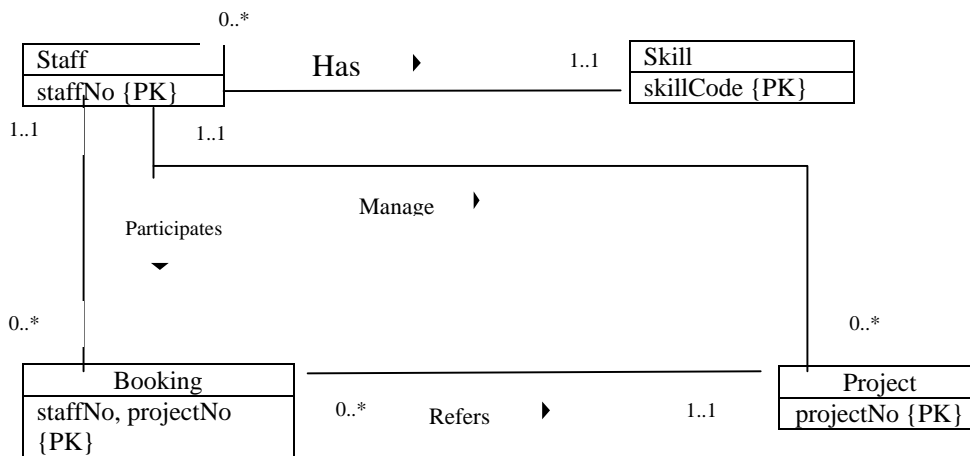


1a)



b) Give SQL statement for the following:

(i) List all skills with a charge out rate greater than 60 per hour, in alphabetical order of description.

```

SELECT * FROM Skill
WHERE chargeOutRate > 60
ORDER BY description;
    
```

(ii) How many staff have the skill 'Programmer'?

```

SELECT COUNT(*) FROM Staff s, Skill k
WHERE s.skillCode = k.skillCode AND description = 'Programmer';
    
```

(iii) List all projects that have at least two staff booking to it.

```

SELECT projectNo, COUNT(*) FROM Booking
GROUP BY projectNo HAVING COUNT(*) >= 2;
    
```

(vi) List all staff with a charge out rate greater than the average charge out rate.

```

SELECT s.* FROM Staff s, Skill k
WHERE s.skillCode = k.skillCode AND
chargeOutRate > (SELECT AVG(chargeOutRate) FROM Skill);
    
```

(v) Create a view of staff details giving the staff number, staff name, skill description, and department, but excluding the skill number and charge out rate.

```

CREATE VIEW SD (staffNo, name, dept, description)
AS SELECT staffNo, name, dept, description
FROM Staff s, Skill k
WHERE s.skillCode = k.skillCode;
    
```

c) Use an English statement to describe the meaning of each of the following SQL queries.

(i) `SELECT * FROM Staff s, Skill k WHERE s.skillCode = k.skillCode AND description = 'Programmer' AND dept = 'Special Projects';`

List all staff with the skill description 'Programmer' who work in the 'Special Projects' department

(ii) `SELECT name, p.projectNo, dateWorkedOn, timeWorkedOn FROM Staff s, Project p, Booking b WHERE s.staffNo = b.staffNo AND`

b.projectNo = p.projectNo AND  
 endDate >= DATE '1995-06-01';

For all projects that were active in July 1995, list the staff name, project number and the date and number of hours worked on the project, ordered by staff name, within staff name by the project number and within project number by date.

d)i)  $\sigma_{description='Programmer' \wedge dept='Special Projects'}(Staff \bowtie Skill)$

ii)  $\prod_{name, p.projectNo, dateworkon, timeworkon} (\sigma_{endDate >= DATE '1995-06-01'}(project \bowtie Booking \bowtie Staff))$

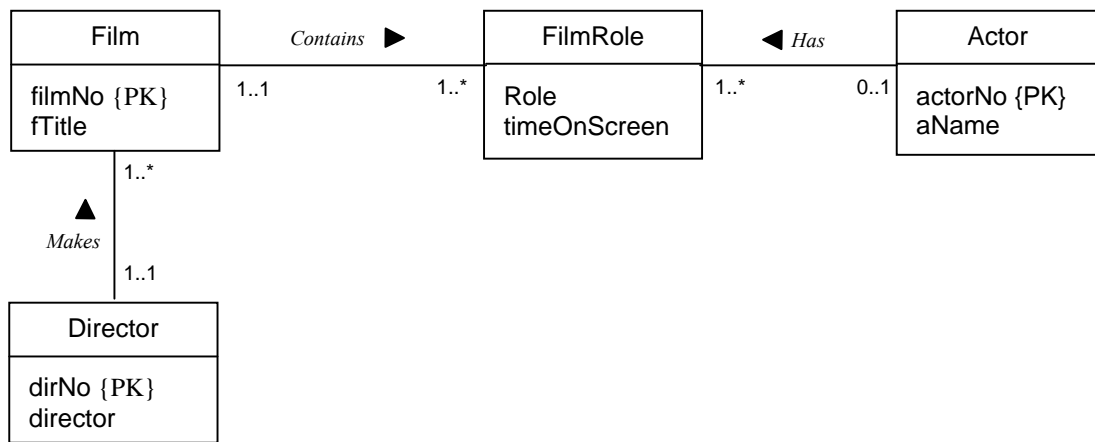
3a) The table contains a repeating group; the details of actors/actresses are repeated for each film. As a consequence, there are multiple values at the intersection of certain rows and columns.

3b) Using the data in the table, the student should provide examples of how insertion, deletion, and update anomalies could occur.

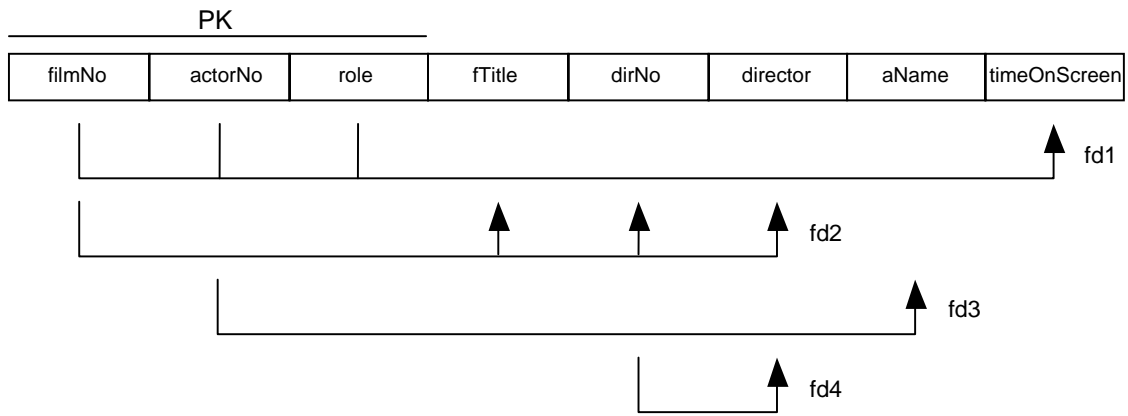
3c) The functional dependencies (fd1 to fd4) are shown in figure below. The student should state any assumptions made about the data show in the table. For example, we may assume that a film has only one director.

3d) The process of normalization is shown in figure below

3e)

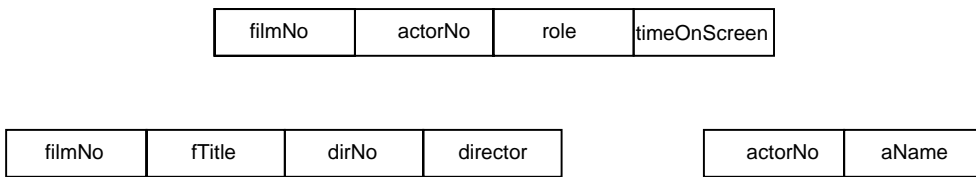


3d)  
1NF



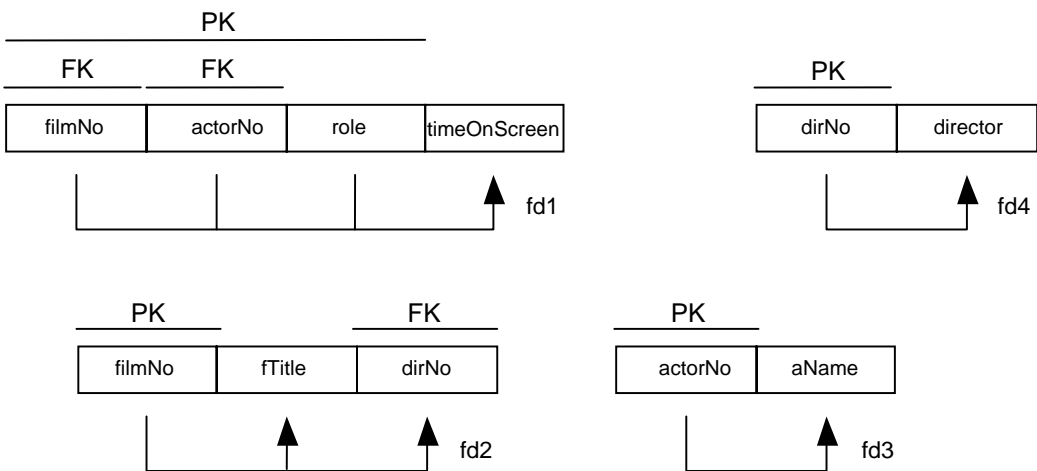
↓  
fd2 and fd3 violates 2NF

2NF



↓  
fd4 violates 3NF

3NF / BCNF



2)

