HW1 – ER Diagrams
COMP 353
Brian Nguyen

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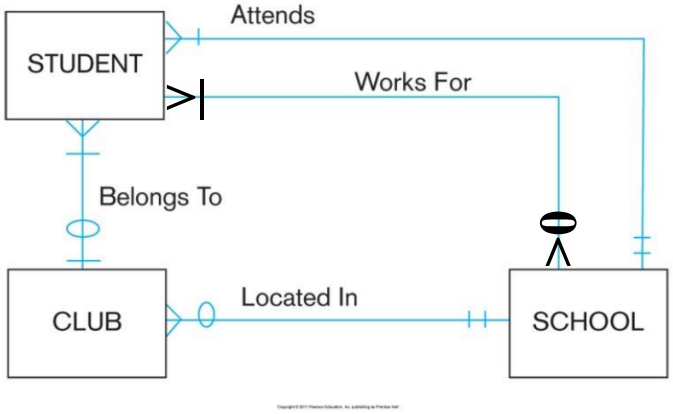
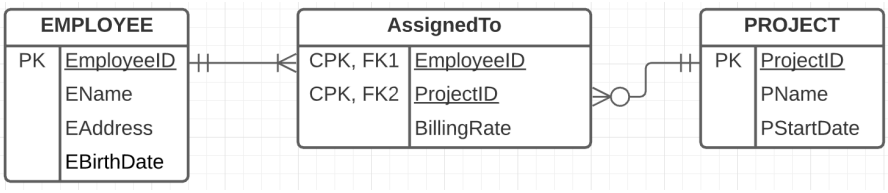
1) **a)** PRODUCT LINE; Includes; PRODUCT
b) CUSTOMER; Submits; ORDER
c) ORDER; ORDER LINE; PRODUCT
d) CUSTOMER; DOES BUSINESS IN; TERRITORY
e) SALESPERSON; Serves; TERRITORY
f) PRODUCT; Uses; RAW MATERIAL
g) VENDOR; SUPPLIES; RAW MATERIAL
h) PRODUCT; PRODUCED IN; WORK CENTER
i) EMPLOYEE; WORKS IN; WORK CENTER
j) EMPLOYEE; Supervises/Is Supervised By

2) **a)** For every one STUDENT, they can work for multiple SCHOOLS, but do not have to work for any. For every one SCHOOL, at least one STUDENT works for them. Therefore, it is a M:N relationship.



b) A STUDENT can only participate in a CLUB if they attend the SCHOOL it is located in.
c) The Works For relationship would not be necessary if an attribute was added to the STUDENT entity indicating whether or not they work for the school (e.g. an Employed attribute).

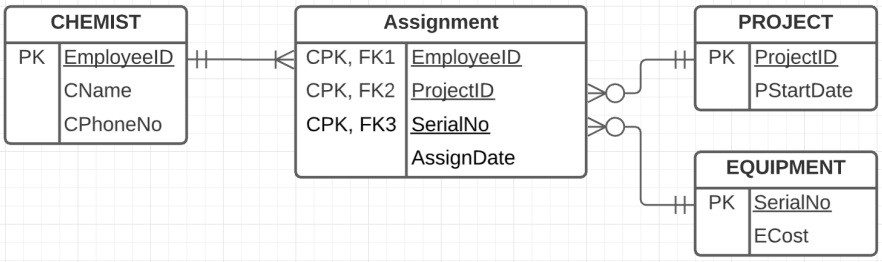
3)



The associative relationship entity AssignedTo's composite primary keys are EmployeeID and ProjectID. This ERD does not allow a project to be created before any employees have been assigned to it, as a project must have at least one employee assigned to it as described by the business requirements. If the BillingRate could change in the middle of a project, it would be more appropriate to have it as an attribute of a

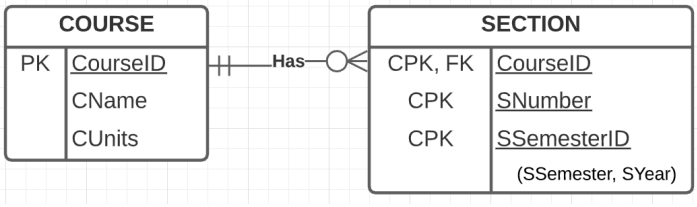
PROJECT instead of AssignedTo, unless BillingRates could vary between EMPLOYEES assigned to the same PROJECT.

4)

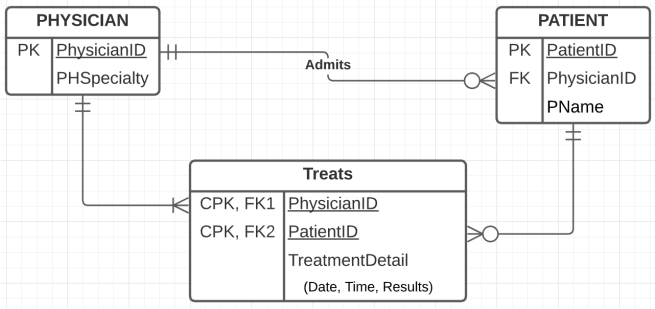


The entities CHEMIST, PROJECT, and EQUIPMENT are share a relationship through the Assignment associative relationship entity, which also contains an AssignDate attribute. While at least one CHEMIST must be included in an Assignment, a PROJECT and EQUIPMENT do not need to be included. Additionally, all entities can be included in multiple Assignments.

5)

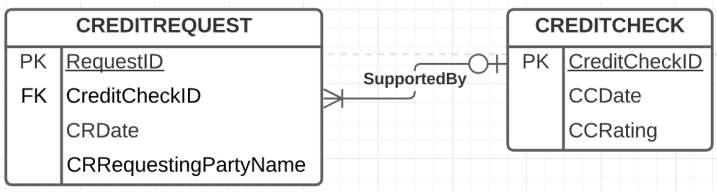


6)

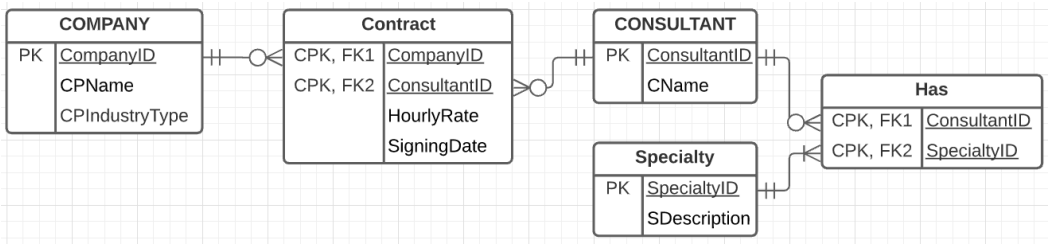


I drew two relationships, Admits and Treats, between the PHYSICIAN and PATIENT entities because they have different degree and cardinality rules. I did not include the hospital as an entity type because it is the owner of the database. This ERD does not allow for the same patient to be admitted by different PHYSICIANs over time. To do so, the Admits relationship would have to be a M:N relationship. The admission time could be tracked by adding an attribute to the Admits associative relationship entity.

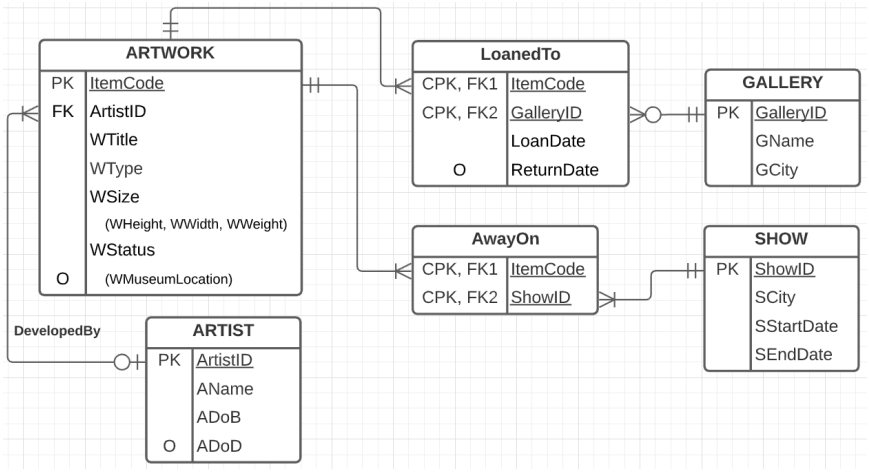
7)



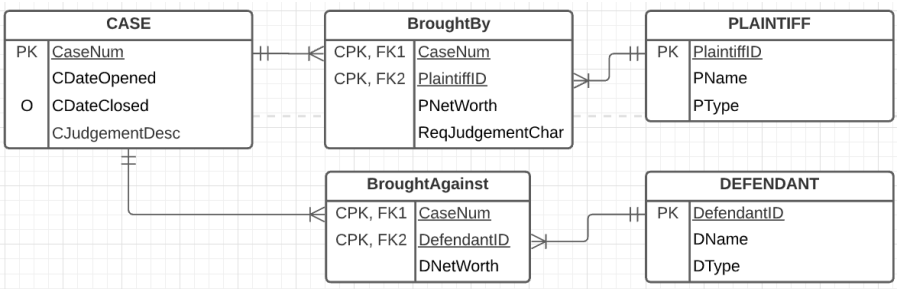
8)


COMPANY
PK CompanyID
CPName
CPIndustryType
Contract
CPK, FK1 CompanyID
CPK, FK2 ConsultantID
HourlyRate
SigningDate
CONSULTANT
PK ConsultantID
CName
Has
CPK, FK1 ConsultantID
CPK, FK2 SpecialtyID
Specialty
PK SpecialtyID
SDescription

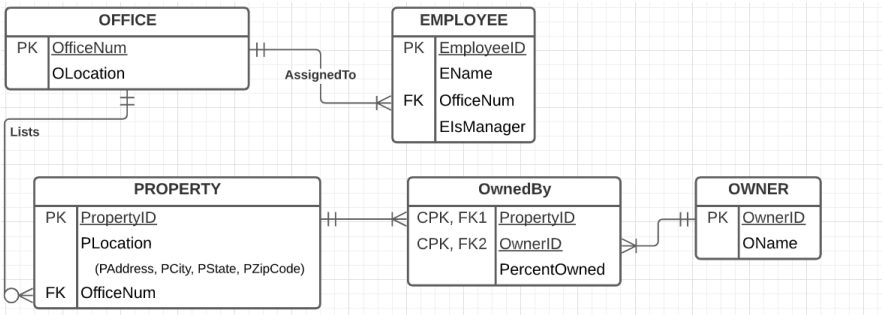
9)


ARTWORK
PK ItemCode
FK ArtistID
WTitle
WType
WSize
(WHeight, WWidth, WWeight)
WStatus
O (WMuseumLocation)
LoanedTo
CPK, FK1 ItemCode
CPK, FK2 GalleryID
LoanDate
O ReturnDate
GALLERY
PK GalleryID
GName
GCity
AwayOn
CPK, FK1 ItemCode
CPK, FK2 ShowID
SHOW
PK ShowID
SCity
SStartDate
SEndDate
DevelopedBy
ARTIST
PK ArtistID
AName
ADoB
O ADoD

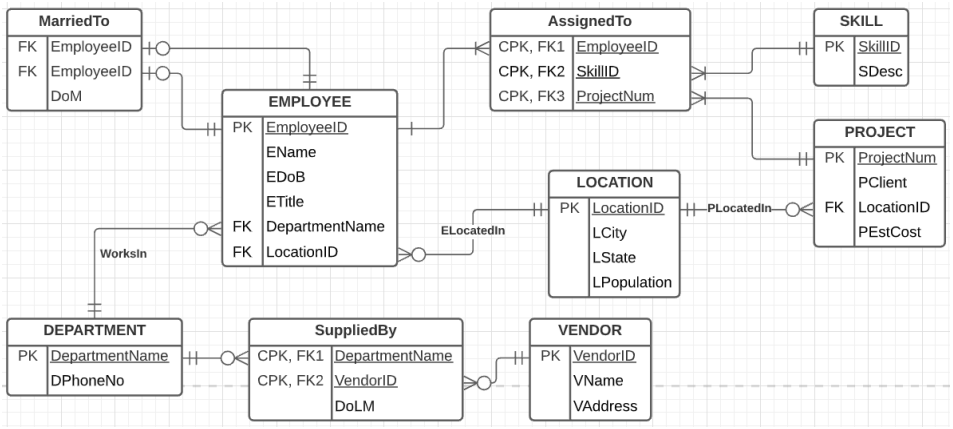
10)


CASE
PK CaseNum
CDateOpened
O CDateClosed
CJudgementDesc
BroughtBy
CPK, FK1 CaseNum
CPK, FK2 PlaintiffID
PNetWorth
ReqJudgementChar
PLAINTIFF
PK PlaintiffID
PName
PType
BroughtAgainst
CPK, FK1 CaseNum
CPK, FK2 DefendantID
DNetWorth
DEFENDANT
PK DefendantID
DName
DType

11)


OFFICE
PK OfficeNum
OLocation
AssignedTo
EMPLOYEE
PK EmployeeID
EName
FK OfficeNum
EIsManager
Lists
PROPERTY
PK PropertyID
PLocation
(PAddress, PCity, PState, PZipCode)
FK OfficeNum
OwnedBy
CPK, FK1 PropertyID
CPK, FK2 OwnerID
PercentOwned
OWNER
PK OwnerID
OName

12)


MarriedTo
FK EmployeeID
FK EmployeeID
DoM
EMPLOYEE
PK EmployeeID
EName
EDoB
ETitle
FK DepartmentName
FK LocationID
AssignedTo
CPK, FK1 EmployeeID
CPK, FK2 SkillID
CPK, FK3 ProjectNum
SKILL
PK SkillID
SDesc
PROJECT
PK ProjectNum
PClient
FK LocationID
PEstCost
LOCATION
PK LocationID
LCity
LState
LPopulation
WorksIn
ELocatedIn
PLocatedIn
DEPARTMENT
PK DepartmentName
DPhoneNo
SuppliedBy
CPK, FK1 DepartmentName
CPK, FK2 VendorID
DoLM
VENDOR
PK VendorID
VName
VAddress