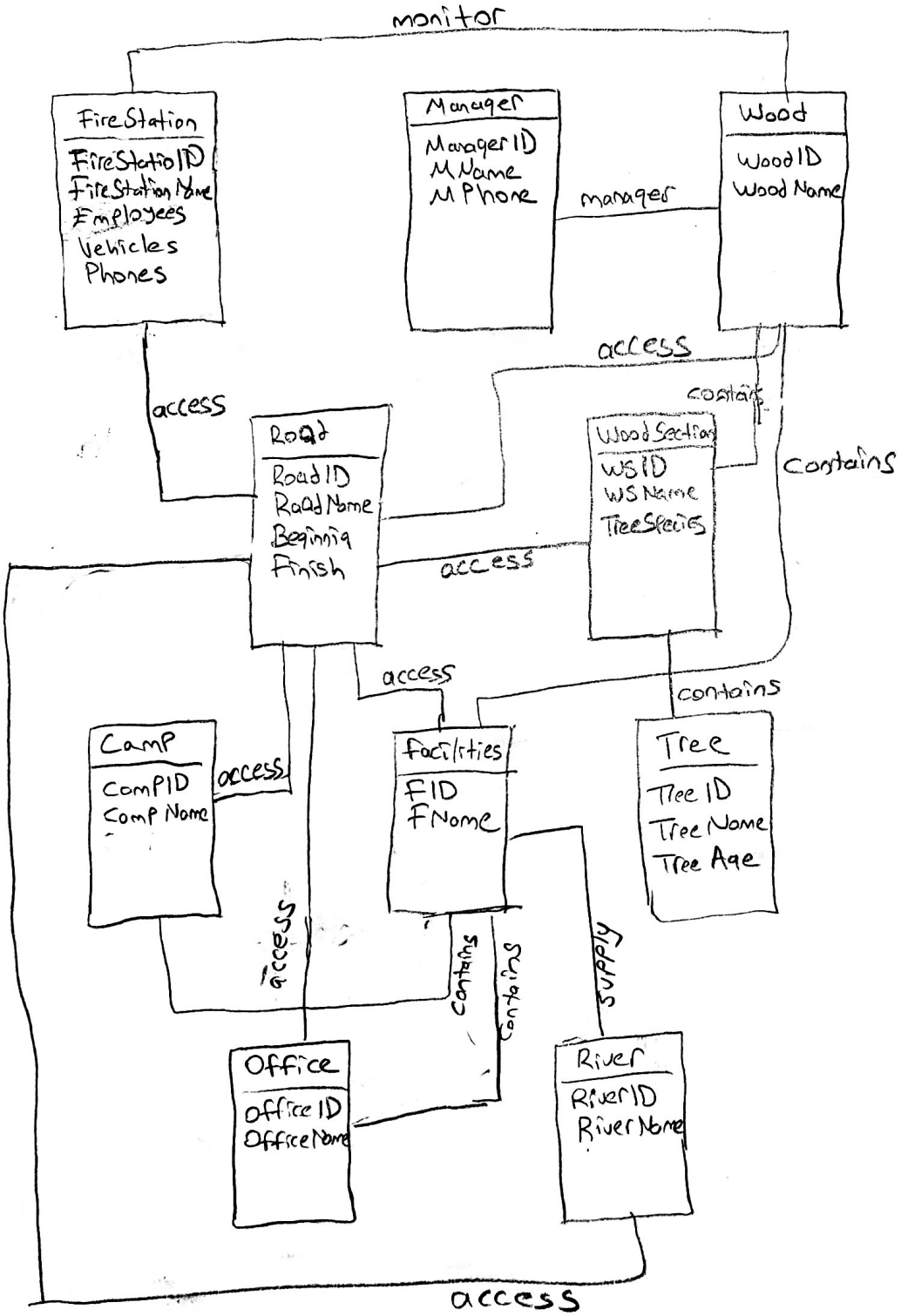
Furkan ÖZEV
161044036

CSE 414 DATABASE HW1

1- Draw E-R diagram of the park.



2- Give all functional dependencies in the question.

ManagerID → WoodID
WoodID → ManagerID
RoadID → WoodID
WSID → WoodID
CampID → CampName
CompID → FID
FID → RiverID
FID → RoadID
TreeID → WSID
OfficeID → officeName
OfficeID → FID
RiverID → RiverName
RiverID → FID
FireStationID → WoodID
FireStationID → RoadID

3-a) Give 2 relations that holds the criterias of Boyce-Codd Normal Form; if there is any. Explain why there are in Boyce-Codd Normal form, give your reasons and proofs in details

If $X \rightarrow Y$ and X is a superkey for each of its dependencies, a relational R scheme is considered to be in BCND. So these tables have 3Nf and also need to have a super key.

Tables	Keys
FireStation	FirestationID
Manager	ManagerID
Wood	WoodID
Road	RoadID
WoodSection	WSID
Camp	CampID
facilities	FID
Tree	TreeID
Office	OfficeID
River	RiverID

Example 1: firestation → Wood

FSID → woodID has 3NF.
Now the firestationID is a primary key and also it is superkey for table fireStation. So this relation is also exomple of BCNf.

Example 2: Wood → Manager

This relationship has 3NF. Rule is Super key.
ManagerID is primary key and also superkey for managertable
So it is single value and we checked 3NF and second key rule.
This relationship complies with BCNF criteria

3-b) Give 2 relations that does not hold the criterias of BCNf if there is any.

Each table has a super key, so there isn't any relations that doesn't hold BCNf

4-a) Give 2 relations that holds the criterias of 3NF. Explain why they are in 3NF, give your reasons and proofs in details.

Example 1: FireStation ID → WoodID

We don't have multiple values for 1NF. ID's are single value. After 1NF, we have to check the partial dependency for 2NF. Our non-prime qualities are phones, employees and vehicles. They are connected to our fire station. The last section from firestation ID is 3NF, we cannot access wood qualities from this section.
Therefore, this relationship also meets the 3NF criteria.

Example 2: WoodID → ManagerID
↓
Super key

They are already in 2NF
They are already in BCNF
There are no transitive dependencies
for every dependency A→B, A is super key

4-b)

Give 2 relations that doesn't hold the criterias of 3NF. Explain why they are not in 3NF, give your reasons and proofs in details.

There isn't any relations that doesn't hold 3NF

There are not relationships that do not meet the 3NF criteria. Since each table has only one value, there are no multivalued (1BF) values. Since the attributes are dependent on a primary key (2NF), they are not in partial dependency. Also, we can't access all other features from a table. There are not transitive (3NF)