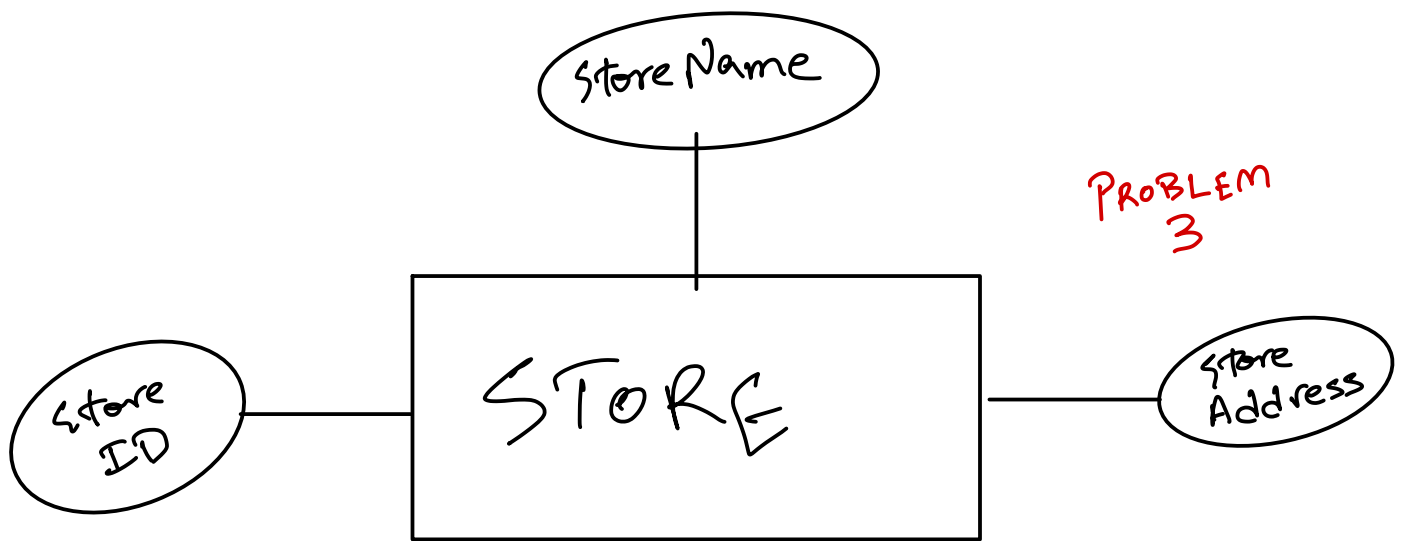
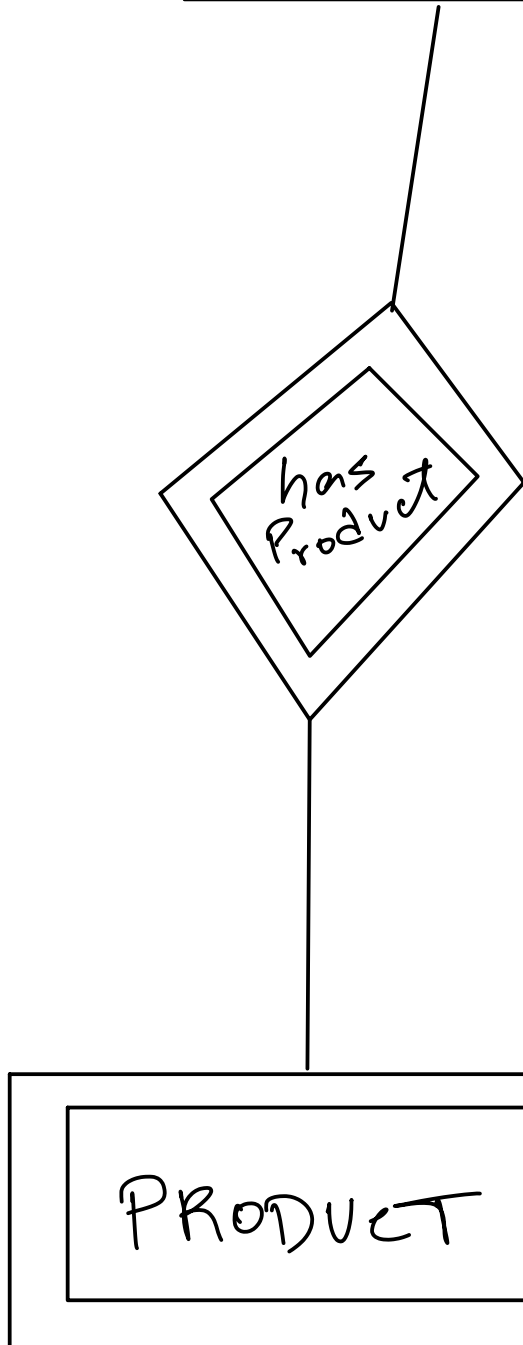


PROBLEM 1



PROBLEM
3



(Product is a weak entity
as one or more of its Key
Attributes are determined
by another entity.)
(Store ID \rightarrow Product ID)
MVD
(Store ID, Product ID \rightarrow Price, Description)

Homework 2 : jay Choudhary - 1506324

Problem 2:

Identify any functional dependencies in the description of Problem 1. Consider any FDs that model (a) primary key constraints and FDs that model (b) many-to-one or one-to-one relationships. Use $-->$ to denote them.

* denotes PrimaryKey

Entity Player:

PlayerID* $-->$ PlayerName, Salary, JerseyNo, Position

Entity Team:

TeamID* $-->$ TeamName, Mascot

Entity Coach:

CoachName* $-->$ Role

Entity Picture:

PictureID* $-->$ PictureCaption

Entity Referee:

RefereeID* $-->$ RefereeName

Entity Field:

FieldName* $-->$ FieldAddress

Relationship PlaysFor :

PlayerID * $-->$ TeamID

Relationship ManagedBy:

CoachName* $-->$ TeamID

Relationship Game :

GameScore, GameDate $-->$ FieldName, PictureID

MVDs:

GameScore,GameDate- >> TeamID

GameScore,GameDate- >> RefereeID

Problem 4 :

a) The Key is A ,B

b) Minimal Basis : $B \rightarrow C$, $B \rightarrow E$, $E \rightarrow D$ and $A,C \rightarrow E$

c) 3 NF Syntheses Algorithm

i) Construct minimal basis -> we have that from b)

ii) Construct a relation from each of these FDs and drop relations that
Are a proper subset of the other :

Resulting Relations :

$R_1 (B , C)$, $R_2 (B , E)$, $R_3 (E , D)$, $R_4 (A,C,E)$

Iii) If none of the relation schemas is a superkey ,then add another
relation which contains the superkey :

Therefore , $R_5(A , B)$

Hence the resulting relations in 3 NF are :

$R_1 (B , C)$, $R_2 (B , E)$, $R_3 (E , D)$, $R_4 (A,C,E)$, $R_5(A,B)$

Problem 5 :

$S = \{ R \}$

R is not in BCNF with respect to $A, C \rightarrow E$. Therefore, we split it into:

$R_1(A, C, D, E)$

$R_2(A, B, C)$

$S = \{ R_1, R_2 \}$

Split 1 :

The projection of FDs or the FDs for R_1 now according to the algorithm
3.12 in DSCB are $A,C \rightarrow E$ and $E \rightarrow D$.

$A,C \rightarrow E$ is in BCNF as it does contain the superkey for R_1 which is A,C

But $E \rightarrow D$ violates it , hence we split it into :

$R_3 (E^*, D)$, FDs : $E \rightarrow D$ - In BCNF wrt R_3

$R_4 (A^*, C^*, E)$: FD - $A, C \rightarrow E$, In BCNF wrt R_4

We also need to split $R_2 (A^*, B^*, C)$ with FD $B \rightarrow C$ which does not contain the superkey A, B for R_2

Hence :

$R_5 (B^*, C)$: FD : $B \rightarrow C$ is in BCNF wrt R_5

$R_6 (A^*, B^*)$: No FD or trivial $A, B \rightarrow A, B$, in BCNF

All our relations are now in BCNF .

Hence the final set of Relations is

$S = \{ (A^*, C^*, E) , (E^*, D) , (B^*, C) , (A^*, B^*) \}$