



ISTE-608 Database Design and Implementation

Homework # 2 – Entity-Relationship Modeling

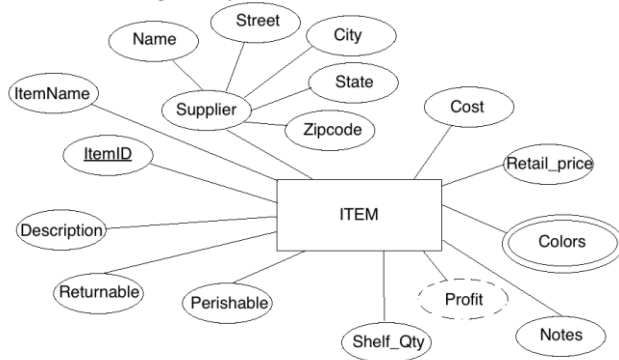
DUE:

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Submit to the Homework #2 dropbox, this document edited to include your answers

Part 1 – 20 points

ResellersRUs Item Management System

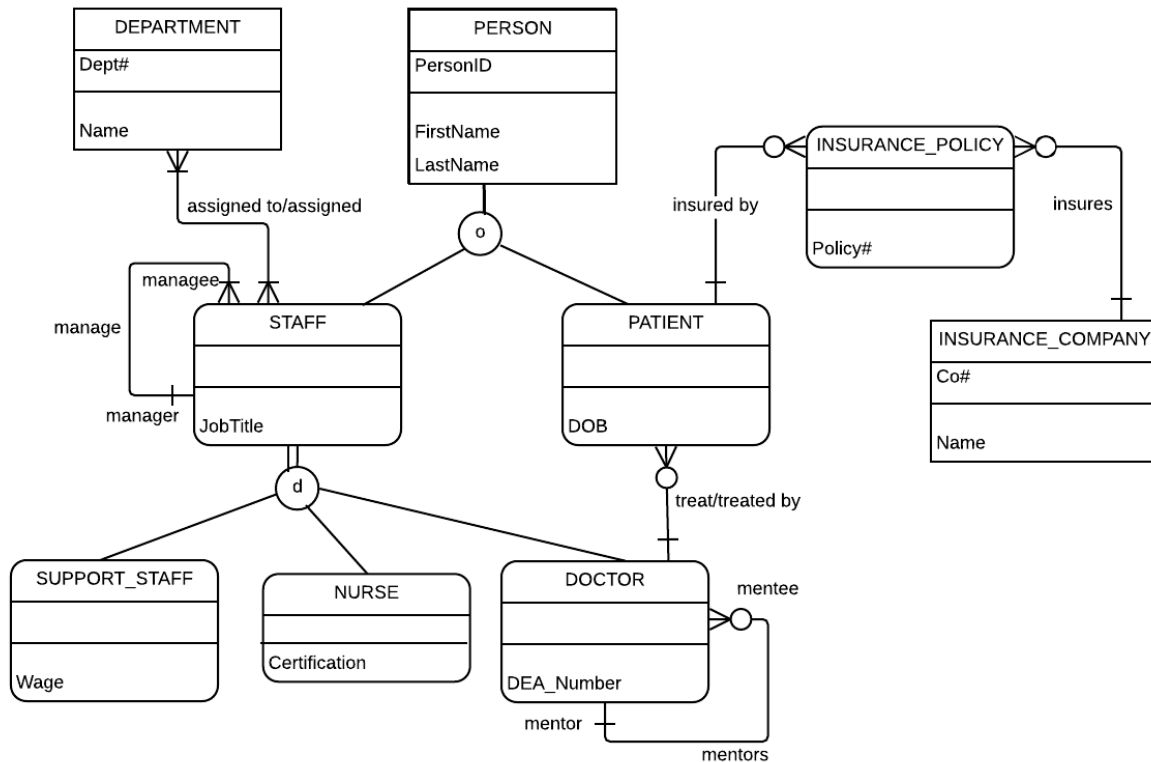


For the table below, please classify each attribute specified based on the E-R diagram above. Please place the best answer for each column that best describes the attribute.

Attribute	Composite or Simple	Single-valued or Multi-valued	Stored or Derived	Identifier ? (Yes or No)
Profit	Simple	Single-Valued	Derived	No
Street	Simple	Single-Valued	Stored	No
ItemID	Simple	Single-Valued	Stored	Yes
Supplier	Composite	Single-Valued	Stored	No
Colors	Simple	Multi-Valued	Stored	No

Part 2 – 80 points

Wellness Hospital



Using the E-R diagram for Wellness Hospital, please provide your answer to the following 22 questions.

- (4 points) List the relationship verb phrase for each 'HAS-A' relationship that appears in the diagram.

YOUR ANSWER:

- Staffs are assigned to departments.
- Departments are assigned to staffs.
- Staff: Manager manages managee: Staff
- Staff: Managee is managed by a manager: Staff
- Doctor: Mentor mentors mentee: Doctor
- Doctor: Mentee is mentored by Mentor: Doctor



- Doctor treats patients.
- Patients are treated by doctor.
- Patients are insured by insurance policies.
- Insurance policies are insured on patients.
- Insurance Company insures insurance policies.
- Insurance policies are insured by insurance company.

2. (3 points) List the relationship verb phrase for each binary relationship that appears in the diagram.

YOUR ANSWER:

- Staffs are assigned to departments.
- Departments are assigned to staffs.
- Doctor treats patients.
- Patients are treated by doctor.
- Patients are insured by insurance policies.
- Insurance policies are insured on patients.
- Insurance Company insures insurance policies.
- Insurance policies are insured by insurance company.

3. (3 points) List the relationship verb phrase for each recursive relationship that appears in the diagram.

YOUR ANSWER:

- Staff: Manager manages managee: Staff
- Staff: Managee is managed by a manager: Staff
- Doctor: Mentor mentors mentee: Doctor
- Doctor: Mentee is mentored by Mentor: Doctor

4. (3 points) List the name of each supertype entity that appears in the diagram.

YOUR ANSWER:



- Person
- Staff

5. (4 points) List the name of each subtype entity that appears in the diagram.

YOUR ANSWER:

- Staff
- Patient
- Support_Staff
- Nurse
- Doctor

6. (3 points) List the name of each associative entity that appears in the diagram.

YOUR ANSWER:

- assigned to/assigned
- manage
- treat/treated by
- insured by
- mentors
- insures

7. (3 points) Provide an example of an entity instance of PERSON.

YOUR ANSWER:

- PersonId

8. (3 points) List the relationship verb phrase for every 1:1 relationship that appears in the diagram.

YOUR ANSWER:

- No 1:1 relationship in the diagram.

9. (3 points) List the relationship verb phrase for every 1:N (N:1) relationship that appears in the diagram.

YOUR ANSWER:

- Patient(1):Insurance Policy(N)- Patient is insured by Insurance_Policies.
- Insurance_Policy(N):Insurance_Company(1)- Insurance_Company insures Insurance_Policy.



10. (3 points) List the relationship verb phrase for every M:N relationship that appears in the diagram.

YOUR ANSWER:

- Department:Staff(M:N)- Staffs are assigned to Departments.

11. (3 points) List the name of each strong entity that appears in the diagram.

YOUR ANSWER:

- Department
- Person
- Insurance Policy
- Insurance Company

12. (4 points) List the name of each weak entity that appears in the diagram.

YOUR ANSWER:

- Staff
- Patient
- Support_Staff
- Nurse
- Doctor

13. (4 points) Must a STAFF:managee be managed by a manager? Explain how you determined your answer from the E-R diagram provided.

YOUR ANSWER:

- Yes, a managee must be managed by a manager, because the E-R diagram shows that a manager manages many managee in the staff class.

14. (4 points) Can there be an instance of DOCTOR that is not an instance of STAFF? Explain your answer.

YOUR ANSWER:

- Yes, there can be an instance of Doctor that is not an instance of Staff. Even though Doctor is a subtype of Staff, the class Doctor can have its own instances and some/all instances of class Staff.



15. (4 points) Can a DOCTOR treat more than one PATIENT? Explain how you determined your answer from the E-R diagram provided.

YOUR ANSWER:

- Yes, Doctor can treat more than one Patient. From the E-R diagram, it is found that a doctor can treat more than one Patient, denoted by crow's foot, which means, a Doctor can treat more than one patient.

16. (4 points) Must every instance of PERSON belong to a subtype? Fully explain how you determined your answer from the E-R diagram provided.

YOUR ANSWER:

- No, it is not necessary that every instance of PERSON should belong to a subtype. Subtypes inherit some or all instances of that supertype. So, a subtype doesn't need to inherit every instance of its supertype.

17. (4 points) Could an instance of PERSON be both a STAFF and a PATIENT? Fully explain how you determined your answer from the E-R diagram provided.

YOUR ANSWER:

- Yes, an instance of person can be both a Staff and a Patient, because, overlap rule is in effect. The subtypes are connected to the supertype with 'o', which means overlap rule is used.

18. (4 points) Must every instance of STAFF belong to a subtype? Fully explain how you determined your answer from the E-R diagram provided.

YOUR ANSWER:

- No, it is not necessary that every instance of Staff should belong to a subtype. Subtypes inherit some or all instances of that supertype. So, a subtype doesn't need to inherit every instance of its supertype. It can have few instances of supertype and its own instances.

19. (4 points) Could an instance of STAFF be both a SUPPORT_STAFF and a DOCTOR? Fully explain how you determined your answer from the E-R diagram provided.

YOUR ANSWER:

- No, an instance of Staff CANNOT be both a Support_staff and a Doctor. Though Support_staff and Doctor are the subtypes of Staff, they will not have the same instances. This is because they belong to different classes. Having similar instances will not create a logical system.



20. (4 points) If a discriminator were to be added to PERSON, fully explain what that would entail and why?

YOUR ANSWER:

- If a discriminator were to be added to Person, then there would be an attribute for each subtype in the supertype that will be a discriminator. As supertype Person has subtypes under overlap rule, there will be an attribute in supertype for every subtype. The value for the discriminator will indicate.

21. (4 points) If a discriminator were to be added to STAFF, fully explain what that would entail and why?

YOUR ANSWER:

- If a discriminator were to be added to Staff, then there would be a single attribute in Staff which could be used as a discriminator. As supertype Staff has subtypes under joint rule, a single attribute will be used as a discriminator in Staff. The value for the discriminator will indicate which subtype, an entity instance of the supertype belongs to.

22. (5 points) Fully state the business rules for the **assigned to/assigned** relationship without using technical terms.

YOUR ANSWER:

- Every Staff must have a department and every department must have staff. A department can have more than one staff and a staff can have more than one department.