CS204
Database Systems

Tuesday, April 03, 2018

Course Instructor

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Serial No:

Sessional II

Total Time: 1 Hour

Total Marks: 50

Signature of Invigilator

Abdul Wahab [redacted] | 160099 | F | Signature

Student Name | Roll No | Section

DO NOT OPEN THE QUESTION BOOK OR START UNTIL INSTRUCTED.

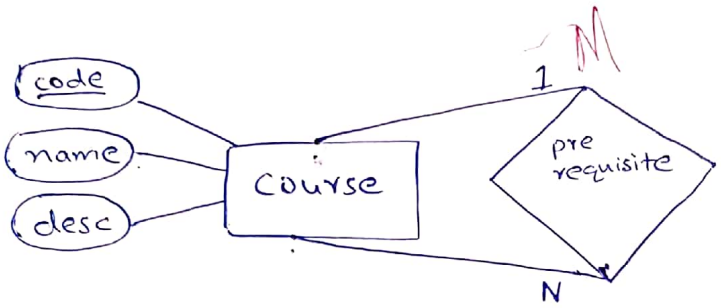
Instructions:

1. Attempt on question paper. Attempt all of them. Read the question carefully, understand the question, and then attempt it.
2. No additional sheet will be provided for rough work. Use **the back of the last page for rough work.**
3. *If you need more space write on the back side of the paper and clearly mark question and part number etc.*
4. *After asked to commence the exam, please verify that you have Eight different printed pages including this title page. There are total of 4 questions.*
5. *Calculator sharing is strictly prohibited.*
6. *Use permanent ink pens only. Any part done using soft pencil will not be marked and cannot be claimed for rechecking.*

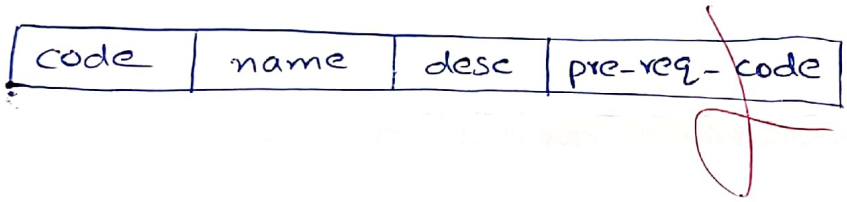
	Q-1	Q-2	Q-3	Q-4	Total
Marks Obtained	4	12.5	4	1.5	22
Total Marks	10	20	10	10	50

Question 1: Marks 5, 3, 2

In an academic environment, courses have some pre-requisite courses. Draw an ER Diagram of Course and their pre-requisite courses. Provide all possible valid attributes and cardinalities.



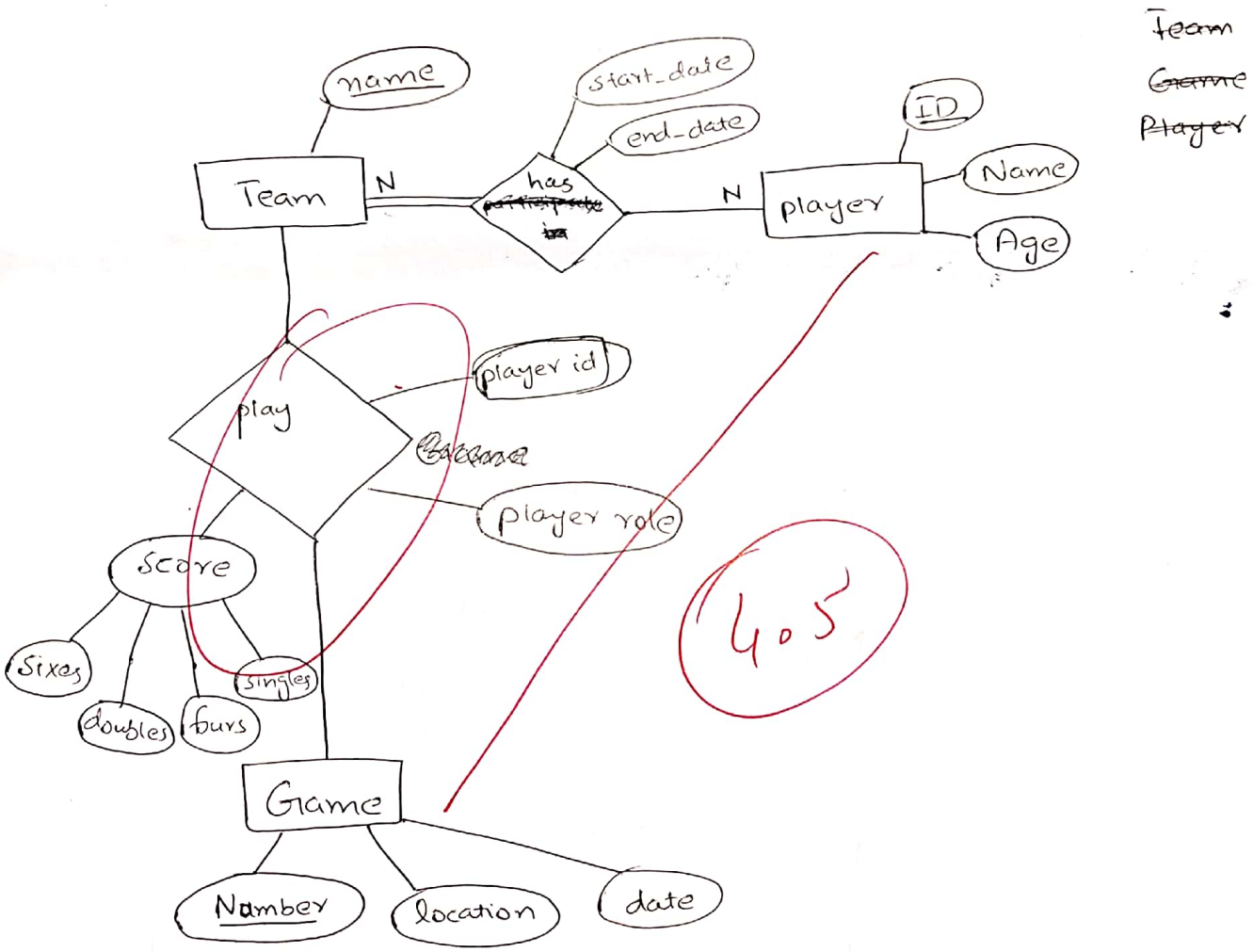
Produce Mapping of above ER Diagram with valid Data Sets.



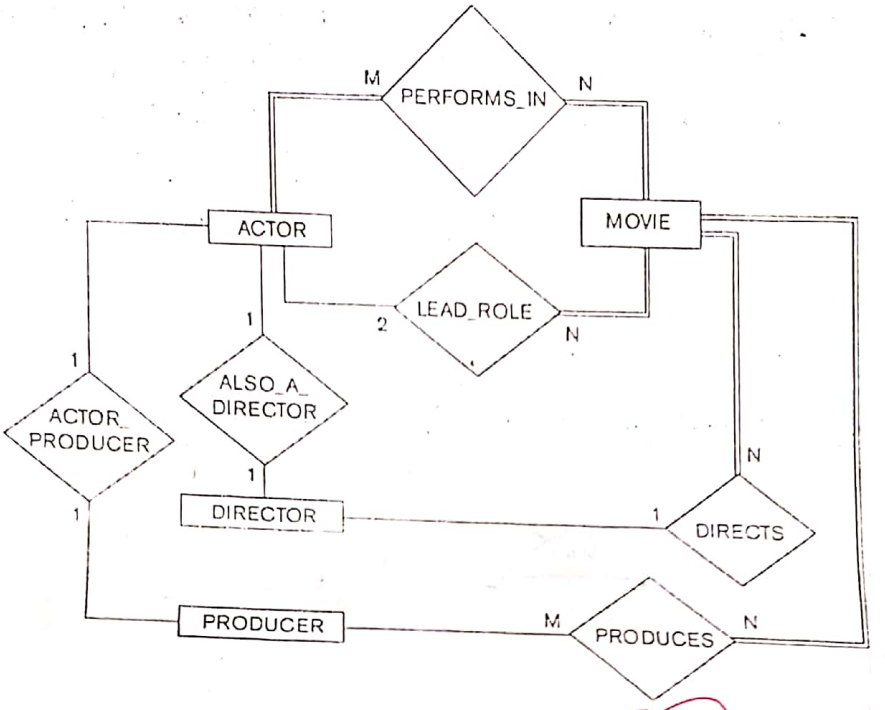
Question 2: **Marks 10 * 2**

a) A database is being constructed to keep track of the teams and games of a cricket league. A team has a number of players, not all of whom participate in each game. A team is uniquely identified by its name while player has ID(unique), name and Age. Start and end date of the player when they were the part of team is also saved. It is desired to keep track of the players participating in each game, the positions they played in that game, and their performance. Teams can play the game and each game has a unique Number, location where game is played and the date. A game is played between two teams and whenever a game is played, information regarding the final score and winner is saved. The final score will be recorded as total number of sixes, fours, singles and doubles that have been scored in that game.

Design an ER schema diagram for this application. Clearly identify the cardinalities as well as specify the role name for each relationship. **[Marks 10]**



b) Consider the ER schema for the MOVIES database below. Assume that MOVIES is a populated database. ACTOR is used as a generic term and includes actresses. Given the constraints shown in the ER schema, respond to the following statements with True, False, or Maybe. Provide proper reasoning against your answer. **[Marks 10]**



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Claim	True/False/Maybe	Justification
There are no actors in this database that have been in no movies.	True	full participation by Actor entity with movie entity through performs_in
There are some actors who have acted in more than ten movies.	Maybe	Because Movies and Actor are related by many to many so an actor may have been in 10 movies.
Every director has been an actor in some movie.	True	Because every actor has been in some movie because of full participation and director is derived from actor.
A movie can have no producer	False	Because there is full participation by movie in "Produces" relationship so every movie has a producer.
A movie can have only a maximum of two lead actors.	True	Because maximum cardinality in Lead_role relationship has 2 written by movie entity.

Question 3: Marks 4 * 2.5

Consider the following scenario representing the requirements of a library management system.

1. Library has a multiple branches and each branch has a unique name and address.
2. A borrower who borrows the book has name, address and phone number.
3. Library branch has multiple books and each book has a unique name, publisher and a number of authors. Each publisher has a name, address and phone number.
4. A library branch maintains different copies of each book and whenever a book is purchased by a branch then it record the number of copies that it has for a certain book.
5. Whenever a book is borrowed, we want to record the information of borrower, the library branch from which the book is borrowed, the borrowed book, the issued date and the due date for returning the book.

We came up with the following relations (or a very similar set of relations) to model this scenario:

- Library_Branch (BranchId, BranchName, Address)
- Borrower (CardNo, Name, Address, Phone)
- Book (Bookid, Title, PUBLISHERNAME)
- Author(AuthorID, AuthorName, Address, City, Email)
- Book_Authors (BOOKID, AuthorID)
- Publisher (Name, Address, Phone)
- Book_Copies (BOOKID, BRANCHID, No_Of_Copies)
- Book_Loans(BOOKID, BRANCHID, CARDNO, DateOut, DueDate)

Note: The underlined attributes represents the primary key of the table while the attributes written in upper case are foreign keys. The attributes that are underlined as well as written in upper case format are primary key of the relation as well as the foreign key.

Write down solutions to the following questions in SQL:

1. **How many copies of the book titled "*The Lost Tribe*" are owned by each library branch?**

```
SELECT ~~Select~~ Branch_id, No_of_Copies FROM Book_Copies
WHERE BOOKID IN (SELECT Bookid FROM Book
                 WHERE Title = "The Lost Tribe");
```

2. For each book authored by *'Stephen King'*, retrieve the title and the number of copies owned by the library branch whose name is *'Central'*.

3. Retrieve the names of all borrowers who have borrowed a book whose publisher are from Pakistan.

```
Select Name FROM Borrower
WHERE CardNo = ( Select CardNo FROM Book_loans
    WHERE Bookid = ( Select Bookid
    FROM Book WHERE Publishername =
    ( select pname from publisher where
    address = 'Pakistan' ) ) ) ;
```

4. For each book that is loaned out from the *'Sharpstown'* branch and whose DueDate is *'29-Mar-2018'*, retrieve the book title, the borrower's name, and the borrower's address.

Question 4: Marks 4 * 2.5

(a) Give real life examples to draw Complex, simple attributes and multi-values attributes

Simple Attributes

eg:- Gender

Can be male or female only.

Multivalues Attributes

eg:- phone num or mob no.

One person may have many numbers.

Complex Attributes

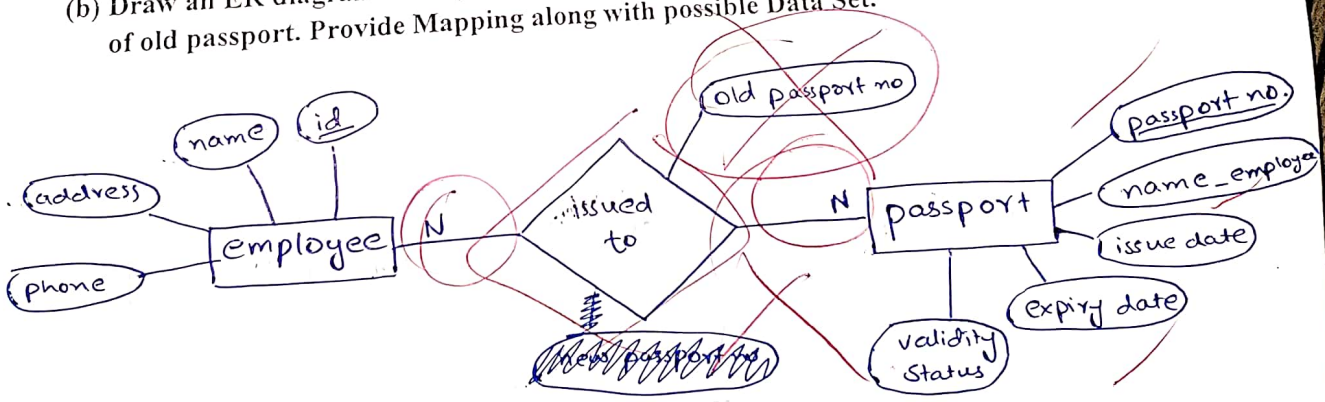
eg:- Address

Because it can have many parts like

street name, house no., ~~road~~, country, city, zip code etc.

0.5

(b) Draw an ER diagram of Employee and Passport when new Passport is issued after expiry of old passport. Provide Mapping along with possible Data Set.

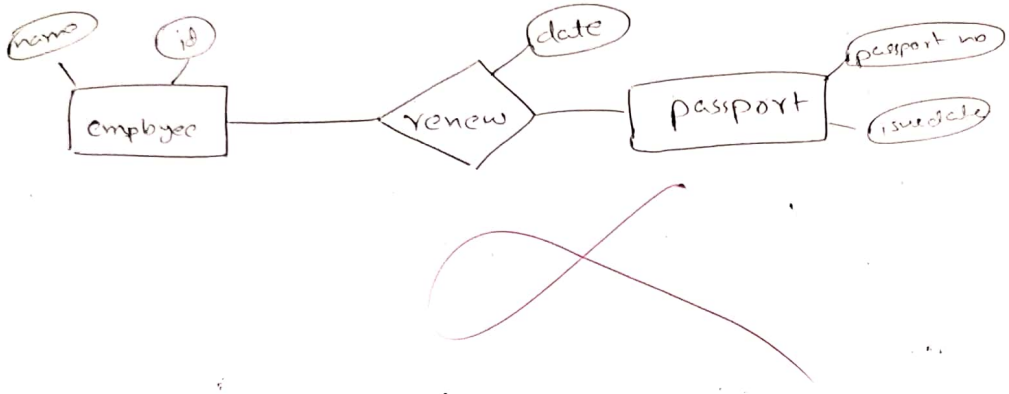


issued_to

emp_id	passport no.	old passport no.

0.5

(c) Draw an ER diagram of Employee and Passport when same Passport is renewed after expiry of passport. Provide Mapping along with possible Data Set.



(d) Draw ER Diagram for Employees who belong to department and also work as part time in projects.