ISTE-230 Introduction to Database & Data Modeling

Homework # 5 – HAS-A and IS-A Relationships

DUE: Monday, March 30, 2020 by 11:59pm
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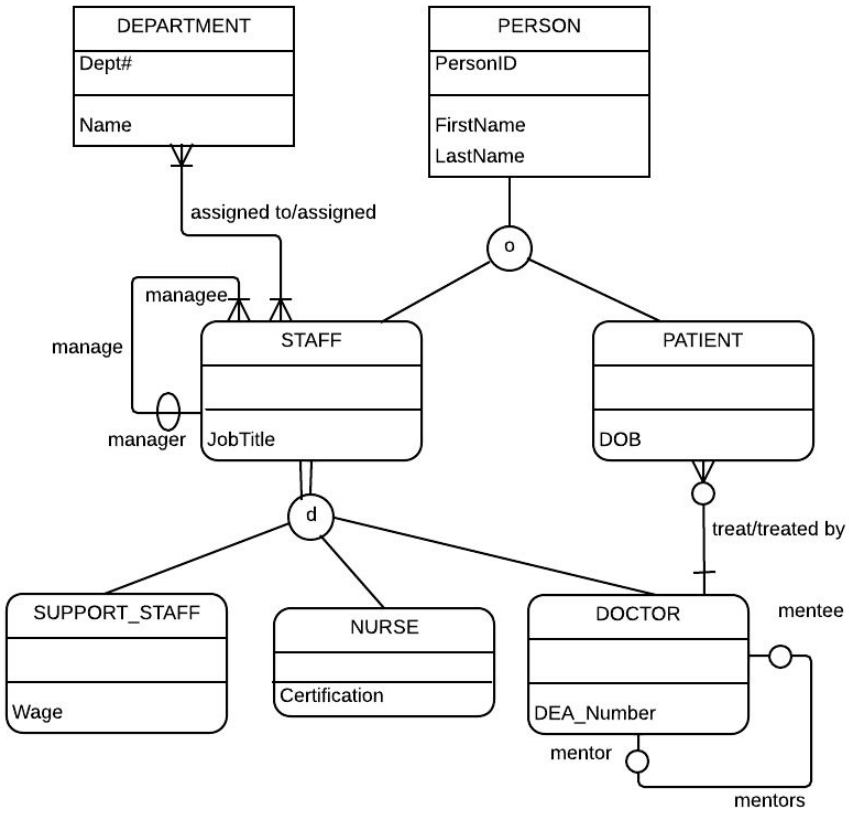
Submit this document, edited to include your answers, as a PDF to the HW#5 Dropbox by the stated deadline.

Wellness Hospital



Using the E-R diagram for Wellness Hospital, that appears on the previous page, please provide your answer to the following questions.

1. (5 points) List the relationship verb phrase for each 'HAS-A' relationship that appears in the diagram.

YOUR ANSWER: assigned to/assigned, manage, treat/treated by, and mentors

2. (5 points) List the relationship verb phrase for each binary relationship that appears in the diagram.

YOUR ANSWER: assigned to/assigned and treat/treated by

3. (5 points) List the relationship verb phrase for each recursive relationship that appears in the diagram.

YOUR ANSWER: manage and mentors

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

YOUR ANSWER: PERSON, STAFF

5. (6 points) List the name of each subtype entity that appears in the diagram.

YOUR ANSWER: SUPPORT_STAFF, NURSE, DOCTOR, STAFF, PATIENT

6. (5 points) Provide an example of an entity instance of PERSON.

YOUR ANSWER: PersonID = 1, FirstName = Brian, LastName = Zarzuela

7. (5 points) List the relationship verb phrase for every 1:1 relationship that appears in the diagram.

YOUR ANSWER: mentors

8. (5 points) List the relationship verb phrase for every 1:N (N:1) relationship that appears in the diagram.

YOUR ANSWER: manage and treat/treated by

9. (5 points) List the relationship verb phrase for every M:N relationship that appears in the diagram.

YOUR ANSWER: assigned to / assigned

10. (5 points) List the name of each strong entity that appears in the diagram.

YOUR ANSWER: DEPARTMENT and PERSON

11. (6 points) List the name of each weak entity that appears in the diagram.

YOUR ANSWER: STAFF, PATIENT, SUPPORT_STAFF, NURSE, and DOCTOR

12. (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: No, the oval going from STAFF:managee to STAFF:manager indicates a minimal cardinality that a STAFF:managee does not have to be managed by a STAFF:manager

13. (4 points) Can there be an instance of DOCTOR that is not an instance of STAFF? Explain your answer.

YOUR ANSWER: No, the relationship between DOCTOR and STAFF is an IS-A relationship in which, as denoted by the total specialization and disjoint rule, STAFF can be a DOCTOR but only if STAFF is not SUPPORT_STAFF or NURsE

14. (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, the maximum cardinality going from DOCTOR to PATIENT is a crow's foot, which indicates that a DOCTOR can treat more than one PATIENT

15. (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, by partial specialization an instance of PERSON does not have to belong to a subtype

16. (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, by overlap rule an instance of PERSON can be any combination of a STAFF and a PATIENT (including both)

17. (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: Yes, by total specialization rule every instance of STAFF must belong to at least one subtype

18. (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, by total specialization and disjoint rule every instance of STAFF must belong to one and only one subtype

19. (5 points) If a discriminator were to be added to PERSON, fully explain what that would entail and why?

YOUR ANSWER: Given that the overlap rule is in effect, an attribute would need to be added to PERSON for each subtype (STAFF and PATIENT). Each attribute would be a boolean to denote whether or not a PERSON was of that particular type

20. (5 points) If a discriminator were to be added to STAFF, fully explain what that would entail and why?

YOUR ANSWER: Given that the disjoint rule is in effect, one attribute would need to be added to STAFF to denote whether the respective PERSON was a SUPPORT_STAFF, NURSE, or DOCTOR

21. (5 points) Fully state the business rules for the **assigned to/assigned** relationship without using technical terms.

YOUR ANSWER:
A DEPARTMENT must be assigned an EMPLOYEE. A DEPARTMENT could be assigned many EMPLOYEEs.
An EMPLOYEE must be assigned to a DEPARTMENT. An EMPLOYEE could be assigned to many DEPARTMENTs.