

Assignment 1

Introduction to Database Design, F2016, IT University of Copenhagen.

Question 1

- 1) Make the straight line from **Manager** towards **manages** a bold line.
Reason: A **Manager** can manage 1 to an infinite amount of projects.
- 2) Change the arrow from **Employee** towards **Department** to a bold arrow.
Reason: An employee has 1 and only 1 **Department**.
- 3) Change the arrow from **Department** towards **Employee** to a straight line.
Reason: A **Department** can have zero or more **Employee**s.
- 4) Change the bold line from **Researcher** towards **Project** to a straight line.
Reason: A project can have zero or more **Researcher**s.
- 5) Make **employeeID** on **Employee** the primary key (underline it).

Question 2

I'd say that no elements are missing from the ER-diagram.

Question 3

- 1) Straight line from **Department** towards **Employee**.
- 2) Bold arrow from **Employee** towards **Department**.
- 3) Bold line from **Manager** towards **manages**.

- 4) Bold arrow from manages to Project .
- 5) Straight line from Researcher to Works on .
- 6) Straight line from Works on to Project .

Question 4

```
CREATE TABLE Exhibition (  
    exhibitionID int NOT NULL AUTO_INCREMENT,  
    Room_Number int NOT NULL,  
    Exhibition_Date: Date(),  
    PRIMARY KEY (exhibitionID)  
);
```

```
CREATE TABLE Painting (  
    paintingID int NOT NULL AUTO_INCREMENT,  
    ArtistNumber int NOT NULL,  
    Price double NOT NULL,  
    medium varchar(255) NOT NULL,  
    title varchar(255),  
    PRIMARY KEY (paintingID),  
    FOREIGN KEY (ArtistNumber) REFERENCES  
    Artist(ArtistNumber)  
    ON DELETE CASCADE,  
    ON UPDATE CASCADE  
);
```

```
CREATE TABLE Artist (  
    ArtistNumber int NOT NULL,  
    name varchar(255),  
    SSN int  
    PRIMARY KEY (ArtistNumber)  
);
```

```
CREATE TABLE showcases (  
    exhibitionID int NOT NULL,
```

```
    paintingID int NOT NULL,  
    FOREIGN KEY (exhibitionID) REFERENCES  
    Exhibition(exhibitionID),  
    FOREIGN KEY (paintingID) REFERENCES  
    Painting(paintingID),  
    ON DELETE CASCADE,  
    ON UPDATE CASCADE  
);
```

I decided to cascade deletion of Paintings when Artists gets deleted.

I decided to cascade deletion of Showcases when either an exhibition or a painting gets deleted.

Question 5 (Problem 2)

1) The thick line between **Exhibition** to **showcases** requires **CHECK** statements. As it is right now, there's no guarantee that at least one **showcase** exists for each time an **Exhibition** is created.

Question 5 (Problem 3)

1)

- a: YES
- b: NO
- c: YES
- d: YES
- e: YES

2)

- B -> A
- BC -> A

Question 6

1)

- $P \rightarrow Q$
- $P \rightarrow S$
- $P \rightarrow T$
- $S \rightarrow V$
- $Q \rightarrow R$
- $P \rightarrow U$

2)

- a: YES
- b: YES
- c: NO
- d: NO

3)

$$\{Q\}^+ = \{Q, R\}$$

4)

$$\{PS\}^+ = \{P, Q, R, S, T, U, V\}$$

Question 7

- $A \rightarrow B$
- $AD \rightarrow C$
- $AE \rightarrow F$
- $AE \rightarrow G$
- $CF \rightarrow G$
- $CF \rightarrow H$

- CF \rightarrow D

Question 8

1. NO
2. YES
3. NO
4. NO

Question 9

$$\{B\}^+ = \{B\}$$

Question 10

$$\{A, D\}^+ = \{A, B, C, D, F, G, H\}$$