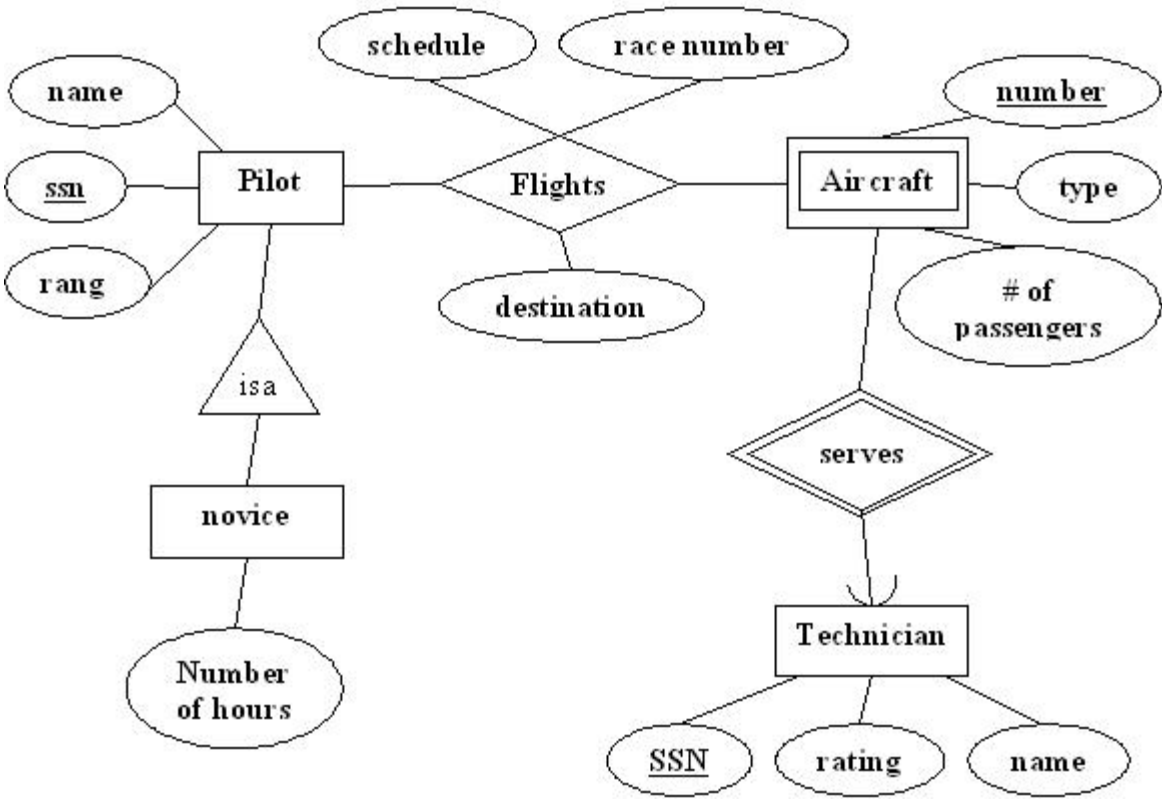
Gradiance - Q179

Question Text:



If we translated the above diagram to relations, and used the NULLs approach to handle the ISA hierarchy, which of the following relations could appear in the database schema?

Correct Choice 1:

Pilot(ssn, name, rang, hours)

Choice Explanation:

NONE

Correct Choice 2:

Flights(pilotSSN, techSSN, number, schedule, race#, destination)

Choice Explanation:

NONE

Correct Choice 3:

Aircraft(number, type, passengers, ssn)

Choice Explanation:

NONE

Correct Choice 4:

Technician(ssn, name, rating)

Choice Explanation:

NONE

Incorrect Choice 1:

Flights(pilotSSN, number, schedule, race#, destination)

Choice Explanation:
NONE

Incorrect Choice 2:
Flights(ssn, number, schedule, race#, destination)
Choice Explanation:
NONE

Incorrect Choice 3:
Aircraft(number, type, passengers)
Choice Explanation:
NONE

Incorrect Choice 4:
Serves(number, ssn)
Choice Explanation:
NONE

Incorrect Choice 5:
Novice(pilotSSN, hours)
Choice Explanation:
NONE

Incorrect Choice 6:
Novice(ssn, name, rang, hours)
Choice Explanation:
NONE

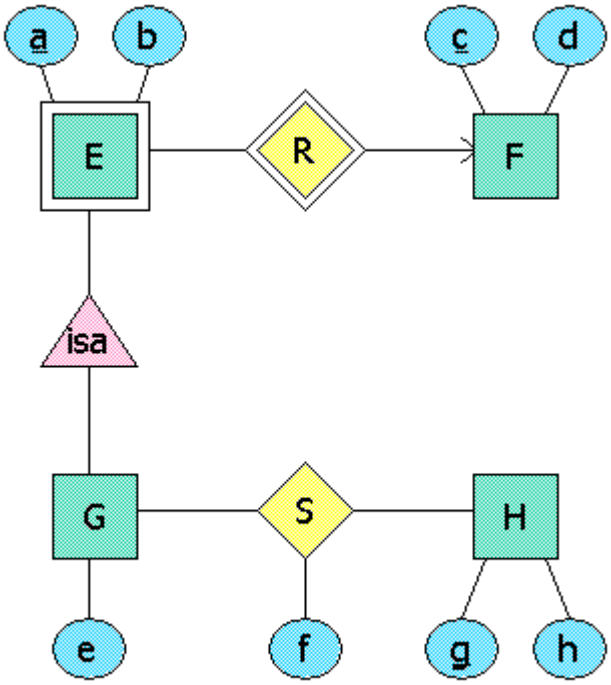
Incorrect Choice 7:
Aircraft(pilotSSN, techSSN, number, type, passengers)
Choice Explanation:
NONE

Incorrect Choice 8:
Serves(type, number, passengers, techSSN)
Choice Explanation:
NONE

Question Explanation:
NONE
Difficulty Level:
3

Question ID: 527

Question Text:



Translate the above E/R diagram to relations, using the "Object-oriented" approach to handling ISA hierarchies. Then, indicate which of the following relations is NOT in the resulting database schema.

Correct Choice 1: E(a,b)

Choice Explanation: **NONE**

Correct Choice 2: R(a,c)

Choice Explanation: **NONE**

Correct Choice 3: S(e,f,g,h)

Choice Explanation: **NONE**

Correct Choice 4: F(a,c,d)

Choice Explanation: **NONE**

Correct Choice 5: R(a,c,c)

Choice Explanation: **NONE**

Correct Choice 6: S(e,f,g)

Choice Explanation: **NONE**

Correct Choice 7: E(a,b,c,d)

Choice Explanation: **NONE**

Correct Choice 8: S(a,c,g)

Choice Explanation: **NONE**

Correct Choice 9: G(a,c,e)

Choice Explanation: **NONE**

Correct Choice 10: E(a,b,c,e)

Choice Explanation: **NONE**

Incorrect Choice 1: F(c,d)

Choice Explanation: This relation is constructed from entity set F in a straightforward way. The basics of conversion from E/R designs to relational schemas is in Section 4.5 (p. 157).

Incorrect Choice 2: H(g,h)

Choice Explanation: This relation is constructed from entity set H in a straightforward way. The basics of conversion from E/R designs to relational schemas is in Section 4.5 (p. 157).

Incorrect Choice 3: S(a,c,f,g)

Choice Explanation: This relation is constructed from relationship S. It includes the key of G (which is a and c from the root of the ISA hierarchy --- the weak entity set E), the key of H, which is g, and the attribute f that belongs to S itself. The basics of conversion from E/R designs to relational schemas is in Section 4.5 (p. 157). See especially the coverage of weak entity sets in Section 4.5.4 (p. 161). The handling of subclasses in the "object-oriented" style is in Section 4.6.2 (p. 167).

Incorrect Choice 4: E(a,b,c)

Choice Explanation: This relation is constructed from weak entity set E. It includes its own attributes, a and b, plus the key c from the supporting entity set F. The basics of conversion from E/R designs to relational schemas is in Section 4.5 (p. 157). See especially the coverage of weak entity sets in Section 4.5.4 (p. 161). The handling of subclasses in the "object-oriented" style is in Section 4.6.2 (p. 167).

Incorrect Choice 5: G(a,b,c,e)

Choice Explanation: This relation is constructed from G. In the object-oriented approach, subclass G gets its own attributes (e), plus all the attributes of its superclasses. In this case, relation G gets the attributes a, b, and c, because a and b are attributes of parent class E, while c is the key of the supporting entity set F for weak entity set E.

The basics of conversion from E/R designs to relational schemas is in Section 4.5 (p. 157). See especially the coverage of weak entity sets in Section 4.5.4 (p. 161). The handling of subclasses in the "object-oriented" style is in Section 4.6.2 (p. 167).

Question Explanation: Here are the relations constructed from the E/R elements:

- E(a,b,c): A weak entity set's relation includes the keys of all supporting entity sets, c in this case.
- F(c,d): An ordinary enitity-set-to-relation transformation.

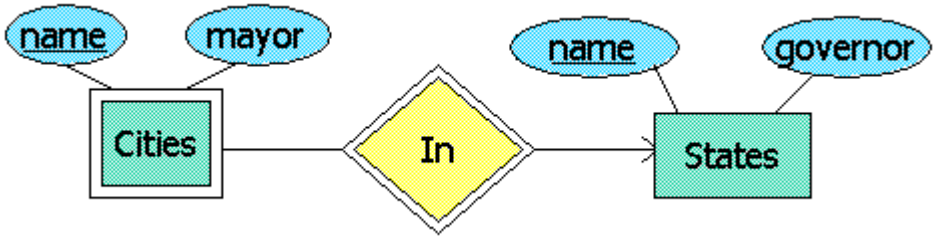
- G(a,b,c,e): In the "object-oriented" approach, a subclass gets all the attributes associated with itself and its ancestors. In this case, the relation for G has attribute e, belonging to G itself, and attributes a, b, and c, belonging to its parent C.
- H(g,h): An ordinary enitity-set-to-relation transformation.
- S(a,c,f,g): A relationship's relation has the keys from all connected entity sets ({a,c} and g in this case), plus whatever attributes are attached to the relationship itself (f here).

Note that R yields no relation, because it supports the weak entity set E.

Difficulty Level: 3

Question ID: 529

Question Text:



Convert this E/R diagram to relations, resolving the dual use of the attribute "name" in some reasonable way. Then, confirm your correct translation by indicating which of the database schemas below is the most reasonable translation from the E/R diagram above into relations?

Correct Choice 1: Cities(cityName, stateName, mayor), States(name, governor)

Choice Explanation: **NONE**

Correct Choice 2: Cities(cname, sname, mayor), States(sname, gov)

Choice Explanation: **NONE**

Correct Choice 3: Cities(name, stateName, mayor), States(name, governor)

Choice Explanation: **NONE**

Incorrect Choice 1: Cities(cityName, stateName, mayor), In(cityName, stateName), States(name, governor)

Choice Explanation: Remember, a supporting relationship such as In does not need a relation. Its information is always contained in the relation of the weak entity set it supports, Cities in this case. The basics of E/R design to relational schema conversion is in Section 4.5 (p. 157). Especially, see point (3) on p. 72.

Incorrect Choice 2: Cities(name, mayor), States(name, governor)

Choice Explanation: Because Cities is a weak entity set, its relation must include not only its own attributes, but the key of the supporting entity set(s), States in this case. Since both Cities and States have an attribute "name," we need to rename at least one of them so we can tell, in the relation, whether the city name or the state name is being referred to. The basics of E/R design to relational schema conversion is in Section 4.5 (p. 157). Especially, see Section 4.5.4 (p. 161) on weak entity sets.

Incorrect Choice Cities(name, name, mayor), States(name, governor)

3:

Choice Explanation: While the attributes "name" from both Cities and States are required in the relation (because Cities is a weak entity set), we cannot use "name" as an attribute twice in the relation for Cities. We must rename at least one of them, e.g., call them cityName and stateName. The basics of E/R design to relational schema conversion is in Section 4.5 (p. 157). Especially, see Section 4.5.4 (p. 161) on weak entity sets.

Incorrect Choice 4: Cities(cname, sname, mayor), In(cname, sname), States(sname, gov)

Choice Explanation: Remember, a supporting relationship such as In does not need a relation. Its information is always contained in the relation of the weak entity set it supports, Cities in this case. The basics of E/R design to relational schema conversion is in Section 4.5 (p. 157). Especially, see point (3) on p. 72.

Incorrect Choice 5: Cities(cname, mayor), States(sname, gov)

Choice Explanation: Because Cities is a weak entity set, its relation must include not only its own attributes, but the key of the supporting entity set(s), States in this case. Since both Cities and States have an attribute "name," we need to rename at least one of them so we can tell, in the relation, whether the city name or the state name is being referred to. The basics of E/R design to relational schema conversion is in Section 4.5 (p. 157). Especially, see Section 4.5.4 (p. 161) on weak entity sets.

Incorrect Choice 6: Cities(cityName, mayor), States(name, governor)

Choice Explanation: Because Cities is a weak entity set, its relation must include not only its own attributes, but the key of the supporting entity set(s), States in this case. Since both Cities and States have an attribute "name," we need to rename at least one of them so we can tell, in the relation, whether the city name or the state name is being referred to. The basics of E/R design to relational schema conversion is in Section 4.5 (p. 157). Especially, see Section 4.5.4 (p. 161) on weak entity sets.

Incorrect Choice 7: Cities(name, stateName, mayor), In(name, stateName), States(name, governor)

Choice Explanation: Remember, a supporting relationship such as In does not need a relation. Its information is always contained in the relation of the weak entity set it supports, Cities in this case. The basics of E/R design to relational schema conversion is in Section 4.5 (p. 157). Especially, see point (3) on p. 72.

Question Explanation: One correct translation to relations is:

Cities(cityName, stateName, mayor) States(name, governor)

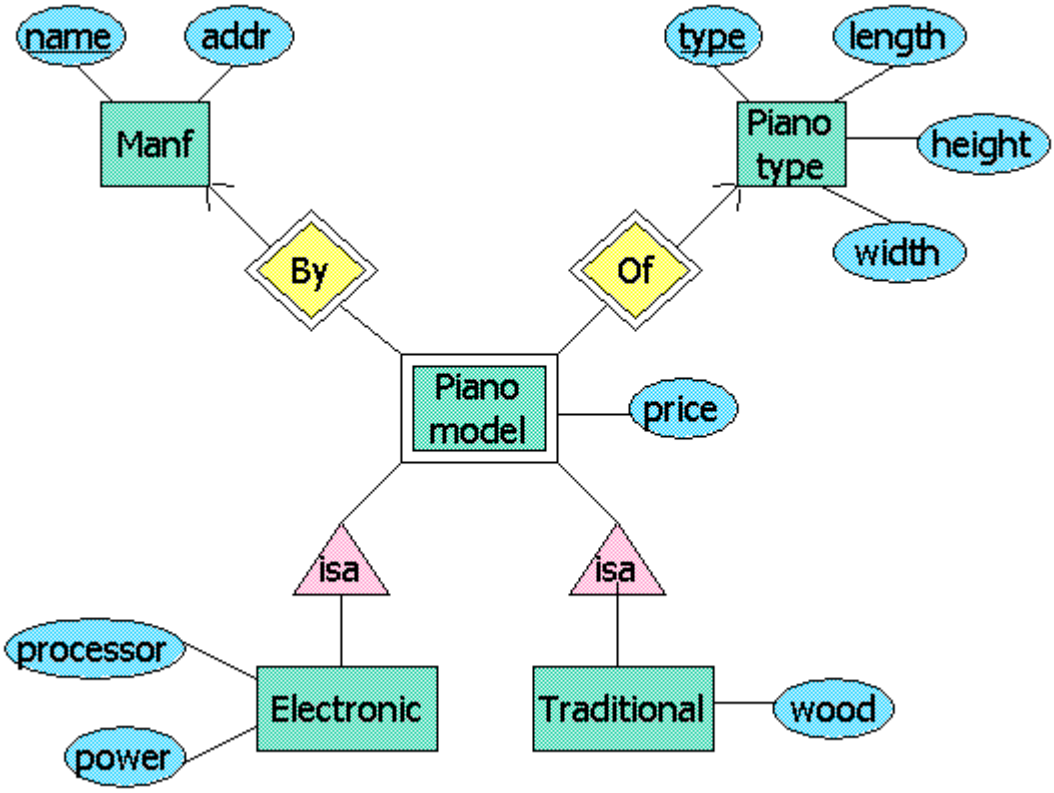
There are others, of course, since we cannot dictate what the attributes of the relation are called. However, note that we cannot use the term "name" for both the city name and the state name in Cities.

Also, observe that because Cities is a weak entity set, its relation must include both its key and that of the supporting entity set States. That is why we are forced to have two "names" in the Cities relation. Finally, observe that In, being a supporting relationship for a weak entity set, does not get a relationship of its own. Its information is kept within the Cities relation.

Difficulty Level: 3

Question ID: 530

Question Text:



The above diagrams describes pianos for sale. The terms should be obvious, except perhaps for a "piano type," which is something like "Baby Grand" or "Upright." Translate the above diagram to relations, using the "E/R" approach to handle the ISA hierarchy. Then, identify which of the following relations appears in the database schema.

Correct Choice 1: PianoModel(manfName, type, price)

Choice Explanation: **NONE**

Correct Choice 2: PianoType(type, height, length, width)

Choice Explanation: **NONE**

Correct Choice 3: Electronic(manfName, type, processor, power)

Choice Explanation: **NONE**

Correct Choice 4: Traditional(manfName, type, wood)

Choice Explanation: **NONE**

Incorrect Choice 1: Manf(name, addr, price)

Choice Explanation: Why price? The basics of converting E/R designs to relational schemas is in Section 4.5 (p. 157). "E/R style" handling of subclasses is in Section 4.6.1 (p. 166).

Incorrect Choice 2: Electronic(processor, power)

Choice Explanation: Where is the key? The basics of converting E/R designs to relational schemas is in Section 4.5 (p. 157). "E/R style" handling of subclasses is in Section 4.6.1 (p. 166).

Incorrect Choice 3: PianoModel(manfName, type)

Choice Explanation: Remember: weak entity sets may have more than key attributes. The basics of converting E/R designs to relational schemas is in Section 4.5 (p. 157). "E/R style" handling of subclasses is in Section 4.6.1 (p. 166).

Incorrect Choice 4: Electronic(manfName, type, price, processor, power)

Choice Explanation: This relation would appear only in an OO-style translation. The basics of converting E/R designs to relational schemas is in Section 4.5 (p. 157). "E/R style" handling of subclasses is in Section 4.6.1 (p. 166).

Incorrect Choice 5: Traditional(manfName, type, price, wood)

Choice Explanation: This relation would appear only in an OO-style translation. The basics of converting E/R designs to relational schemas is in Section 4.5 (p. 157). "E/R style" handling of subclasses is in Section 4.6.1 (p. 166).

Incorrect Choice 6: PianoModel(manfName, type, price, processor, power, wood)

Choice Explanation: This relation would appear only in a NULLs-style translation. The basics of converting E/R designs to relational schemas is in Section 4.5 (p. 157). "E/R style" handling of subclasses is in Section 4.6.1 (p. 166).

Incorrect Choice 7: Traditional(name, wood)

Choice Explanation: Where is the key? The basics of converting E/R designs to relational schemas is in Section 4.5 (p. 157). "E/R style" handling of subclasses is in Section 4.6.1 (p. 166).

Incorrect Choice 8: By(name, price)

Choice Explanation: Supporting relationships do not get translated to relations. The basics of converting E/R designs to relational schemas is in Section 4.5 (p. 157). See especially point (3) on p. 72. "E/R style" handling of subclasses is in Section 4.6.1 (p. 166).

Incorrect Choice 9: Of(type, price)

Choice Explanation: Supporting relationships do not get translated to relations. The basics of converting E/R designs to relational schemas is in Section 4.5 (p. 157). See especially point (3) on p. 72. "E/R style" handling of subclasses is in Section 4.6.1 (p. 166).

Question Explanation: Here is the E/R-style conversion of the diagram to relations:

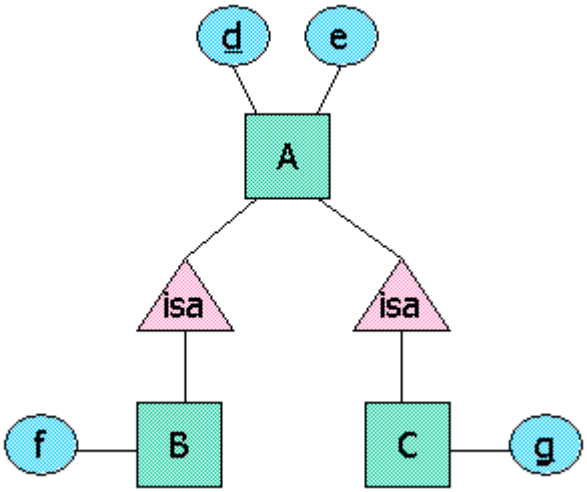
- Manf(name, addr): an ordinary entity-set-to-relation transformation.
- PianoType(type, height, length, width): ditto.
- PianoModel(manfName, type, price): This weak entity set needs, in its relation, the keys of the supporting entity sets, Manf and PianoType.
- Electronic(manfName, type, processor, power): A subclass uses the key from the root of the hierarchy (manfName and type in this case).
- Traditional(manfName, type, wood): ditto.

Note that the supporting relationships By and Of do not get converted to relations.

Difficulty Level: 3

Question ID: 533

Question Text:



Translate the above E/R diagram to relations using the "Object-oriented" approach, the "E/R" approach, and the "NULLS" approach. Then, identify which of the following sets of attributes is the schema for some relation in the "E/R" approach, but does not appear if we use either the "object-oriented" approach or the "NULL's" approach.

Correct Choice 1: B(d,f)

Choice Explanation: **NONE**

Correct Choice 2: C(d,g)

Choice Explanation: **NONE**

Incorrect Choice 1: A(d,e)

Choice Explanation: This relation appears in both the ER and OO approaches. Translation of subclasses is covered in Section 4.6 (p. 165).

Incorrect Choice 2: B(d,e,f)

Choice Explanation: This relation appears in the object-oriented approach. Translation of subclasses is covered in Section 4.6 (p. 165).

Incorrect Choice 3: C(d,e,g)

Choice Explanation: This relation appears in the object-oriented approach. Translation of subclasses is covered in Section 4.6 (p. 165).

Incorrect Choice 4: A(d,e,f,g)

Choice Explanation: This relation appears in the NULLs approach. Translation of subclasses is covered in Section 4.6 (p. 165).

Incorrect Choice 5: A(d,e,f)

Choice Explanation: This relation appears in no approach. Translation of subclasses is covered in Section 4.6 (p. 165).

Incorrect Choice 6: A(d,e,g)

Choice Explanation: This relation appears in no approach. Translation of subclasses is covered in Section 4.6 (p. 165).

Incorrect Choice 7: B(e,f)

Choice Explanation: This relation appears in no approach. Translation of subclasses is covered in Section 4.6 (p. 165).

Incorrect Choice 8: C(d,f,g)

Choice Explanation: This relation appears in no approach. Translation of subclasses is covered in Section 4.6 (p. 165).

Question Explanation: In the OO approach, we get relations A(d,e), B(d,e,f), and C(d,e,g). In the E/R approach, we get A(d,e), B(d,f), and C(d,g), while in the "nulls" approach we get one relation A(d,e,f,g). Thus, of those in the E/R translation, only B(d,f) and C(d,g) appear in neither of the other two translations.

Difficulty Level: 3