

# Assignment 02

Solution

*(question number from PDF)*

# Question 01

- Minimum = 0
  - No entity-set has total participation constraints
  - At minimum, no entity is required to participate in R
  - Hence, minimum is 0
- Maximum = 10
  - E3 has key constraint
    - E3 can participate in R at most 1 time
  - There are 10 entities in E3
    - Maximum is achieved when all E3 has participated
  - Hence, maximum is 10

# Question 02

- Minimum = 60
- Maximum = 60
  - Covering constraint means that every element in E0 must be in either E1, E2, or E3
  - Additionally, not satisfying overlap constraint means that entities in E1 cannot be in E2, etc
  - Hence, minimum = maximum =  $15+20+25 = 60$

# Question 03

- Minimum = 10
  - By covering constraint, minimum is  $50 - 25 - 15 = 10$
  - Since there are 10 entities in E0 not in either E1 or E2
- Maximum = 50
  - By overlap constraint, all entities in E0 can be in E3
  - Hence, maximum is 50

# Question 04

- Answer: C,E
  - Reasoning for C
    - Consider table E2 to mean combined relation R and entity E2
    - PK  $(a_1, a_2)$  ensures that
      - Every  $a_2$  is in R
        - total participation constraint
      - There can be  $(a_1^1, a_2)$  and  $(a_1^2, a_2)$ 
        - no key constraint
      - Every unique  $a_2$  can uniquely identify an entity E2
        - by virtue of not having any other attributes
  - Reasoning for E
    - By translation of weak entity-set to SQL from lecture note

# Question 05

- Answer: E
  - Reasoning for NOT C
    - Consider table E2 to mean combined relation R and entity E2
    - PK  $(a_1, a_2)$  ensures that
      - Every  $a_2$  is in R
        - total participation constraint
      - There can be  $(a_1^1, a_2)$  and  $(a_1^2, a_2)$ 
        - no key constraint
      - $a_2$  cannot uniquely identify entity in E2
        - we can have  $(a_1^1, a_2, b_2^1)$  and  $(a_1^2, a_2, b_2^1)$  and thus violate PK of E2
  - Reasoning for E
    - By translation of weak entity-set to SQL from lecture note

# Question 06

- Answer: B,C
  - A. Consider  $(a, b)$  as PK, this cannot be enforced by column constraint
  - B. But  $(a, b)$  can be enforced by table constraint
    - PRIMARY KEY  $(a, b)$
  - C. CHECK  $(a \text{ IS NOT NULL})$
  - D. Consider the pair  $(a, b)$  as unique, this cannot be enforced by column constraint
    - Consider a integer UNIQUE, b integer UNIQUE
      - This means both a and b is individually unique
    - Need to use UNIQUE  $(a, b)$
  - E. Since B,C is true, this statement is automatically false

# Question 07

- Answer: A,B,C

C1. No covering constraint is specified

C2. No overlap constraint is specified

C3. Should use double-line arrow between adventurer and registered  
(i.e., Adventurer ==> Registered)

C4. Correct use of double-line without arrow

C5. Since Party is a relationship, each tuple in Party consists of a triple (Fighter, Mage, Healer)



# Question 08

- Answer: C,D,E

C1. type can only be the three specified value

C2. type cannot be null

C3. gid is not part of Adventurer table

C4. gid is a PK, cannot have  $(gid_1, aid_1)$  and  $(gid_1, aid_2)$

C5. Not checked if fighter have type='fighter', etc