1st SIT COURSEWORK QUESTION PAPER: Year Long 2021/2022

Module Code:	**CS6004NT**
Module Title:	**Application Development**
Module Leader:	**Mr. Rabi Rouniyar / Mr. Dhruba Sen** (Islington College)

Coursework Type:	**Groupwork**
Coursework Weight:	This coursework accounts for **30%** of your total module grades.
Submission Date:	**Week 26**
When Coursework is given out:	**Week 18**
Submission Instructions:	Submit the following to Itahari International College RTE department before the due date: • The software application to be developed in C# • The documentation in MS Word compatible or PDF format
Warning:	London Metropolitan University and Itahari International College takes Plagiarism seriously. Offenders will be dealt with sternly.

Plagiarism Notice

You are reminded that there exist regulations concerning plagiarism.

Extracts from University Regulations on Cheating, Plagiarism and Collusion

Section 2.3: "The following broad types of offence can be identified and are provided as indicative examples …..

(i)   Cheating: including copying coursework.
(ii)   Falsifying data in experimental results.
(iii)   Personation, where a substitute takes an examination or test on behalf of the candidate. Both candidate and substitute may be guilty of an offence under these Regulations.
(iv)   Bribery or attempted bribery of a person thought to have some influence on the candidate's assessment.
(v)   Collusion to present joint work as the work solely of one individual.
(vi)   Plagiarism, where the work or ideas of another are presented as the candidate's own.
(vii)   Other conduct calculated to secure an advantage on assessment.
(viii) Assisting in any of the above.

Some notes on what this means for students:

(i)   Copying another student's work is an offence, whether from a copy on paper or from a computer file, and in whatever form the intellectual property being copied takes, including text, mathematical notation and computer programs.
(ii)   Taking extracts from published sources without attribution is an offence. To quote ideas, sometimes using extracts, is generally to be encouraged. Quoting ideas is achieved by stating an author's argument and attributing it, perhaps by quoting, immediately in the text, his or her name and year of publication, e.g. " e = mc2 (Einstein 1905)". A reference section at the end of your work should then list all such references in alphabetical order of authors' surnames. (There are variations on this referencing system which your tutors may prefer you to use.) If you wish to quote a paragraph or so from published work then indent the quotation on both left and right margins, using an italic font where practicable, and introduce the quotation with an attribution.

Further information in relation to the existing London Metropolitan University regulations concerning plagiarism can be obtained from http://www.londonmet.ac.uk/academic-regulations

Software Development Scenario

The application is to support the operations of Ropey DVDs, specifically administration of the renting and returning of DVDs. The application described is simplified and is an incorrect representation of normal practice and/or legal requirements. Please implement the system as described in the specification rather than as in the real world where there is conflict between them.

Ropey DVDs operates a chain of franchise DVD rental shops, i.e. all the shops operate under a single name and share purchasing and advertising but each shop is a separate business. Each shop is to be supplied with a freestanding single PC computer system to manage the stock, loan and return of DVDs to members. To borrow a DVD from a shop, a customer must become a member of that shop (membership is not transferable to other shops in the chain). The E-R diagram for the application, and the tables and attributes are given below.

The application needs the following tables:-

The primary key attribute(s) are underlined, foreign keys in **bold**.

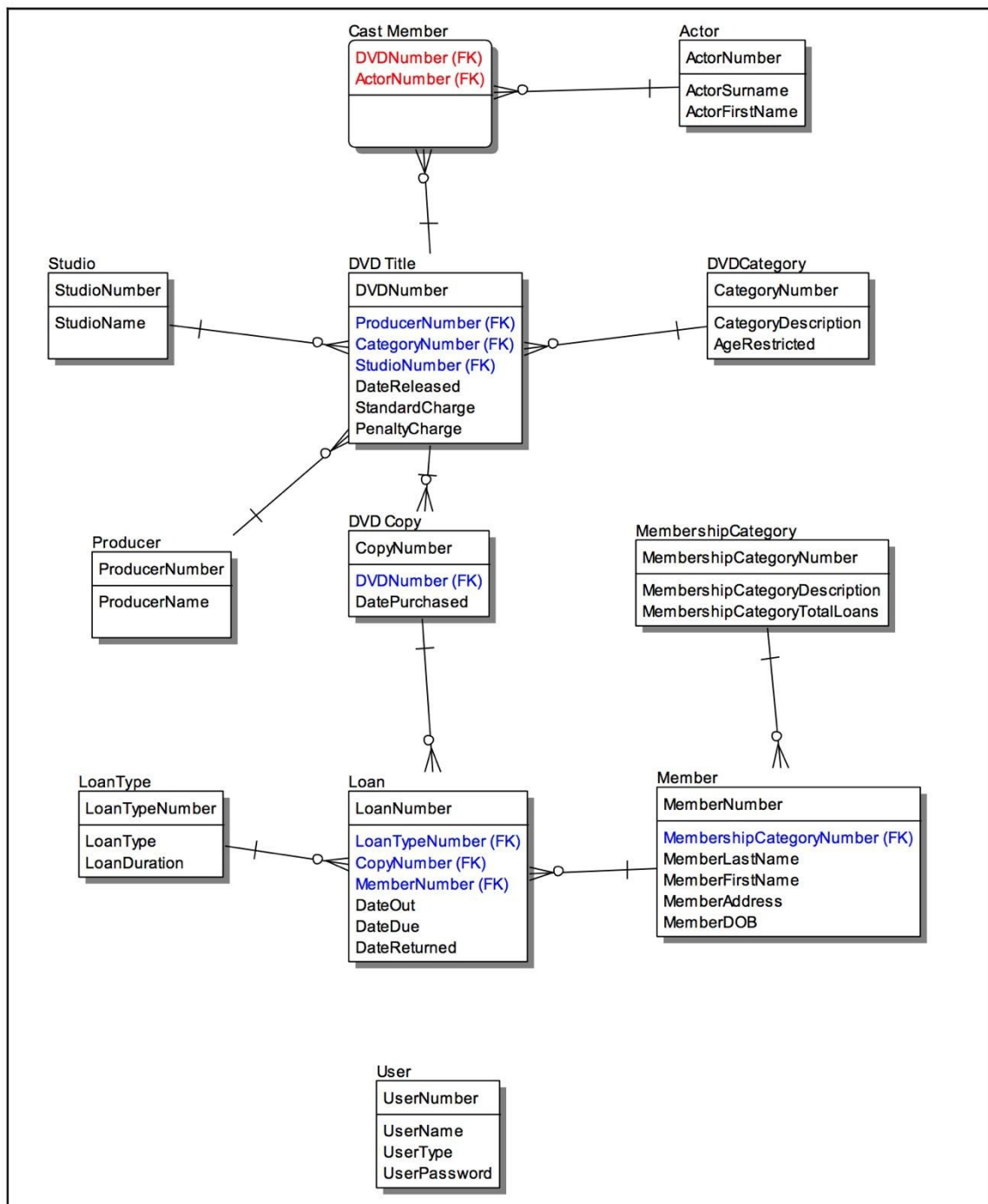| Database Table	Attributes
Actor	ActorNumber, ActorSurname, ActorFirstName
CastMember	**DVDNumber, ActorNumber**
DVDTitle	DVDNumber,**CategoryNumber, StudioNumber, ProducerNumber,** DVDTitle, DateReleased, StandardCharge, PenaltyCharge
DVDCopy	CopyNumber, **DVDNumber,** DatePurchased
Studio	StudioNumber, StudioName
Producer	ProducerNumber, ProducerName
DVDCategory	CategoryNumber, CategoryDescription, AgeRestricted
Loan	LoanNumber, **LoanTypeNumber, CopyNumber, MemberNumber,** DateOut, DateDue, DateReturned
LoanType	LoanTypeNumber, LoanType, LoanDuration
Member	MemberNumber, **MembershipCategoryNumber,** MemberLastName, MemberFirstName, MemberAddress, MemberDateOfBirth
MembershipCategory	MembershipCategoryNumber, MembershipCategoryDescription, MembershipCategoryTotalLoans
User	UserNumber, UserName, UserType, UserPassword

A record is kept of the (main) actors appearing in each DVD (Title) in the linking table (relationship relation) CastMember and of the Studio and Producer of each DVD (Title). It is assumed (for simplification) that each DVD comes from exactly 1 studio and each DVD has

exactly 1 producer.

Each DVD is categorised both in genre (eg Comedy, Musical, Thriller, Horror etc) and in its suitability for under 18's (AgeRestricted is True for DVDs which may not be rented to people under the age of 18 and false if anyone can rent them).

Each shop has a list of members (Member) who are the only people who are allowed to borrow DVDs. Each member falls in a category (MembershipCategory) which sets how many DVDs they can have on loan at any one time.

When a member borrows a DVD, a Loan record (Loan) is created saying who has borrowed which copy and on what basis (LoanType) which determines how long they can keep the DVD before returning it without penalty. (For the full procedure on loaning and returning DVDs see the functions to be implemented below).

Ropey DVDs Entity – Relationship Diagram

A Brief Description of the System and the Functionality you must implement

The description of the functionality below is not a complete specification it is just a list of the functions to be supported. It is up to individual group to design their application to exploit the functionality of Visual Studio and .NET technology to deliver an appropriate implementation of the functionality, supporting the users' task as effectively as possible.

The system is to support the following functions:-

1.   Allow the user to enter or select an actor's name (Lastname) and see the titles of all DVDs stocked by the shop (whether on loan or on the shelves) for which the Actor is a CastMember.

2.   Allow the user to enter or select an actor's name (Lastname) and see the titles and the number of copies on the shelves of all DVDs for which the Actor is a CastMember and which have at least one copy on the shelves.   (Hint – a DVD copy is on the shelf if it is not on loan. A DVD copy is on loan if there exists a Loan row for that copy where the DateReturned is Null)

3.   Allow the user to enter or select a member by MemberNumber or MemberLastName and view a list of all the DVDs (by title and copynumber) that they have been loaned in the last 31 days (i.e. where there is a Loan row with DateOut >= Current_date-31, whether the DVD has been returned or not).

4.   List the producer, studio and cast lists of all DVDs in the shop with the DVDs in increasing order of DateReleased, showing the title of each DVD and the names of all the cast members in alphabetic order of last name.

5.   Allow the user to enter or select a Copy by CopyNumber and find the details of the last loan for that copy (whether it is still on loan or has been returned), ie the Name of the Member who borrowed it, the date out, due and back (if any) and the title of the DVD.

6.   Allow the User to issue a DVD Copy on loan to a member.   This process records the member going to the counter with the physical DVD copy and should involve Checking that, if the member is under 18, that AgeRestricted on DVDCategory for the Copy's Title is False   That the member has not already got on loan the number of DVDs they are allowed (from the corresponding MembershipCategoryTotalLoans) Creating a row in Loan with   LoanNumber 1 more than the highest value currently on file (hint, this will be the loan number on the last row currently in the table) LoanTypeNumber corresponding to the LoanType requested by the Member (decode options on LoanType table) CopyNumber the copy number of the DVD being issued MemberNumber the member number of the member borrowing the DVD

   DateOut the date part of the current (system) date   DateDue date out plus the LoanDuration for the LoanType chosen DateReturned Null

   Displaying the charge the Member has to pay (the StandardCharge for the DVD title times the LoanDuration)

7.   Allow a user to record the return of a DVD copy This involves   Locate the row on loan

for this Copy which has DateReturned Null   Updating DateReturned to the date part of the current (system) date, indicating the DVD has been returned   Checking if the DateReturned is after the DateDue and, if it is, calculating what the Member has to pay which is the number of days DateReturned is greater than DateDue times the PenaltyCharge for the DVDTitle and displaying this

8.   Produce an alphabetic list of all members (including members with no current loans) with all their details (with membership category decoded) and the total number of DVDs they currently have on loan. This report should highlight with the message "Too many DVDs" any member who has more DVDs on loan than they are allowed from their MembershipCategory.

9.   Allow the user to enter a new DVD Title into the system. This should allow for situations where it is the first Title involving a particular Producer, Studio and/or Actor, i.e. requiring adding row(s) to Producer, Studio and/or Actor. A new title will always require adding rows to CastMember.   This task is particularly difficult to get perfect, so reasonable attempts can score full marks.

10.   Ropey DVDs has a policy of removing from stock all DVD copies which are more than 365 days old.   This function should   a. Produce a list of all DVD Copies which are more than a year old and which are not currently on loan   b. Delete all these copy rows (the assumption is that the staff use the list to remove the DVDs from the shelves)

11.   Produce a list of all DVD copies currently on loan (DateReturned Null on Loan), in date order of date out with the loans of a particular day ordered by the title. The list should show the Title of the DVD, the copy number and the name of the member who borrowed it and, for each date out, the total number of loans.

12.   Allow the user to produce a list of all Members who have not borrowed any DVD in the last 31 days (defined on DateOut of their most recent Loan). You may ignore any Member who has never borrowed a DVD.

This list should be in increasing order of the DateOut of their most recent loan, showing the member First and Last Names and Address and the DateOut and DVDTitle of the last Loan and the number of days since the last loan.

13.   Allow the user to display a list of all DVD titles in the shop where no copy of the title has been loaned in the last 31 days (ie all titles for which there exist no copies with loan rows for the copy where the DateOut is >= Current_date – 31).

14.   Allow Assistants to change **their own** passwords (on User) while Managers can change any detail on any row on User (including adding and deleting rows).

For full marks, this function must not require the user to log in again, i.e. the application must keep track of who is logged in from their initial login (see below) and not require them to identify themselves again.

User Access Control

Access to the system is to be controlled by password. Different users should have access to different set of the system's functions.

1. Any user can access to functions 1 and 2 bypassing the login. The other functions require to login either as Assistant or Manager as follows.

2. Assistants should have access to functions 1 to 13, and change ONLY their own password in function 14.

3. Managers should have access to all the functions 1 to 14 of the application

DELIVERABLES

Your submission should include the software project and a reflective essay as described below.

1. Your **software artefact** in the form of **a complete Visual Studio project**, which should include the program's source code, compiled classes, the executable file and database.

2. A **reflective essay** (1200 words), which concisely documents:

    a. detailed instructions to run the program

    b. concise description of your solution design for each of the implemented function of the application. Please do not include code listing here.

    c. the architecture of your software in terms of software classes and their purpose, clearly indicating which classes to be of your own work and which classes from other sources (e.g. from textbooks, online sources such as MSDN etc.)

    d. detailed description of the classes' properties and methods

    e. **individual** group member's reflection of own experience of using Visual Studio, C#, ASP.NET and MS SQL to develop a web application interfacing a backend database, e.g. which feature you like and why, what issues you experienced and your solution to overcome it.

Section	Topic	Full Marks

A	Implementation of Application	150
1.	View the titles of all DVDs stocked by the shop User by entering or selecting an actor's name (Last name) for which the Actor is a Cast Member.	10
2.	View the titles and the number of copies on the shelves of all DVDs by the user by entering or selecting an actor's name (Last name) for which the Actor is a Cast Member and which have at least one copy on the shelves	10
3.	View a member by MemberNumber or MemberLastName and view a list of all the DVDs (by title and copynumber) that they have been loaned in the last 31 days.	10
4.	List all producers, studio and cast lists of all DVDs in the shop with the DVDs in increasing order of Date Released, showing the title of each DVD and the names of all the cast members in alphabetic order of last name.	10
5.	Display customer/member detail by entering or selecting a Copy-by-Copy Number and find the details of the last loan for that copy (whether it is still on loan or has been returned), with the Name of the Member who borrowed it, the date out, due, and back (if any) and the title of the DVD.	10

6.	Allow the User to issue a DVD Copy on loan to a member.
	
	[should involve Checking that, if the member is under 18, that Age Restricted on DVD Category for the Copy's Title is False. That the member has not already got on loan the number of DVDs they are allowed (from the corresponding Membership Category Total Loans)]
	
	Date Out the date part of the current (system) date DateDue date out plus the Loan Duration for the Loan Type chosen
	  Date Returned Null
	
	Displaying the charge, the Member has to pay (the Standard Charge for
	  the DVD title times the Loan Duration)
		25

7.	Allow a user to record the return of a DVD copy	10
8.	Produce an alphabetic list of all members with all their details and the total number of DVDs they currently have on loan. [This report should highlight with the message "Too many DVDs" any member who has more DVDs on loan than they are allowed from their Membership Category.]	10
9.	**Allow the user to enter a new DVD Title into the system.** [This should allow for situations where it is the first Title involving a particular Producer, Studio and/or Actor. A new title will always require adding rows to Cast Member. This task is particularly difficult to get perfect, so reasonable attempts can score full marks.]	20
10.	Remove all data from stock all DVD copies which are more than 365 days old.	5
11.	Produce a list of all DVD copies currently on loan (Date Returned Null on Loan), in date order of date out with the loans of a particular day ordered by the title. [The list should show the Title of the DVD, the copy number and the name of the member who borrowed it and, for each date out, the total number of loans.]	10

12.	Produce a list of all Members who have not borrowed any DVD in the last 31 days
	
	[This list should be in increasing order of the DateOut of their most
	  recent loan, showing the member First and Last Names and Address and the
	  DateOut and DVDTitle of the last Loan and the number of days since the last
	  loan.]
		5

13.	Display a list of all DVD titles in the shop where no copy of the title has been loaned in the last 31 days.	5
14.	Allow Assistants to change their own passwords (on User) and Managers can change any detail on any row on User (including adding and deleting rows).	10
B	Documentation	25
1.	Detailed instruction to run the program	5
2.	Concise description of your logical solution to each of the implemented functions of the application.	5
3.	The software architecture, i.e., class and their purpose	5
4.	Detailed description of the classes' properties and method	5
5.	Individual member's own reflection of own experience	5
C	Programming Style	25

1.	Clarity of code, Proper Naming conventions & comments	5
2.	Sensible naming of programmer-defined variables, classes, properties, and methods	5
3.	Useful comments in code	5
4.	Data validation and exception handling	5
5.	Interface design and usability of the system	5
	Total Marks	**200**