Name: _____ ID: _____

Object-Oriented Programming Homework #5 **Feb 17th, 2023**

User Defined Types

1. Write a class for representing a book information along with basic operations and test programs.

1.1) Modify the code from exercise **1.3)** in **lab #5** (or redo the exercise) by adding the following operations:

- **Read** a book data from the input stream
  The data format will be `"<ISBN>\n<title>\n<author>\n<copyright>\n<genre>\n"`, each consumes the whole line of text
- **Find** a book that match the title from a collection of books
- **Find** a book that match the ISBN from a collection of books

Add additional support operations as needed. Write a test program for testing all of the above operations.

1.2) Modify the code from **1.1)** by adding a function to **get a list** of books that mat specific genre from a collection of books. Add additional support operations as needed. Finally, write a test program for testing the function.

1.3) Modify the code from **1.1)** by adding the following operations:

- **Sort** a book by the title from a collection of books
- **Sort** a book by the ISBN from a collection of books

Add additional support operations as needed. Write a test program for testing all of the above operations.

2. Write a class for representing an ASCII picture along with basic operations and test programs.

2.1) Write a `Picture` class which stores a text string of `W×H` characters for its content of which `W` represents the width and `H` represents the height.
You are required to:

- Provide appropriate **constructors** for class `Picture`
- Provide appropriate **member functions** for getting the width and the height of a `Picture` object
- Write a test program for testing all use cases of a `Picture` object and its operations

2.2) From **2.1)** add the following operations:

- `hcat` for creating a new picture by **concatenating** two pictures **horizontally**
- `vcat` for creating a new picture by **concatenating** two pictures **vertically**
- **Print** the contents of a picture to the output stream

Write a test program for testing all of the above operations.

2.3) Modify the code from **2.2)** by adding a function `resize` to adjust the width and height of a picture. The function will expand the picture size when the new width/height is larger and crop the picture when the new width/height is smaller. Add additional support operations as needed. Finally, write a test program for testing the function.