# EN3085 Example Coursework 2

You will have 2.5 hours to produce the programs below using Visual Studio in the lab at designated time. You will have additional 30 minutes to upload your solution at the end of the assessment.

1. Your company has won a contract to create a software system for a local library. The library stocks three types of items: books, films and music albums. The program should allow a librarian to add new items to the cataloguing system, to issue the items to the library members and to update the returned items. Your colleagues have provided you with the following class hierarchy diagram:

Book

name : string

author : string

publisher : string

edition : string

year : string

printDetails()

MusicAlbum

name : string

artist : string

year : string

recordLabel : string

printDetails()

Film

name : string

director : string

year : string

language : string

printDetails()

Entry

borrowed : integer

borrowedBy : string

Entry()

entryBorrowed(string name)

entryReturned()

printDetails();

* 1. Write a C++ class Entry according to the given diagram. Derive from it three subclasses: MusicAlbum, Book and Film. The class Entry should have member variables to store the name of the item and if it is borrowed and by who. The subclasses should have additional data members as specified in the diagram. Include member function declarations into your four class definitions according to the diagram. In addition, include two constructor declarations for each of the subclasses: one constructor with parameters for passing the values of all data members and another constructor with no parameters, but which allows the user to enter the values for all data members interactively. Use virtual functions appropriately. [30 points]
  2. Write definitions of all member functions for classes Entry, Film and Book. The functions printDetails() should display the values of their class data members. [30 points]
  3. Create a class Library to store a collection of library entries and the total number of all entries. You may want to use an object of one of the Standard Template Library container classes as a member of your Library class for this purpose.

It should be possible to add new objects of classes Film and Book to a Library object at program run-time when new entries are added to the library and to remove them when they are decommissioned. Add appropriate member functions to your Library class for this purpose.

[20 marks]

* 1. Write the main() function demonstrating the use of all classes created in your answer to this question.

[20 marks]

Marks will be awarded for:

• A correctly functioning program. The program should operate according to the specification.

• A program that makes appropriate use, and demonstrate understanding, of the concepts taught in the module.

• An efficient program and elegant algorithms. Try to develop algorithms, which are efficient in terms of the amount of data that needs to be stored (e.g. minimum number of variables used) and the speed in which the functions operate.

• A user-friendly program. When your program runs, the messages on the screen should be easy to understand and succinct.

• A well commented program. The judicious use of commenting is essential if somebody else is to easily understand your program.