Practical Assignment-3(C++)

C++ Operator Overloading Exercises

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1. **Overload + operator for a class Point**
   • Create a class Point with x and y coordinates and overload the + operator to add two points (add their x and y separately).

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2. **Overload == operator for a class Student**
   • Create a class Student with id and name, and overload the == operator to check if two students have the same id.

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3. **Overload << operator for a class Book**
   • Create a class Book with title and author, and overload the << operator to print book details easily.

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4. **Overload - operator for a class Box**
   • Create a class Box with length, width, and height, and overload the - operator to subtract dimensions of one box from another.

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5. **Overload ++ operator (prefix) for a class Counter**
   • Create a class Counter with an integer count, and overload the prefix ++ operator to increase the count by 1.

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6. **Overload * operator for class Matrix**
   • Create a class Matrix with two integers, and overload * to multiply corresponding elements of two matrices.

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7. **Overload != operator for class Employee**
   • Create a class Employee with id and salary, overload != to check if two employees have different ids.

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8. **Overload [] operator for class Array**
   • Create a class Array with an integer array inside, overload [] to access elements.

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9. **Overload () operator for class Multiplier**
   • Create a class Multiplier with a member function that multiplies two integers, overload () operator to do the multiplication.

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10. **Overload += operator for class Accumulator**
    • Create a class Accumulator with an integer sum, overload += to add a value to sum.

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11. **Overload -- operator (postfix) for class Timer**
    • Create a class Timer with an integer count, overload postfix -- to decrease count by 1.

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12. **Overload < operator for class Box**
    • Create a class Box with volume, overload < to compare volumes of two boxes.

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13. **Overload >> operator for class Person**
    • Create a class Person with name and age, overload >> to input data from user.

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14. **Overload + operator for class String**
    • Create a class String with a char array, overload + to concatenate two strings.

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15. **Overload - operator for class Time**
    • Create a class Time with hours and minutes, overload - to find the difference between two time objects.

Unary Operator Overloading

1. **Overload unary - operator for class Number**
    • Create a class Number with an integer member. Overload unary - to negate the value of the member.

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2. **Overload unary ++ operator (prefix) for class Counter**
    • Create a class Counter with an integer member. Overload prefix ++ to increment the member.

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3. **Overload unary -- operator (prefix) for class Counter**
    • Use the same Counter class. Overload prefix -- to decrement the member.

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4. **Overload unary ! operator for class Switch**
    • Create a class Switch with a boolean member. Overload unary ! to toggle the boolean member.

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5. **Overload unary ~ operator for class Bitwise**
    • Create a class Bitwise with an integer member. Overload unary ~ to perform bitwise NOT on the member.

Binary Operator Overloading

1. **Overload - operator for class Point**
   • Subtract the coordinates of two Point objects.

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2. **Overload / operator for class Fraction**
   • Create a class Fraction and overload / to divide one fraction by another.

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3. **Overload < operator for class Date**
   • Create a class Date. Overload < to compare two dates.

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4. **Overload << operator for class Complex**
   • Create a class Complex and overload << to output the complex number in a+bi format.

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5. **Overload && operator for class BoolWrapper**
   • Create a class BoolWrapper. Overload && to perform logical AND on two objects.

C++ Type Conversion Exercises

Implicit & Explicit Type Conversion

1. **Implicit Conversion from int to float**
   • Create an integer variable and assign it to a float variable. Print both values to observe implicit conversion.

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2. **Explicit Conversion using static_cast**
   • Create a float variable and convert it to an integer using static_cast. Print both values.

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3. **Explicit Type Conversion with C-style Cast**
   • Create a double variable and convert it to an integer using C-style cast (int). Print both values.

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4. **Constructor-based Conversion**
   • Create a class Distance with a constructor that accepts an integer representing meters. Create an object by passing an integer to test implicit conversion.

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5. Implicit Conversion from char to int

- Create a char variable and assign a character to it.
- Assign the char variable to an int variable.
- Print both values to observe how the character is implicitly converted to its ASCII value.

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6. Explicit Conversion from float to int Using Function-style Cast

- Create a float variable with a decimal value.
- Use **function-style casting** to convert the float to an int.
- Print both values to observe how the decimal part is discarded during conversion.

Basic to Class Conversion

1. **Class Score with int Constructor**
   • Convert an int representing points into a Score object.

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2. **Class Percentage with double Constructor**
   • Convert a double (e.g., 85.5) into a Percentage object.

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3. **Class Level with char Constructor**
   • Convert a char (like 'A') into a Level object.

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4. **Class Radius with float Constructor**
   • Convert a float radius value to a Radius object.

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5. **Class Age with unsigned int Constructor**
   • Convert an unsigned int to an Age object.

Class to Basic Conversion

1. **Class Score Converts to int**
   • Convert a Score object to an int representing the points.

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2. **Class Percentage Converts to double**
   • Convert a Percentage object to a double value.

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3. **Class Level Converts to char**
   • Convert a Level object to a char representing the level.

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4. **Class Radius Converts to float**
   • Convert a Radius object to a float.

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5. **Class Age Converts to unsigned int**
   • Convert an Age object to an unsigned int value.

Class to Class Conversion

1. **Convert Between Celsius and Fahrenheit**
   • Convert temperature values between Celsius and Fahrenheit classes.

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2. **Convert Between Inch and Centimeter**
   • Convert length units between Inch and Centimeter classes.

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3. **Convert Between Kilogram and Pound**
   • Convert weight values between Kilogram and Pound classes.

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4. **Convert Between Seconds and Minutes**
   • Convert time values between Seconds and Minutes classes.

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5. **Convert Between RGB and HSV Color Spaces**
   • Convert color values between RGB and HSV classes.
