Worked Example

Worked Example

- You have been asked to design a database for a garage. The manager of the garage has told you details (on next 2 slides).

- **To do:**
  - Produce an Entity Relationship diagram to clarify your understanding of the client’s requirements.

Worked Example

- We keep a list of customers who book in repair jobs. Their customerId, name (fName, lName), address (street, town and county) and contact number are recorded.
- For each repair job, we allocate a new job number, record the date and vehicle registration number.
- We keep a list of all our mechanics, with their hourly rate of pay. We also record their staffId, and name (fName, lName).
- We keep a list of the different parts that we use. For each part we record a part number, description, quantity in stock and cost of the part.
- We record the supplier details for the supplier who supplies each part. These details include supplier number, supplier name (fName, lName), address (street, town and county), contact number, fax number and email address.

Worked Example

- Each customer will submit 0 or more repair jobs. Each repair job involves one and only one customer.
- There is only one supplier for each particular part and each supplier will supply 0 or more parts.
- Every repair job is worked on by at least one mechanic and each mechanic will work on 0 or more repair jobs. For billing purposes, we need to keep track of all the time that each mechanic spends on a given job.
- A repair job will use 0 or more parts and a part can be used in 0 or more repair jobs. We need to keep track of the quantity of the part used in each repair job.

Worked Example

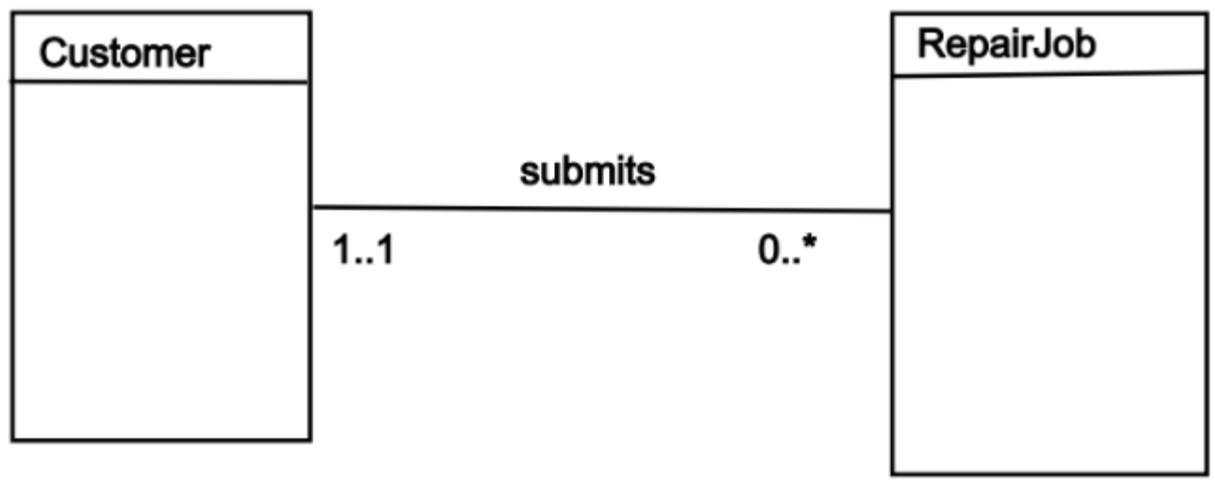
- **Step 1.1 Identify entities**
  - Customer
  - Repair Job
  - Mechanic
  - Part
  - Supplier

Worked Example

- **Step 1.2 Identify relationships**
  - Each customer will submit 0 or more repair jobs.
    Each repair job involves one and only one customer.
    - Customer 1..1 **submits** 0..* Repair Job
  - There is only one supplier for each particular part and each supplier will supply 0 or more parts.
    - Supplier 1..1 **supplies** 0..* Part

Worked Example

- **Step 1.2 Identify relationships**
  - Customer 1..1 **submits** 0..* Repair Job



Worked Example

- **Step 1.2 Identify relationships**
    - Every repair job is worked on by at least one mechanic and each mechanic will work on 0 or more repair jobs.
        - Mechanic 1..* **worksOn** 0..* Repair Job
- A repair job will use 0 or more parts and a part can be used in 0 or more repair jobs.
    - Repair Job 0..* **uses** 0..* Part

Worked Example

- **Step 1.3 Identify and associate attributes with entities or relationships**

- **Entity Type attributes:**
  - **Customer**:customerId, name (fName, lName), address (street, town, county), contactNumber
  - **Repair Job**: jobNumber, jobDate, regNumber
  - **Mechanic**: staffId, name (fName, lName), hourlyRate
  - **Supplier**: supplierNumber, supplierName (fName, lName), address (street, town, county), contactNumber, faxNumber, emailAddress
  - **Part**: partNumber, description, stockQuantity, partCost

Worked Example

- **Step 1.3 Identify and associate attributes with entities or relationships**
  - **Relationship Type attributes:**
    - There is a requirement to record the *time* that each Mechanic spends on a given Repair Job. This attribute *time* is not an attribute of Mechanic because there would be multiple *time* values for each Repair Job that the Mechanic works on. Likewise, it is not an attribute of Repair Job because there would be multiple *time* values for each Mechanic working on the Repair Job. It represents the amount of *time* one Mechanic works on one Repair Job. So for each relationship occurrence between Mechanic and Repair Job there will be a *time* value.

Worked Example

- **Step 1.3 Identify and associate attributes with entities or relationships**
  - **Relationship Type attributes:**
    - There is also a requirement to record the *quantity* of a Part used in each Repair Job. This attribute *quantity* is not an attribute of Part because there would be multiple *quantity* values for each Repair Job that the Part is used in. Likewise, it is not an attribute of Repair Job because there would be multiple *quantity* values for each Part being used in the Repair Job. It represents the *quantity* amount of one Part being used in one Repair Job. So for each relationship occurrence between Part and Repair Job there will be a *quantity* value.

Worked Example

- **Step 1.4 Determine attribute domains**

- In the data dictionary record the allowable set of values for the attribute; and the size and format of the attribute.

Worked Example

- **Step 1.5 Determine candidate, primary, and alternate key attributes**

  - **Customer**: Candidate keys: customerId, name and address, contactNumber
    Primary key: customerId

  - **Repair Job**: Candidate key: jobNumber
    Primary key: jobNumber

  - **Mechanic**: Candidate key: staffId
    Primary key: staffId

Worked Example

- **Step 1.5 Determine candidate, primary, and alternate key attributes**

  - **Supplier**: Candidate keys: supplierNumber, supplierName and address, contactNumber, faxNumber, emailAddress
    Primary key: supplierNumber

  - **Part**: Candidate keys: partNumber, description
    Primary key: partNumber

Worked Example