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Assignment 2

1) For each table, identify the primary key and the foreign key(s). If a table does not have a foreign key, write *None*.

- EMPLOYEE
 - PK
 - EMP_CODE
 - FK
 - STORE_CODE
- STORE
 - PK
 - STORE_CODE
 - FK
 - REGION_CODE
- REGION
 - PK
 - REGION_CODE
 - FK
 - *None*

2) Do the tables exhibit entity integrity? Answer yes or no, and then explain your answer.

- Yes, these tables do have entity integrity. For each table, the primary key is unique for each row and is never (null).

3) Do the tables exhibit referential integrity? Answer yes or no, and then explain your answer.

- Yes, these tables do have referential integrity. For each table, any foreign key has a matching entry in the related table.

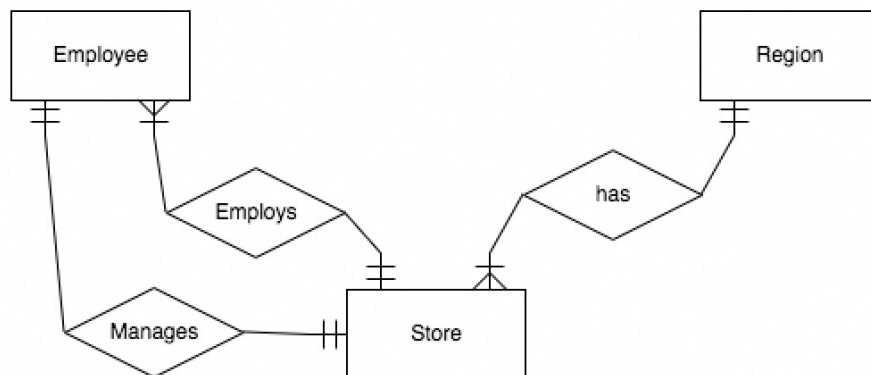
4) Describe the type(s) of relationship(s) between STORE and REGION.

- STORE and REGION have a 1:M relationship. A region may have many stores but each store only has one region.

5) Describe the type(s) of relationship(s) between EMPLOYEE and STORE. (*Hint: each store employs many employees, one of whom manages the store.*)

- There is a 1:M relationship where each employee works at one store and each store has many employees.
- There is also a 1:1 relationship where each store has one manager and each manager manages one store.

6) Create an ERD to show all relationships involving EMPLOYEE, STORE, and REGION. ([ERDPlus](#) is a good, free tool to use for this.)



7) For each table, identify the primary key and any foreign keys.

- MACHINE
 - PK
 - MACHINE_NUM is clearly supposed to be the primary key but it is not one since there is a null value
 - FK
 - None
- ITEM
 - PK

- ITEM_NUMBER
- FK
 - *None*
- STOCK
 - PK
 - (MACHINE_NUM, ITEM_NUM) is probably supposed to be but they can't be because ITEM_NUM is (null) for one entry.
 - FK
 - MACHINE_NUM
 - ITEM_NUM

8) Do the tables exhibit entity integrity? Why or why not?

- These tables do not exhibit entity integrity. Both STOCK and MACHINE don't have primary keys which are required for entity integrity.

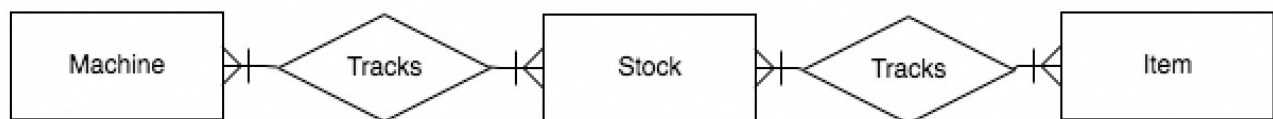
9) Do the tables exhibit referential integrity? Why or why not?

- These tables do not exhibit referential integrity. The Stock table has foreign keys that reference a primary key which doesn't exist. For example, MACHINE_NUM == 6 does not have a matching row in the MACHINE table.

10) Describe the types of relationships between MACHINE, ITEM, and STOCK.

- There is a M:N relationship between MACHINE and STOCK where each machine has many things stocked in it and stock keeps track of many machines.
- There is an M:N relationship between ITEM and STOCK where each item is stocked multiple times and each machine has many items stocked.

11) Create an ERD to show all relationships involving MACHINE, ITEM, and STOCK.



12) For each of the following functional dependencies, say whether it is true with the given data. If it is not, give an example where it fails to hold.

- $\text{GAME_TITLE} \rightarrow \text{PUBLISHER_NUM}$
 - This functional dependency holds.
- $\text{GAME_YEAR} \rightarrow \text{PUBLISHER_NUM}$
 - This functional dependency does not hold. $\text{GAME_YEAR} == 2001$ yields 2 publisher numbers, 46 and 137
- $\text{GAME_NUM} \rightarrow \text{GAME_TITLE}$
 - This functional dependency holds.
- $(\text{GAME_NUM}, \text{GAME_TITLE}) \rightarrow (\text{GAME_YEAR}, \text{PUBLISHER_NUM})$
 - This functional dependency holds.

13) For each of the dependencies in #12, say whether the determinant does or does not constitute a superkey.

- $\text{GAME_TITLE} \rightarrow \text{PUBLISHER_NUM}$
 - GAME_TITLE is not a superkey.
- $\text{GAME_YEAR} \rightarrow \text{PUBLISHER_NUM}$
 - GAME_YEAR is not a superkey
- $\text{GAME_NUM} \rightarrow \text{GAME_TITLE}$
 - GAME_NUM is a superkey.
- $(\text{GAME_NUM}, \text{GAME_TITLE}) \rightarrow (\text{GAME_YEAR}, \text{PUBLISHER_NUM})$
- $(\text{GAME_NUM}, \text{GAME_TITLE})$ is a superkey.

14) List at least three candidate keys for this relation.

- GAME_NUM
- $(\text{GAME_TITLE}, \text{GAME_YEAR})$
- $(\text{GAME_YEAR}, \text{PUBLISHER_NUM})$