Homework # 5

01286131 Object-Oriented Programming
Software Engineering Program,
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By

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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.

```
Enter the line in order :
The data format will be "<ISBN>\n<title>\n<author>\n<copyright>\n<genre>\n" , each consumes the whole line of text
99999
Simple AtoZ for university students
Chanasorn H.
2048
biography

|---------------------------------------------------------------------------------|

The list of books is :
ISBN : 99999
Title: Simple AtoZ for university students
Author : Chanasorn H.
Year : 2048
Genre : biography
Checked : false


ISBN : 1234567890
Title: The Lord of the Rings
Author : J.R.R. Tolkien
Year : 1954
Genre : fiction
Checked : false


ISBN : 1234567891
Title: The Hobbit
Author : J.R.R. Tolkien
Year : 1937
Genre : fiction
Checked : false


ISBN : 1234567892
Title: The Silmarillion
Author : J.R.R. Tolkien
Year : 1977
Genre : fiction
Checked : false
```

```
ISBN : 1234567893
Title: The Silmarillion
Author : J.R.R. Tolkien
Year : 1977
Genre : children
Checked : false


ISBN : 1234567894
Title: The Silmarillion
Author : J.R.R. Tolkien
Year : 1977
Genre : biography
Checked : false



|------------------------------------------------------------------------------------------|
The book with ISBN 99999 is(findISBN) :
ISBN : 99999
Title: Simple AtoZ for university students
Author : Chanasorn H.
Year : 2048
Genre : biography
Checked : false

The book with title The Hobbit is(findTitle) :
ISBN : 1234567891
Title: The Hobbit
Author : J.R.R. Tolkien
Year : 1937
Genre : fiction
Checked : false

The list of books with genre fiction is :
ISBN : 1234567890
Title: The Lord of the Rings
Author : J.R.R. Tolkien
Year : 1954
Genre : fiction
Checked : false
```
```
ISBN : 1234567891
Title: The Hobbit
Author : J.R.R. Tolkien
Year : 1937
Genre : fiction
Checked : false

ISBN : 1234567892
Title: The Silmarillion
Author : J.R.R. Tolkien
Year : 1977
Genre : fiction
Checked : false

The list of books with genre children is :
ISBN : 1234567893
Title: The Silmarillion
Author : J.R.R. Tolkien
Year : 1977
Genre : children
Checked : false

The list of books with genre biography is :
ISBN : 99999
Title: Simple AtoZ for university students
Author : Chanasorn H.
Year : 2048
Genre : biography
Checked : false

ISBN : 1234567894
Title: The Silmarillion
Author : J.R.R. Tolkien
Year : 1977
Genre : biography
Checked : false

Sorting the books by title :
ISBN : 99999
Title: Simple AtoZ for university students
Author : Chanasorn H.
Year : 2048
Genre : biography
Checked : false
```

```
ISBN : 1234567891
Title: The Hobbit
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ISBN : 1234567893
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Year : 1977
Genre : children
Checked : false

ISBN : 1234567894
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Sorting the books by ISBN :
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Author : Chanasorn H.
Year : 2048
Genre : biography
Checked : false
```

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.