1. **Material(MaterialID, MaterialName, MaterialType)** ( E / WE / R / DA )

**District(DistrictID, DistrictName)** ( E / WE / R / DA )

**Unit(DistrictID, UnitID, UnitName)** ( E / WE / R / DA )

**Stock(DistrictID, MaterialID, CurrentAmount, AmountIn, AmountOut)** ( E / WE / R / DA )

**Purchase(DistrictID, MaterialID, PurcDate, PurcAmount, UnitPrice)** ( E / WE / R / DA )

**Consumption(DistrictID, UnitID, MaterialID, ConsDate, ConsAmount)** ( E / WE / R / DA )

**Transfer(DistrictID1, DistrictID2, MaterialID, TransDate, TransAmount)** ( E / WE / R / DA )

1. For each element given in the stock database above, state whether it is **E**ntity, **W**eak **E**ntity, **R**elation or having **D**escriptive **A**ttribute by circling appropriate options(s).
2. Draw the Entity-Relational (ER) diagram of stock database above.
3. Write an appropriate question for the relational algebra below.

X1←DistrictID, MaterialID((TotalAmount=0)(Stock))

X2← X1

X3←(((X1.MaterialID = X2.MaterialID) (X1. DistrictID ≠ X2. DistrictID)  (X1 ****X2)

X4←  X1.MaterialID (X3)

X5← MaterialID, MaterialName (Material ⋈ X4)

1. Write a relational algebra that outputs the name of each district having all “food” type materials in its stock. (Take current amount of stock into consideration, which should be greater than 0)
2. Using an SQL query, find the name of each district such that there exists at least one material (current amount of material is greater than zero) in its stock.
3. Suppose you are given a relation R with four attributes ABCD. For each of the following sets of FDs, assuming those are the only dependencies that hold for R, do the following:
   * 1. A → B, BC → D, A → C
     2. AB → C, AB → D, C → A, D → B
4. Identify the candidate key(s) for R.
5. If R is not in BCNF, decompose it into a set of BCNF relations that preserve the dependencies.