Tutorial 5:
DB & W – ER Modeling

Q1. Consider a movie database in which data is recorded about the movie industry. The data requirements are summarized as follows:
Each movie is identified by title and year of release. Each movie has a length in minutes. Each has a production company, and each is classified under one or more genres (such as horror, action etc).Each movie has one or more directors and one or more actors. Each actor can be identified by name and date of birth and appear in more than one movies. Directors are also identified by name and date of birth and direct one or more movies (including one that he/she may also direct). Production companies are also identified by name and each has an address. It can produce one or more movies.
Design an Entity-Relationship diagram for the above database. Show multi-valued, composite and derived attributes, if any. Is there any weak entity set in the above scenario?

Q2.

Draw an ER diagram for the following application from the manufacturing industry:

1. Each supplier has a unique name.
2. More than one supplier can be located in the same city.
3. Each part has a unique part number.
4. Each part has a colour.
5. A supplier can supply more than one part.
6. A part can be supplied by more than one supplier.
7. A supplier can supply a fixed quantity of each part.

Q3.
You have been hired to design an RDBMS for the *Luxury Limousines Inc*. which operates a number of vehicles. The relevant information is given below.

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Every **vehicle** has a *registration number* and each vehicle ***is of*** a specific **model**; each model is identified by a *model number* (e.g, LIN-2000) and has a *capacity* and *weight*. In addition, the model also has a *range* (eg. 100 km, 1000 km) associated with it.

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A number of **technicians** work for the company. You need to store the *name*, *SIN*, *address*, *phone number* and *salary* of each technician; Each technician ***specializes*** in one or more vehicle models. This expertise may overlap with that of other technicians.

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The company has **controllers** who control the incoming and outgoing vehicle traffic in the vehicle areas. As they are exposed to a lot of smoke emissions and also because their job is

important, they need to have an annual medical examination. The *date* of the most recent exam must be stored for each controller.

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All company **employees** including technicians and controller belong to a union. Each employee has a union *membership number* which must be stored. You can assume that the SIN uniquely identifies each employee.

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The company performs a number of checks periodically to ensure that the vehicles are in good condition. These **tests** are standardized by the *Beaureau of Motor Vehicles* (BMV) and is identified by a BMV *test number.* The test also has a *name* and a *maximum possible score*.

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The BMV requires the company to keep track of each time a given vehicle is ***checked*** by a given technician using a given test. The information for each testing event is the *date*, the number of *hours* spent in testing and the *score* the vehicle received on the test.

(a) Draw an ER diagram for the company database. Make sure to indicate the various attributes of each entity and relationship set. Also specify the key and cardinality constraints. Specify (in English) any necessary overlap and covering constraints as well.