 <p>MANUKAU INSTITUTE OF TECHNOLOGY <i>Te Whare Takiri o Manukau</i></p>	<div style="border: 1px solid blue; padding: 2px;">School of Digital Technologies</div> <div style="border: 1px solid blue; padding: 2px;">562.613 Applied Data Structures</div>
Assessment	Project
Due Date:	November 20, 2018
Assessment Weighting:	This project contributes 20% towards the course total.
Student ID:	
Student Name:	
Student E-mail:	
<div style="border: 1px solid blue; padding: 2px; margin-bottom: 10px;">Statement of Original Authorship</div> <p>I hereby confirm that this project is my own work. In addition, the project has not previously been submitted for assessment, either in whole or in part, by either myself or any other student at either Manukau Institute of Technology or at any other tertiary institution. To the best of my knowledge and belief, the project contains no material which has been previously published or written by another person except where due reference has been made. All unpublished sources of information have been acknowledged. I make this statement in full knowledge of an understanding that, should it be found false, I will, in most circumstances, receive zero marks for this project and may face disciplinary action.</p> <p>Signed by student: _____</p> <p>Date: _____</p> <p>_____</p>	

This signed form must be submitted with your project.

Learning Outcomes

This project will test your understanding of the following learning outcomes:

LO2	Implement the data structures and algorithms using a programming language.
LO3	Select and apply appropriate data structures and algorithms for problems.
LO4	Demonstrate the applications of data structures through implementing software solutions that employ the data structures and algorithms.

Case Study

You are hired by a library to handle and process the new arriving books and storing all the data in their system. The purchase department provided you with a simple text file as shown below:





```
M G Abbas Malik,Applied Data Structures,Oxford University Press,2018,Computer Science
John Trevolta,Mathematics for Computing,Cambridge University Press,2016,Computer Science
Reza Shahmiri,UX/UI Design,MIT Press,2017,Software Development
Sayan Ray,Networking,MIT Press, 2015,Computer Networks
Dil M,Applied Mathematics,Weily,2000,Mathematics
Zia Bashir,Algebra,Pearson,2008,Mathematics
...
```

This file contains one record on each line. The structure of each record is as follows:

Author,Book Name,Publisher,Year,Category

All values in one record are separated with COMMA (,) and one line contains only one record (information about only one book). This file will be available for download on Canvas.

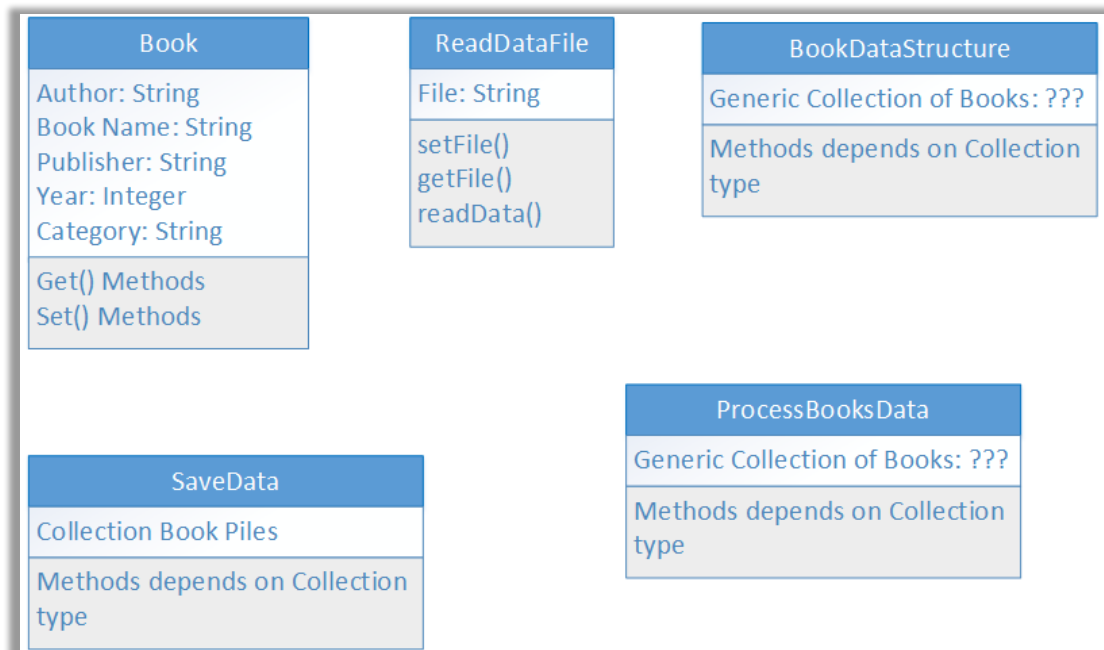
You will create a C# class **ReadDataFile** that will read this file into your program. This class will read each record in order and create an object of **Book** class with book information. It will save all these book class objects in an appropriate data structure called **BookDataStrucrue** that will help us to process each book on the principle of **FIRST-COME-FIRST-SERVE** basis. Now you will create another class **ProcessBooksData** that will process all the book-records in the data structure, created above. This class will create multiple piles of books based on the **category** of the book, as shown below. You need to select an appropriate data structure to store these piles of books in the order of their processing.

			
Computer Science	Networking	Mathematics	Software Development

Once you have created these piles, you need to show these piles to the user in an appropriate Tabular form, one pile at one time.

Finally, you will create a class **SaveData** that will save all these books in the Library Database.

A generic class diagram is given below:



We will discuss this diagram in the class with more details.

What you are required to do:

The class diagram of the above case study and the csv files containing a list of books is provided with this project. You need to complete the following tasks:

1. Create a Command Line Interface that will help a user to use your application.

This Command Line Interface will look like this:

```

===== Applied Data Structure Course Project =====
--:--: Menu Options :--:--
--: Press 1 to Read Data from File
--: Press 2 to Process Data and Store in BookDataStructure
--: Press 3 to Create Book Piles
--: Press 4 to Show Book Piles
--: Press 5 to Save Book in Database
--: Press 0 to Exit Application
--:--: Menu End :--:--
Enter Menu Number: █
  
```

Note: A sample program is available for download.

2. Design and Implement **Book** Class.
3. Design and Implement **BookDataStructure** class. Here you need to choose appropriate data structure and methods accordingly to store the Book class objects such that they can be processed on the principle of First-Come-First-Serve.
4. Design and Implement **ReadDataFile** class
5. Design and Implement **ProcessBooksData** class

6. Design and Implement **SaveData** class. You will use **Entity Framework** to save data in the database.

You have a choice to work in teams (maximum of 2 students) or individually for this project but you will only be assessed on your own contribution to the overall work.

Note: *You should use this project as an opportunity to demonstrate knowledge of various data structures such as Array, ArrayList, Dictionary, Stack, Queue and others you have learned in this course. This is very important.*

Submission

You are required to submit the C# project in zip format via Canvas by the due date. Moreover, you are also required to present your project. You must be able to explain your code and answer questions about it.

A presentation schedule will be provided and you are expected to present on time. Please contact your Lecturer, if you intend to reschedule your presentation. You may only do this, if you have a genuine excuse.

Late submission

If you have not completed your project by the due date, I may allow you to hand it in up to 5-days late. In this case a penalty of 5% per day will be deducted from your mark.

Marking Guide

You are required to submit the following items:

1. Coding	
a. Design and Implementation Book class	5
b. Design and Implementation of BookDataStructure class	15
c. Appropriate Data Structure is selected and appropriate methods are implanted in the BookDataStructure class	5
d. Design and Implementation of ReadDataFile class	15
e. Design and Implementation of ProcessBooksData class	30
f. Design and Implementation of SaveData class	15
g. Main Program Class is implemented with appropriate methods to test the application	5
h. Overall quality of code and object oriented design	10
Total	100

Feedback to Student:

Feedback will be uploaded on canvas along with your marks.