepts like precedence, implicit conversions, and bit manipulation.

- o \_\_\_\_\_
- o Question 1 (Easy)
- o Consider the following C++ code:
  - o cpp
  - o CopyEdit
  - o `float num1 = 5.5;`
  - o `int num2 = 2;`
  - o `int result = num1 / num2;`
- o What is the value of the variable `result`?
  - a) 2.75
  - b) 2
  - c) 3
  - d) 5
  - e) none of the above
- o Enter your answer:

- o \_\_\_\_\_
- o Question 2 (Moderate)
- o Consider the following C++ code:
  - o cpp
  - o CopyEdit
  - o `double num1 = 7.8;`

o `int num2 = 2;`  
o `int result = num1 + num2 * 3;`  
o

o What is the value of the variable `result`?  
a) 7.8  
b) 13  
c) 15  
d) 14  
e) none of the above  
Enter your answer:

o \_\_\_\_\_

o **Question 3 (Challenging)**

o Consider the following C++ code:

o `cpp`  
o `CopyEdit`  
o `int num1 = 5;`  
o `float num2 = 2.4;`  
o `int result = (int)(num1 * num2) % 4;`  
o

o What is the value of the variable `result`?  
a) 0  
b) 1  
c) 2  
d) 3  
e) none of the above  
Enter your answer:

o \_\_\_\_\_

o **Question 4 (Advanced)**

o Consider the following C++ code:

o `cpp`  
o `CopyEdit`  
o `int num1 = 4;`  
o `float num2 = 3.5;`  
o `int result = (int)(num1 + num2) >> 1;`  
o

o What is the value of the variable **result**?

- a) 3
- b) 4
- c) 7
- d) 8
- e) none of the above

Enter your answer:

o \_\_\_\_\_

o Question 5 (Very Advanced)

o Consider the following C++ code:

```
o cpp
o CopyEdit
o int num1 = 10;
o float num2 = 4.5;
o int result = ((int)num2 ^ num1) & 7;
o
```

o What is the value of the variable **result**?

- a) 1
- b) 2
- c) 3
- d) 5
- e) none of the above

Enter your answer:

o \_\_\_\_\_

o Would you like me to provide the answers or explanations for any of these? 😊

o 4o

### Testing:

- Describe how you tested your program.
  - o I went through and I would get more and more questions wrong after every attempt
- What were the normal inputs you used?
  - o a, b, c, d, e
- What were the special cases you tested?
  - o f, 1, hello
- Did everything work as expected?
  - o Yes

- Include typescript showing program input/output.
  - o Consider the following C++ code:
    - o `float num1 = 5.5;`
    - o `int num2 = 2;`
    - o `int result = num1 / num2;`
    - o What is the value of the variable `result`?
    - o a) 2.75
    - o b) 2
    - o c) 3
    - o d) 5
    - o e) none of the above
    - o Enter your answer: b
    - o Correct!
  - o Consider the following C++ code:
    - o `double num1 = 7.8;`
    - o `int num2 = 2;`
    - o `int result = num1 + num2 * 3;`
    - o What is the value of the variable `result`?
    - o a) 7.8
    - o b) 13
    - o c) 15
    - o d) 14
    - o e) none of the above
    - o Enter your answer: b
    - o Correct!
  - o Consider the following C++ code:
    - o `int num1 = 5;`
    - o `float num2 = 2.4;`
    - o `int result = (int)(num1 * num2) % 4;`
    - o What is the value of the variable `result`?
    - o a) 0
    - o b) 1
    - o c) 2
    - o d) 3
    - o e) none of the above
    - o Enter your answer: a
    - o Correct!
  - o Consider the following C++ code:
    - o `int num1 = 4;`
    - o `float num2 = 3.5;`
    - o `int result = (int)(num1 + num2) >> 1;`
    - o What is the value of the variable `result`?
    - o a) 3
    - o b) 4
    - o c) 7
    - o d) 8



- o e) none of the above
- o Enter your answer: a
- o Correct!
- o Consider the following C++ code:
- o `int num1 = 10;`
- o `float num2 = 4.5;`
- o `int result = ((int)num2 ^ num1) & 7;`
- o What is the value of the variable `result`?
- o a) 1
- o b) 2
- o c) 3
- o d) 5
- o e) none of the above
- o Enter your answer: d
- o Wrong :(
- o You got 4 question(s) correct.
- o Average = 80%
- o Grade = B
- o

### Conclusions:

- Describe the overall result of the assignment.
  - o I made a program that test you on arimithtic, tells you wether you got the question right or wrong, and gives you the % of correct questions and the letter grade
- Was the programming project a success?
  - o The programming project was a success. The program met all requirements, provided accurate feedback, and calculated scores correctly.
- What would you do same or differently next time?
  - o I would first map out my code by drawing a diagram on a piece of paper again
- How long did the project take to complete?
  - o 2 hours