## Term 3 Database Modelling Worksheet 2

1    Consider the following booking form used by a travel agency.

**Booking Number**   00453

**Hotel:**  Esplanade                      **Rating:**  ★★★
        Colwyn Bay
        North Wales

| Date | Room type | Number of rooms | Room rate |
|------|-----------|-----------------|-----------|
| 23/06/2016 | Front-facing double | 2 | $80 |
| 23/06/2016 | Rear-facing double | 1 | $65 |
| 24/06/2016 | Front-facing double | 2 | $80 |

(a)   Create a single file to store the above data. Indicate the attribute/field names on the first row of the file and a row that contains the data.
Example:

| Attribute 1 | Attribute 2 | Attribute 3 | … | Attribute N |
|-------------|-------------|-------------|---|-------------|
| 00453 | Esplanade | Colwyn Bay, NorthWales | | |
| | | | | |
| | | | | |

(b)   What is the normalised form of the table you create in a)  and state 2 problems with  the table?

(c)   Convert the table  you create in a) to third normal form, 3NF.
Present your design as 1 or more relations and its attributes.  Identify the primary key and foreign key  attributes with an underline and asterisk(*) respectively.
Example
RelationName (<u>Attribute 1</u>,Attribute2,Attribute3)
RelationName (<u>Attribute 1</u>,Attribute2,Attribute3*)

2 An art gallery wishes to computerize the information on their customers, artists and paintings. They may have several paintings by each artist in the gallery at one time. Paintings may be bought and sold more than once on different dates. In other words, the gallery may sell a painting, then buy it back at a later date and eventually sell it again. The art gallery is currently using a spreadsheet to keep track of its customers, paintings and customers' purchases. An initial migration of the spreadsheet data to a relational database is done. A sample of the tables used for recording such information is as follows:

**Customer**

| CustID | CustName | Contact |
|---|---|---|
| 5029 | Michael Tan | 87654321 |
| 7123 | John Koh | 94325671 |

**Purchase**

| CustID | PaintID | PaintName | ArtistID | ArtistName | Date | Price |
|---|---|---|---|---|---|---|
| 5029 | 334 | Winter Night | 15 | Alice Lim | 22/12/2015 | 7000 |
| 5029 | 125 | A fruit Basket | 23 | Robert Lo | 07/01/2013 | 1800 |
| 7123 | 067 | Self Potrait | 01 | Vincent Voo | 01/02/2014 | 928 |
| | 209 | Marketplace | 15 | Alice Lim | 02/14/2015 | 5500 |
| 5029 | 125 | A Fruit Basket | 23 | Robert Lo | 05/15/2016 | 2200 |

(a) Identify the primary key for the Customer and Purchase tables

(b) Are the Customer and Purchase tables in third normal form (3NF) ? Explain your reason.

(c) Normalised all the tables to third normal form(3NF). Present your design as 1 or more relations and its attributes. Show all attributes and identify the primary key and foreign key with an underline and asterisk(*) respectively.

(d) Draw the ERD after the relations are normalized to 3NF.

3  The following figure shows the partial contents of an unnormalised relational database  table for library book loans by an amateur database administrator.

| CallNo | Title | Author | Publisher ID | Publisher Name | Borrower ID | Borrower Name | Email | LoanDate |
|---|---|---|---|---|---|---|---|---|
| A2345 | Superhuman | Peter Smith | P0928 | Healthy Global | X894 | Robert Lim | roblim@gmail.com | 20181004 |
| A1133 | Agile Methodology | Sophia Jones | P7823 | CS Books | X894 | Robert Lim | roblim@gmail.com | 20181004 |
| B5104 | Python Advanced | Zen Wang | P8246 | Make It Harder | Y532 | Mary Tan | maryt@yahoo.com | 20181007 |
| A2257 | Computer Science | Berry Mile | P8246 | Make It Harder | X451 | Ben Neo | benn@gmail.com | 20181007 |
| B7513 | Alibaba | Jacky Ma | P3245 | Ali Pub | X451 | Ben Neo | benn@gmail.com | 20181007 |

(a) Give **two** potential anomalies that can occur with this design

(b) Draw an E-R diagram to represent your normalised design

(c) Give the table specification in 3NF