

Question 1:

A:

```
SELECT s.sname, s.address, s.city
FROM PRODUCT p, STORE s, INVENTORY i
WHERE p.pid = i.pid AND s.sid = i.sid AND p.pname = 'iPod' AND p.color
= 'red'
ORDER BY s.city
```

B:

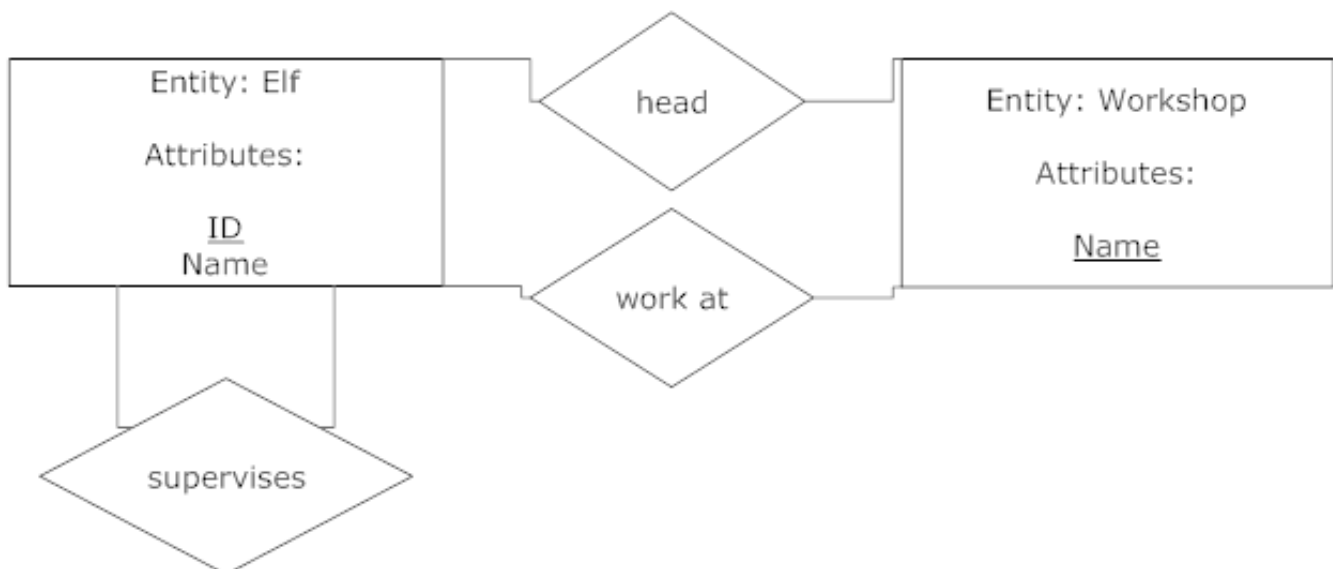
```
SELECT min(i.price)
FROM INVENTORY i, PRODUCT p
WHERE p.pname = 'Droid' AND i.pid = p.pid AND i.quantity > 0
```

C:

```
SELECT s.city, SUM(s.quantity), AVG(i.price)
FROM PRODUCT p, STORE s, INVENTORY i
WHERE p.pid = i.pid AND i.sid = s.sid AND p.pname = 'Xbox'
GROUP BY s.city
ORDER BY s.city
```

Question 2:

Part A:



Part B:

Notation: tbl.key means a foreign key in the given table.

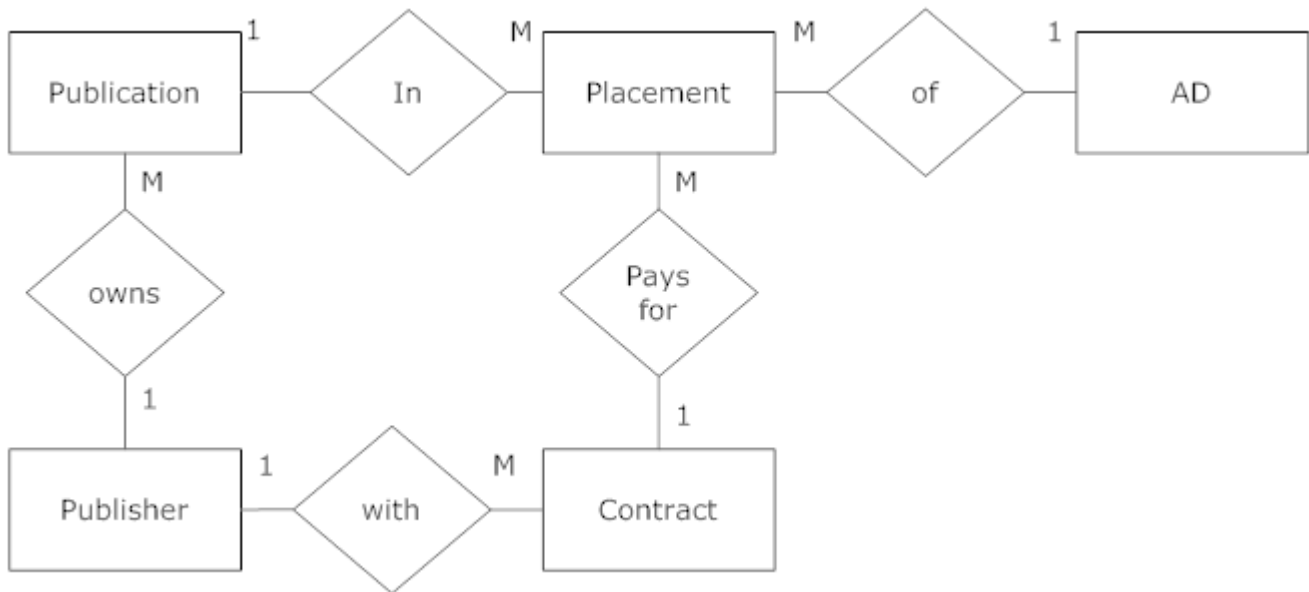
Elf(id, name, Workshop.name)

Workshop(name, Elf.id)

Supervises(Elf.id, Elf.id)

Question 3:

Part A:



Part B:

AD(AdID, Description, DateFinalized, SignOffDirector)

PUBLISHER(PublisherID, Name, Description, Address, City, State, Zip, Phone)

PUBLICATION(PublicationID, Name, Description, Frequency, Circulation, PublisherID)

PublisherID foreign key to PUBLISHER

CONTRACT(ContractID, DateSigned, AgreedPrice, PublisherID)

PublisherID foreign key to PUBLISHER

PLACEMENT(PlacementID, ContractID, AdID, PublicationID, IssueDate)

ContractID foreign key to CONTRACT

AdID foreign key to AD

PublicationID foreign key to PUBLICATION

There is a synthetic key for PLACEMENT. If you make the reasonable assumption that you only run a given ad once in a single issue of a publication, (*AdID*, *PublicationID*, *IssueDate*) would be reasonable composite key.

It is tempting to insert an extra relationship between AD and PUBLICATION; that isn't necessary, because the PLACEMENT table tells you which ads have been placed in each publication.

It is possible to argue, depending on exactly when data gets entered in the various tables, that no direct relationship is needed between CONTRACT and PUBLISHER, since you could figure out this relationship by tracing through foreign keys from CONTRACT to PLACEMENT to PUBLICATION, and then to PUBLISHER. However, since it's not clear that PLACEMENT entries are made as soon as a contract is created, it is probably safer to keep the CONTRACT-PUBLISHER relationship. In that case, there is actually a clever arrangement of composite keys that guarantees that the publication in each placement has the same publisher as the placement's contract. I would not expect students to come up with that and didn't grade this part.

There is no need to have an entity for *issues* of publications. That would only be necessary if we were storing information determined by the combination of *PublicationID* and *IssueDate*, such as the number of pages in the issue.