Tutorial Objectives:
- to develop further understanding of data structure diagrams and data modelling
- to practise data structure diagramming and data modelling skills
- Work on Individual assignment

Tutorial Task:
1. The SIMS Alumni Association wishes to keep records of all their past students and their employment history ie the companies they have worked for and the positions they have held within the companies.

The data for these records is contained in a single table as follows:

<table>
<thead>
<tr>
<th>Student No</th>
<th>Student Name</th>
<th>Student Address</th>
<th>Course Code</th>
<th>Course Name</th>
<th>Company Name</th>
<th>Company Address</th>
<th>Position Held</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>1256</td>
<td>Jane</td>
<td>Brighton</td>
<td>9458</td>
<td>M. Comp</td>
<td>Boles</td>
<td>Carnegie</td>
<td>Programmer</td>
<td>050292</td>
</tr>
<tr>
<td>3297</td>
<td>Jack</td>
<td>Caulfield</td>
<td>2358</td>
<td>Bach. I.S.</td>
<td>Felstra</td>
<td>Melbourn e</td>
<td>Programmer</td>
<td>030593</td>
</tr>
<tr>
<td>2672</td>
<td>Bill</td>
<td>Frankston</td>
<td>9458</td>
<td>M. Comp</td>
<td>Mobil</td>
<td>Melbourn e</td>
<td>Analyst</td>
<td>020794</td>
</tr>
<tr>
<td>1256</td>
<td>Jane</td>
<td>Brighton</td>
<td>9458</td>
<td>M. Comp</td>
<td>Waysafe</td>
<td>Geelong</td>
<td>Systems Analyst</td>
<td>100195</td>
</tr>
<tr>
<td>1256</td>
<td>Jane</td>
<td>Brighton</td>
<td>2358</td>
<td>Bach. I.S.</td>
<td>Sands</td>
<td>Caulfield</td>
<td>Systems Analyst</td>
<td>050597</td>
</tr>
<tr>
<td>1256</td>
<td>Jane</td>
<td>Brighton</td>
<td>9458</td>
<td>M. Comp</td>
<td>Waysafe</td>
<td>Geelong</td>
<td>IT Project Manager</td>
<td>180899</td>
</tr>
</tbody>
</table>

- Draw the ER model based on the above information
- Check that your ER diagram is correct and captures all business rules
- Express the structure of the table above as a set of 3NF relations. Show the steps you follow to obtain these relations.
- Draw the resulting DSD.

2. Draw data structure diagrams for the following sets of relations.

a) Integrated Ordering / Purchasing
   CUSTOMER (Cust-no, Cust-name, Cust-address)
   ORDER (Order-no, Order-date, Cust-no, Salesman)
   ORDER-LINE (Order-no, Item-no, Price, Qty, Comments)
   ITEM (Item-no, Item-desc, Qty-on-hand)
   SUPPLIER (Supplier-no, Supplier-name, Supplier-address)
   PURCHASE-ORDER (Purchase-no, Purchase-date, Supplier-no)
   PURCHASE-LINE (Purchase-no, Item-no, Qty)
b) “Bill of Materials’’

   ITEM (Item-no, Desc, Qty-on-hand)
   STRUCTURE (Used-by-itemno, Used-in-itemno, Qty)

c) Airline flights

   AIRCRAFT (Aircraft-no, Desc, No-seats)
   CITY (City-name, Desc, Population)
   FLIGHT (Flight-no, Departure-city-name, Arrival-city-name, Aircraft-no)

d) Personnel

   DEPARTMENT (Dept-no, Dept-name, Budget)
   EMPLOYEE (Emp-no, Emp-name, Salary, Dept-no, Manager-no)

(Note: Manager-no is the Emp-no of that employee's manager.)