| OOP Spring 2023 |
| HW #1 |

(1) Write a Rectangle class. The class has the following properties.

(a) There are two data members: length and width.

(b) Write a constructor for the class.

(c) Write member functions that compute the area and perimeter of the Rectangle.

(d) Write setter and getter functions for the length and width.

(e) Write a member function to print the length and width.

(f) Write a test program to test your class.

(g) You **must** write the class and test program in all of the following languages: C++, C#, Groovy, Java, and Python 3.

The following are short answer questions.

(2) Which of the following C++ mechanisms is used to create polymorphism?

Virtual functions _____   Templates _____

(3) Which of the following conversions is generally not legal?
(a) Converting a base object to a derived object?
(b) Converting a derived object to a base object?

(4) True or false: it is illegal for a destructor to throw an exception in C++.

(5) What is the difference between function overloading and function overriding?

(6) What is a predicate in C++?

(7) What is a function object?

(8) How does a function object differ from a function?

(9) Explain the difference between overloading and polymorphism.

(10) Why are namespaces used in C++?

(11) True or false: Only object-oriented programming languages can exhibit polymorphism.