

C and C++ Programming Assessment 3

June 12, 2025

C MULTIPLE CHOICE

Each question will have four options, with each multiple choice question being worth **Two marks**.

1. What is the size of a `double` on most systems?

- A) 4 bytes
- B) 8 bytes
- C) 16 bytes
- D) 32 bytes

2. Which of the following is NOT a valid C data type?

- A) short
- B) long
- C) string
- D) char

3. What will this code output?

```
1      int x = 3;
2      printf("%d", ++x + x++);
3
```

- A) 7
- B) 8
- C) 9
- D) Undefined Behavior

4. What is wrong with the following code?

```
1      int *ptr;
2      *ptr = 10;
3
```

- A) Pointer not initialized
- B) Incorrect dereference syntax
- C) Invalid assignment
- D) Nothing is wrong

5. Which of the following is guaranteed to execute its condition check before the loop body?

- A) do-while
- B) while
- C) for
- D) Both B and C

6. What does the `sizeof` operator return for an array passed to a function?

- A) Size of the entire array
- B) Size of the first element

- C) Size of a pointer
- D) Number of elements

7. What is wrong with the following code?

```
1      int arr[5] = {1, 2, 3};  
2      for (int i = 0; i <= 5; i++) {  
3          printf("%d ", arr[i]);  
4      }  
5
```

- A) Loop condition is incorrect
- B) Array initialization is invalid
- C) Missing format specifier
- D) Nothing is wrong

8. What is the purpose of the `const` keyword in C?

- A) Defines a variable as immutable
- B) Allocates memory dynamically
- C) Restricts function scope
- D) Enables inline expansion

9. Which of the following declares a 2D array correctly?

- A) `int arr[3,3];`
- B) `int arr[3][3];`
- C) `int arr(3)(3);`
- D) `int *arr[3][3];`

10. What is wrong with this code?

```
1      FILE *fp = fopen("test.txt", "r");  
2      fscanf(fp, "%d");  
3
```

- A) Missing variable in `fscanf`
- B) File not checked for NULL
- C) Incorrect file mode
- D) Nothing is wrong

C++ MULTIPLE CHOICE

1. Which of the following is a feature of C++ but not C?

- A) Pointers
- B) References
- C) Arrays
- D) Structures

2. What is wrong with this class definition?

```
1      class Test {  
2          int data;  
3      public  
4          void setData(int d);  
5      };  
6
```

- A) Missing colon after public
- B) Missing semicolon after class
- C) Missing function implementation
- D) Nothing is wrong

3. What does the **override** keyword ensure in C++?

- A) Function is virtual
- B) Function overrides a base class virtual function
- C) Function is static
- D) Function is inline

4. What is wrong with this code?

```
1      class Example {  
2      public:  
3          Example() {  
4              int x = 0;  
5              return x;  
6          }  
7      };  
8
```

- A) Constructors cannot declare variables
- B) Constructors cannot return values
- C) Constructor name is incorrect
- D) Nothing is wrong

5. What does the **this** pointer refer to in a C++ class?

- A) Current class definition
- B) Current object instance
- C) Base class instance
- D) Static member

6. What is the error in this code?

```
1      int *ptr = new int;  
2      delete[] ptr;  
3
```

- A) Incorrect deletion syntax for single object
 - B) Memory leak
 - C) Pointer not initialized
 - D) Nothing is wrong
7. What is the purpose of operator overloading in C++?
- A) To redefine operators for user-defined types
 - B) To prevent operator usage
 - C) To restrict operator scope
 - D) To inline operator functions
8. Which keyword prevents a class from being inherited?
- A) sealed
 - B) final
 - C) private
 - D) static
9. What is the difference between **struct** and **class** in C++?
- A) Default access specifier
 - B) Memory allocation method
 - C) Inheritance support
 - D) Function definition scope

(Last question on the next page)

10. What will be the output of this code?

```
1      class Base {
2      public:
3          virtual void print() {
4              cout << "Base";
5          }
6      };
7      class Derived : public Base {
8      public:
9          void print() override {
10             cout << "Derived";
11         }
12     };
13     int main() {
14         Base *b = new Derived();
15         b->print();
16         delete b;
17     }
18
```

- A) Base
- B) Derived
- C) Compilation Error
- D) Undefined Behavior

C CREATIVE QUESTION

C Programming Topic: Array Reversal

1. Define an integer array with the following specifications:

The array should contain 8 elements: {5, 10, 15, 20, 25, 30, 35, 40}. Declare this array in the main function and print all its elements to confirm initialization.

(4 marks)

2. Write a function named `reverseArray` that performs the following tasks:

Accept the `array` and its `size` as arguments. Reverse the array in place using a loop. Return void, as the array is modified directly.

(8 marks)

3. Modify the `main` function to use the `reverseArray` function:

Call the `reverseArray` function. Print the array elements after reversal to confirm the operation.

(8 marks)

4. Write a function named `findDuplicates` that performs the following:

Accept the array and its size as arguments. Check for duplicate elements in the array. Print any duplicates found in the main function after calling `findDuplicates`.

(6 marks)

5. Write a function to calculate the range of the array elements:

Accept the array and its size as arguments. Calculate the range (difference between max and min elements). Return the range and print it in the main function.

(4 marks)

C++ CREATIVE QUESTION

Be careful with the formatting of your answer; it should be easy to read.

1. Define a `Book` class with the following specifications:

Private member variables: `title` (a string) to store the book's title. `ratings` (an array of 4 floats) to store reader ratings. `isbn` (an integer) to store the book's ISBN number.

Public member functions: A constructor to initialize the title, ratings, and ISBN for each book.

(5 marks)

2. Write a member function named `calculateAverageRating` in the `Book` class that:

Computes the average of the ratings stored in the `ratings` array. Returns the calculated average as a `float`.

(5 marks)

3. Add a member function named `isHighlyRated` to the `Book` class that:

Uses `calculateAverageRating` to check if the average rating is 4.0 or higher. Returns `true` if the average rating is 4.0 or higher, `false` otherwise.

(5 marks)

4. Write a member function named `displayBookInfo` in the `Book` class that:

Displays the book's title, ISBN, ratings, average rating, and rating status in the following format:

Title: The Great Gatsby

ISBN: 123456789

Ratings: 4.5 4.0 3.8 4.2

Average Rating: 4.13

Status: Highly Rated

Part 4 (final part) on the next page

5. In the main function, perform the following:

Create two **Book** objects using the constructor. For example:

Book 1: Title: "The Great Gatsby", ISBN: 123456789, Ratings: {4.5, 4.0, 3.8, 4.2}

Book 2: Title: "1984", ISBN: 987654321, Ratings: {3.5, 3.0, 3.2, 3.8}

Call the `displayBookInfo` function for both books to test all functionalities.

(10 marks)