

# Test of skills and knowledge

Mandatory assignment

Media system



# Media system

## Case description

Zealand - Sjællands Erhvervsakademi needs a new media system, MediaSystem, that can administer lending of media eg. books or games to their patrons, who are typically students at Zealand in Roskilde.

In the system, it must be possible to create and manage (Create, Read, Update and Delete) Media that can be borrowed. In addition, it must be possible to manage patrons. In the MediaSystem, it must of course be possible to register loans of a media. For each loan, a loan date and a delivery date must be registered. The delivery date is 1 month after the loan date.

The first draft of the domain model looks like this:

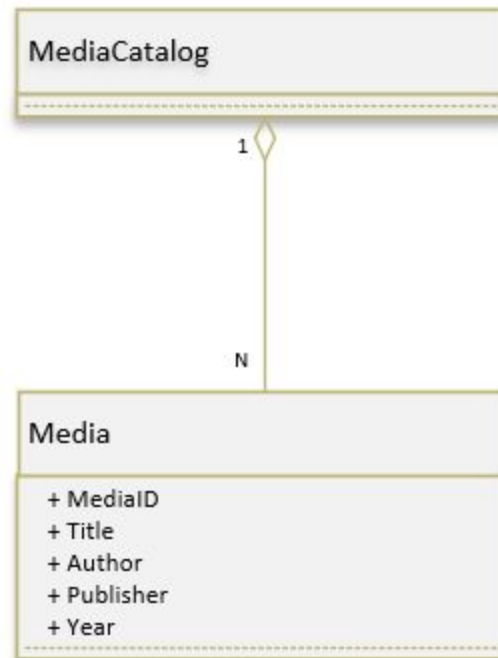


Fig.1 First draft of the domain model

The first draft of the design class diagram looks like this:

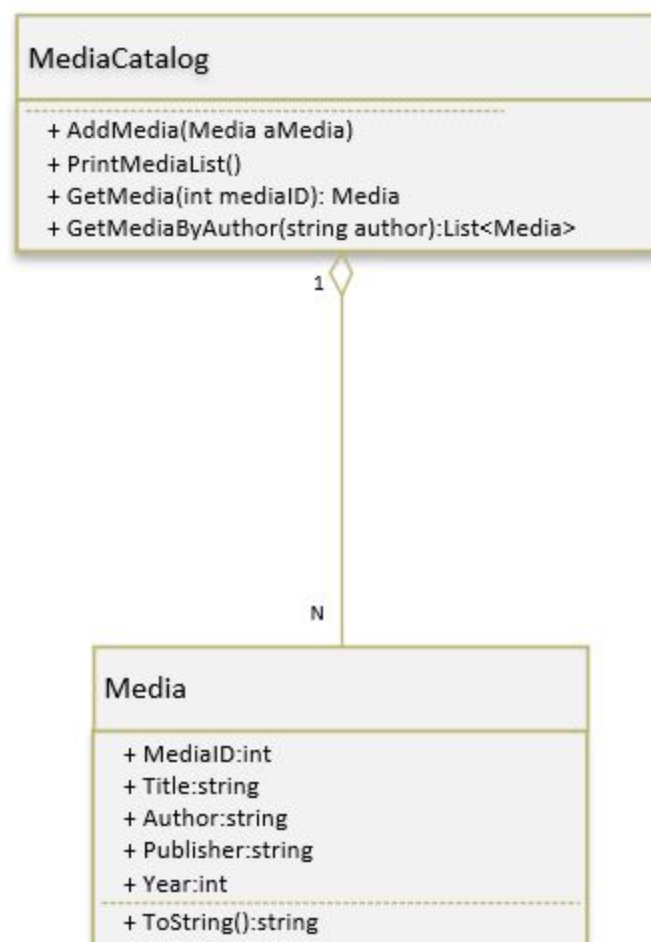


Fig.2 First draft of the design class diagram.

In the final system the classes Media and MediaCatalog must be implemented. The MediaID in the Media class is unique.

### Assignment 1. User stories (SWD)

Write at least 3 user stories with acceptance criteria for the MediaSystem.

### Assignment 2. Domain model (SWD)

Expand the first version of the domain model in fig.1. You must model the central parts of the MediaSystem. It should contain a maximum of 6 conceptual classes.

You should use a digital drawing tool like Visio or DrawIO.

### Assignment 3. Design class diagram (SWD)

Expand the first version of the design class diagram fig. 2. Draw a new design class diagram based on the domain model you have created in assignment 2.

You should use a digital drawing tool like Visio or DrawIO.

### Assignment 4. Implement the class Media (SWC)

Create a new console application (.net core). Create a class Media and implement the class following the description in the design class diagram in fig.2.

- It should be possible to get and set the values for the properties Author, Title, Year and Publisher.
- It should be possible to get the MediaID, but it should only be possible to set the MediaID through the constructor.
- Implement a constructor that can initialize all the instance fields/properties in the object.
- Implement a ToString method in the class. It should print out information about all the instance fields in the object.

Create 3 instances of class Media in the Main method of the class Program.

### Assignment 5. Implement the class MediaCatalog (SWC)

Create a class MediaCatalog and implement the methods according to the design class diagram and the description below. In the MediaCatalog the collection of Media objects should be stored in a data structure of type List or Dictionary.

- Create a constructor for the MediaCatalog
  - Use the constructor to initialize the collection.

There should be only one Media object with the same MediaID in the MediaCatalog.

- public void AddMedia(Media aMedia)
  - This method adds a single Media object to the collection.
  - In the Main method of the class Program:
    - Create an instance of the MediaCatalog and add the 3 objects you created in assignment 4.
- public void PrintMediaList()
  - This method should write all the media objects in the collection to the console window.
  - Each media object should be printed on a separate line
  - Every line should start with a line number starting with 1.
  - Test the method in the Main method of the class Program.
- public GetMedia(int mediaID)
  - This method returns a Media object which has a matching MediaID in the collection of objects.
  - If no such object exists the method returns null.
  - Test the method in the Main method of the class Program.

### Assignment 6. Exceptions (SWC)

All the media in Zealand's MediaSystem should be up to date. The administration has defined that there should be no media from before 2010 in the system.

- Change the implementation of the MediaCatalog, so that it throws an ArgumentException if you try to add a Media with a Year earlier than 2010.
- Write code to catch/handle the ArgumentException in the Main method of the class Program
- Try to add a new Media object from before 2010 and write out an error message in the console window.

### Assignment 7. Implement inheritance (SWC & SWD)

Book **is-a** special kind of Media. A Book has a property ISBN that uniquely identifies the Book object.

- Implement a class Book.
  - It should have a property, constructor and a ToString method.
  - It should be possible to initialize the properties through the constructors.
  - The ToString methods should return a string representing the state of the current object.
- Update the design class diagram with the Book class.
- Test your implementation in the Main method:
  - Create 2 instances of the type Book.
  - Add the objects to the MediaCatalog.
  - Print the media in the MediaCatalog using PrintMediaList() in the MediaCatalog.
- Explain in your own words the concept "Polymorphism".

### Assignment 8. Extend the MediaCatalog (SWC)

- public List<Media> GetMediaByAuthor(string author)
  - The methods search for all media created by a given author in the collection of media.
  - The method returns a List of all the media created by the author
  - If no media in the collection is found the method return null
  - Test the method in the Main method of the class Program
    - The returned list of media objects should be printed to the console window using a while loop