**四川大学期末考试试题（闭卷）**

**（2022——2023学年第 2 学期） B卷**

课程号：304024030 课序号：08 课程名称：高级语言程序设计-Ⅱ 任课教师：赵启军 成绩：

适用专业年级：计算机学院2023级 学生人数：12 印题份数： 学号： 姓名：

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| **考 生 承 诺**  我已认真阅读并知晓《四川大学考场规则》和《四川大学本科学生考试违纪作弊处分规定（修订）》，郑重承诺：  1、已按要求将考试禁止携带的文具用品或与考试有关的物品放置在指定地点；  2、不带手机进入考场；  3、考试期间遵守以上两项规定，若有违规行为，同意按照有关条款接受处理。  **考生签名：** |
| **Ⅰ. Multiple Choice (3 points each, 30 points in total)**  1. What are the values of the following expressions? B  10 % 3, 4 >= 4u, (8 << 1)  a. 1, false, 16  b. 1, true, 16  c. 2, false, 64  d. 1, true, 64  2. What are the values of the following expressions? A  7 / 3, 7 != 7u, (-10) >> 2  a. 2, true, -3  b. 2, false, -3  c. 2, true, -2  d. 2, false, -2  3. Which keyword can be used in C++ to hide a base class method in a derived class? C  a. override  b. hide  c. private  d. virtual  4. Which keyword is used to define a constant variable in C++? D  a. final  b. static  c. template  d. const  5. Which keyword is used to declare an immutable variable in C++? C  a. volatile  b. mutable  c. const  d. extern  6. In C++, which of the following correctly initializes a pointer to a null value? C  a. int\* ptr = 0;  b. int ptr\* = nullptr;  c. int\* ptr = nullptr;  d. ptr\* int = 0;  7. Which of the following access specifiers should be used to allow access to  class members only within the class itself and by friend functions? B  a. public  b. private  c. protected  d. internal  8. Which of the following is used to determine the type of a polymorphic class  at runtime in C++? D  a. Virtual function  b. Type casting  c. Type introspection  d. Dynamic binding  9. The line of code std::string str("Hello World!"); uses which constructor of  the std::string class? D  a. Default Constructor  b. Copy Constructor  c. Move Constructor  d. Parameterized Constructor  10. What does the expression std::unique\_ptr<int> ptr(new int(10)) create? B  a. An instance of std::unique\_ptr<int> pointing to an uninitialized int variable.  b. An instance of std::unique\_ptr<int> pointing to an int variable with the value 10.  c. A copy of an existing std::unique\_ptr<int>.  d. A null pointer. |

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| **Ⅱ. Fill in the Blanks (4 points each, 20 points in total)**   1. The auto keyword allows the compiler to (deduce) the type of the variable during compilation. 2. A (range-based) loop can iterate over sequences like arrays, container classes, and other sequence types, making it a versatile tool for traversing data structures. 3. Exception handling in C++ is done using try, catch, and (throw) blocks to manage exceptions and errors dynamically. 4. In C++, the (const) specifier is used to indicate that a member function does not modify the object for which it is called. 5. A (unique\_ptr) pointer in C++ is a smart pointer that manages an array and deletes it automatically when it's no longer needed.   **Ⅲ. Concept Explanation (5 points each, 20 points in total)**   1. What is a lambda function in C++? Provide examples on how to define and use lambda functions, including capturing external variables.   A lambda function in C++ is an anonymous, inline function that can be defined directly within the body of another function. It is a convenient way to define an ad-hoc function without explicitly giving it a name.   1. Describe the concept of namespaces in C++. Why are they used and provide an example to illustrate how to define and use namespaces to avoid name conflicts.   Namespaces in C++ are used to organize code into logical groups and to prevent name conflicts that can occur especially when your code base includes multiple libraries. They provide a way for you to define a scope for identifiers (such as variables, types, functions, and so on) to avoid clashes between names used in different parts of a program or different libraries.   1. Explain the purpose and usage of the constexpr keyword in C++. Provide examples to illustrate when and how constexpr can be used to improve the performance and correctness of a program.   The constexpr keyword in C++ declares that the value of a variable, the return value of a function, or the value of an object constructor can be evaluated at compile time, which can lead to better performance because calculations can be done before the program runs. It also ensures correctness by allowing the compiler to enforce constancy and to use constants in places where only compile-time constants are permitted, such as array sizes or non-type template parameters.   1. List all the usages of keyword friend and give them brief introductions   The friend keyword in C++ has three main uses, allowing one class or function to access private or protected members of another class. This helps with encapsulation by letting you control which classes or functions can access the internals of another class. |

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| **Ⅳ.** **Short Answer Questions (3 points each, 30 points in total)**   1. Give the result of following program with inputs below.     Is  there  a  template  function  in  the  program?   1. Can member functions of a class access static variables, and can static member functions of a class access ordinary variables? Why?   A member function can access static variables because static variables are not bound to class instances, it is shared by all objects of the class.  A static member function can’t access ordinary variables because ordinary variables belongs a special instance, however static functions are not bound to class instances.   1. Please design a function called count\_if, which takes a container and a function returning a bool type as parameters, and returns the number of elements in the container that make the function return true. |