ISYS114 2018 – ASSIGNMENT ONE

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Workshop Number: Class 25
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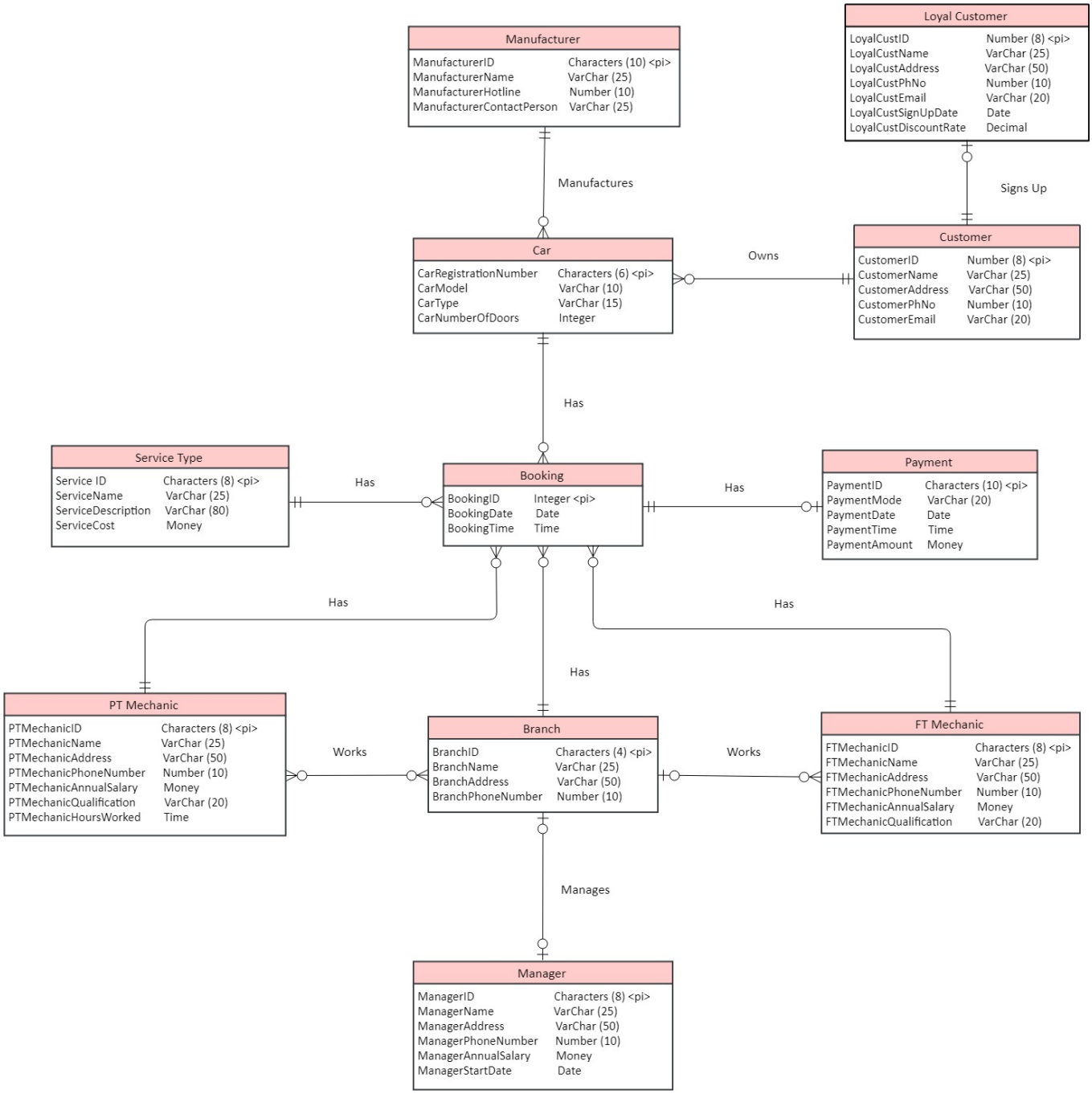
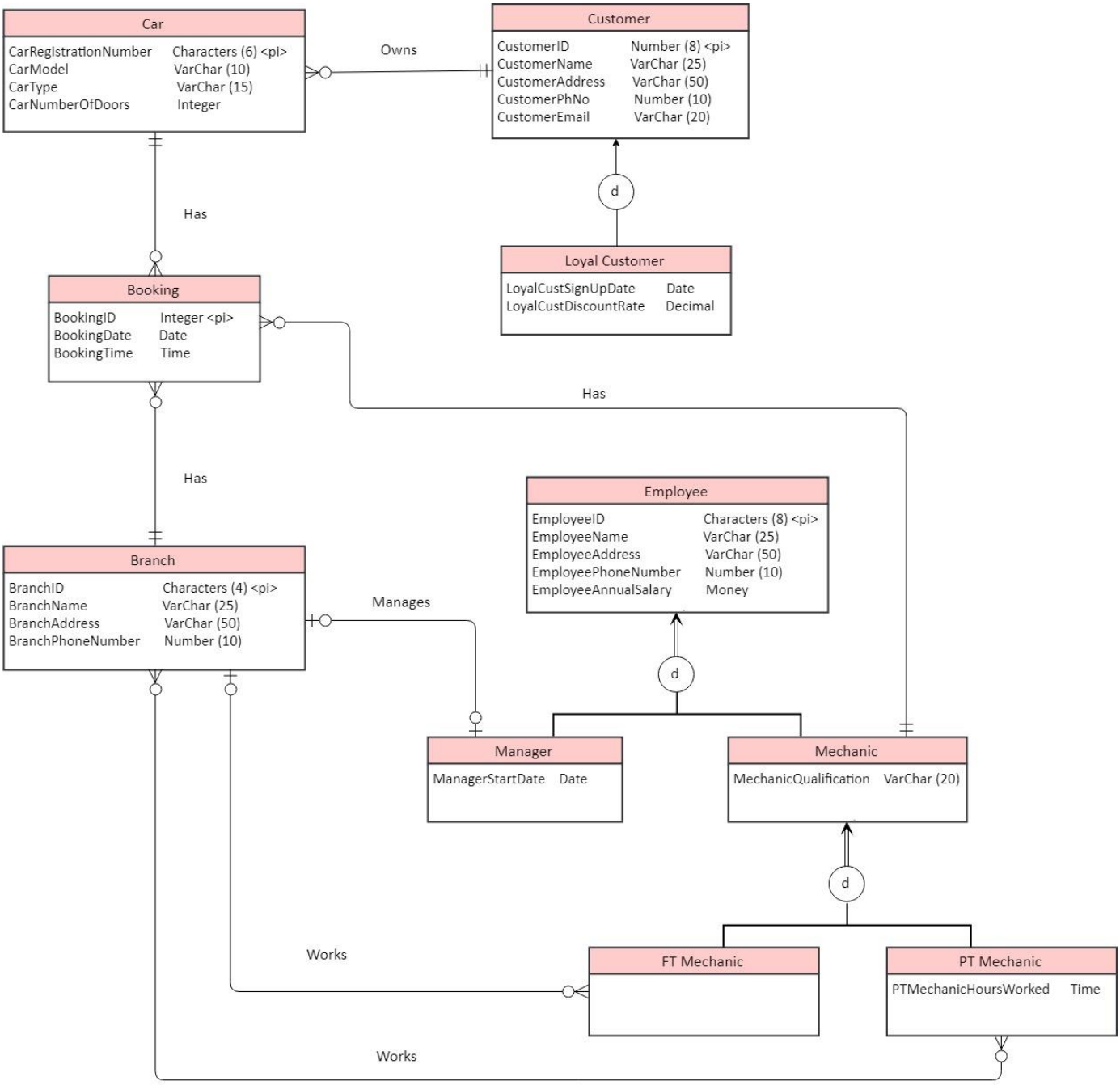
Workshop Day and Time: Monday, 11:00am to 1:00pm

Task 1: ER Diagram

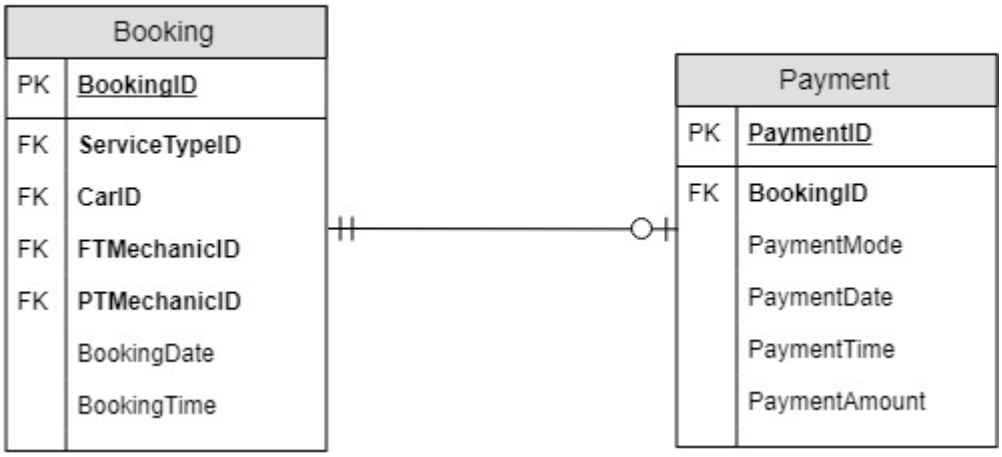


Task 2: EER Diagram

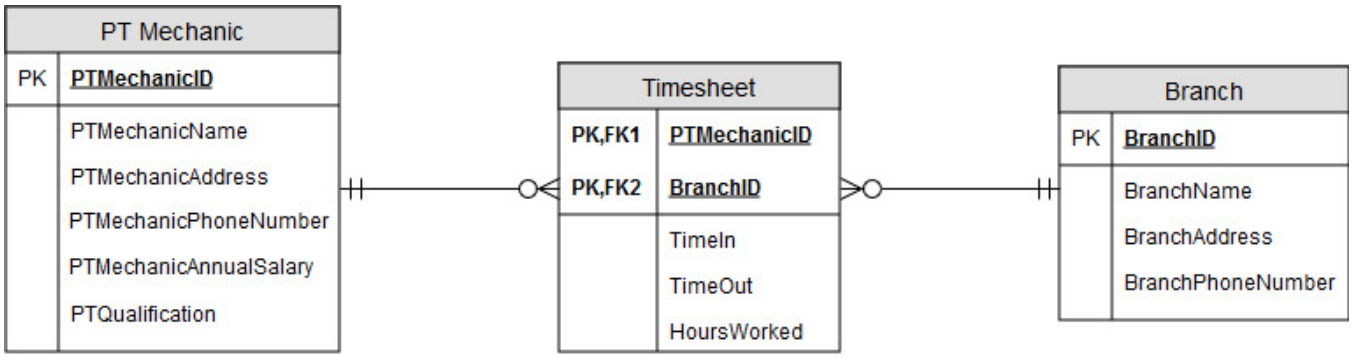


Task 3: Relational Model

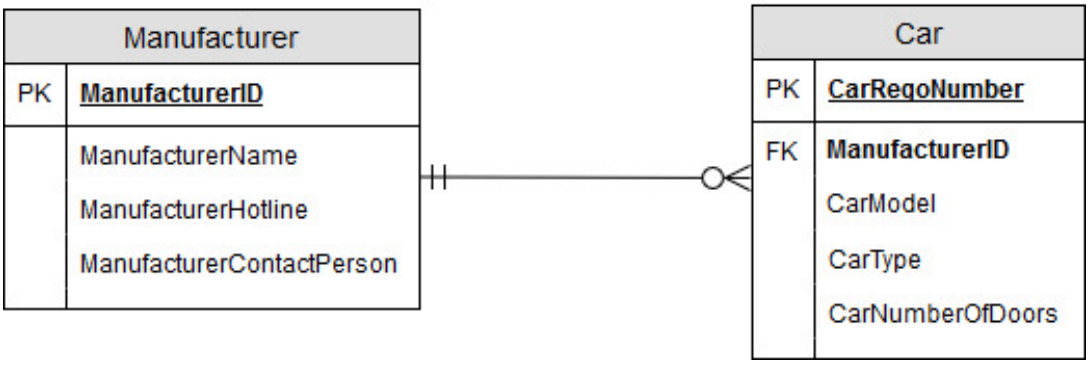
1) Question 1: Booking and payment



2) Question 2: Part-time mechanics and branch



3) Question 3: Manufacturer and car



Task 4: Normalisation

1) The given table is in this normal form: **1NF**

2) Decomposition into normal form:

Composite PK: CarRego, ServiceDate

PD1: CarRego -> ManufacturerID, ManufacturerName, CarModel

PD2: ServiceDate -> None

FD: ServiceDate, **CarRego** -> ServicedBranchID, ServicedBranchName, ServiceID, TypeOfService

2NF

PD1:	CarRego (PK)	ManufacturerID	ManufacturerName	CarModel		**CAR**	
FD:	ServiceDate (PK)	CarRego (PK,FK)	ServicedBranchID	ServicedBranchName	ServiceID	TypeOfService	**CAR_SERVICE**

TD1: ManufacturerID -> ManufacturerName

TD2: ServicedBranchID -> ServicedBranchName

TD3: ServiceID -> TypeOfService

New PD1: CarRego -> **ManufacturerID**, CarModel

New FD: ServiceDate, **CarRego** -> **ServicedBranchID**, **ServiceID**

3NF

TD1:	ManufacturerID (PK)	ManufacturerName			**MANUFACTURER**	
TD2:	ServicedBranchID	ServicedBranchName			**BRANCH**	
TD3:	ServiceID (PK)	TypeOfService			**SERVICE_TYPE**	
NEW PD1:	CarRego (PK)	ManufacturerID (FK)	CarModel		**CAR**	
NEW FD:	ServiceDate (PK)	CarRego (PK,FK)	ServicedBranchID (FK)	ServiceID (FK)		**CAR_SERVICE**

3) Relational model

MANUFACTURER

ManufacturerID (PK)	ManufacturerName

BRANCH

ServicedBranchID (PK)	ServicedBranchName

SERVICE_TYPE

ServiceID (PK)	TypeOfService

CAR

CarRego (PK)	ManufacturerID (FK)	CarModel

CAR_SERVICE

ServiceDate (PK)	CarRego (PK,FK)	ServicedBranchID (FK)	ServiceID (FK)

Assumptions, if any:

Task 1:

- Customer to Car is optional: Customer can be added in the system without registering a Car.
- Manufacturer to Car is optional: Manufacturer can be a start-up without manufacturing any cars yet.
- Branch to FT Mechanic, PT Mechanic and Manager is optional: A Branch has just opened and may not have any employees.
- FT mechanic, PT mechanic and Manager to Branch are optional: Employees have just been hired and may not work at any branch.
- Booking is an associative entity.

Task 2:

- FT and PT Mechanic to supertype relationship will be total since FT Mechanic can exist (even without attributes with just relationship).

Task 3:

- Timesheet in question 2 is an associative entity.

Task 4:

- The texts in red are foreign keys. The underlined texts are primary keys.