Task 1, Part 1: DB Design (15 marks)

Deliverable:

Using SQL, implement the database above. To do so, you'll need to normalise the table (should that be required), identify the attributes, create and Entity-Relationship Diagram and create the tables using SQL commands.

Normalise the table and Identify the attributes

1st Normal Form

Equipment_Quantity_Table

Mission_ID *	Mission_No	Agency_No	Mission Date	Equipment	Qty	Item Weight
1	ISS- 2237	178	14/12/2013	Portable Water Dispenser	2	100KG
2	ISS- 2237	178	14/12/2013	Flexable Airduct	6	0.5KG
3	ISS- 2237	178	14/12/2013	Small Storage/Rack	4	2KG
4	ISS- 3664	526	16/01/2014	Biofilter	6	0.2KG
5	ISS- 2356	167	12/02/2014	Small Storage/Rack	3	2KG
6	ISS- 2356	167	12/02/2014	Battery Pack	2	5KG
7	ISS- 2356	167	12/02/2014	Urine Transfertubing	2	1.5KG
8	ISS- 2356	167	12/02/2014	O2 Scrubber	1	50KG
9	ISS-1234	32	16/04/2014	Small Storage/Rack	1	2KG
10	ISS-1234	32	16/04/2014	Flexable Airduct	2	0.5KG

Agency_Table

Agency_No	Lead Agency	Country
178	JAXA	JAPAN
526	ESA	EU
167	NASA	USA
32	Roskosmos	Russia

2nd Normal Form

Equipment_Quantity_Table

Mission_ID *	Mission_No	Agency_No	Equipment	Qty	Item Weight
1	ISS- 2237	178	Portable Water Dispenser	2	100KG
2	ISS- 2237	178	Flexable Airduct	6	0.5KG
3	ISS- 2237	178	Small Storage/Rack	4	2KG
4	ISS- 3664	526	Biofilter	6	0.2KG
5	ISS- 2356	167	Small Storage/Rack	3	2KG
6	ISS- 2356	167	Battery Pack	2	5KG
7	ISS- 2356	167	Urine Transfertubing	2	1.5KG
8	ISS- 2356	167	O2 Scrubber	1	50KG
9	ISS-1234	32	Small Storage/Rack	1	2KG
10	ISS-1234	32	Flexable Airduct	2	0.5KG

Mission_Table

Mission_No *	Mission Date
ISS- 2237	14/12/2013
ISS- 3664	16/01/2014
ISS- 2356	12/02/2014
ISS-1234	16/04/2014

Agency_Table

Agency_No *	Lead Agency	Country
178	JAXA	JAPAN
526	ESA	EU
167	NASA	USA
32	Roskosmos	Russia

3rd Normal Form				

Equipment_Quantity_Table

Mission_ID *	Mission_No fk	Agcy_No fk	Equipment fk	Qty
1	ISS- 2237	178	Portable Water Dispenser	2
2	ISS- 2237	178	Flexable Airduct	6
3	ISS- 2237	178	Small Storage/Rack	4
4	ISS- 3664	526	Biofilter	6
5	ISS- 2356	167	Small Storage/Rack	3
6	ISS- 2356	167	Battery Pack	2
7	ISS- 2356	167	Urine Transfertubing	2
8	ISS- 2356	167	O2 Scrubber	1
9	ISS-1234	32	Small Storage/Rack	1
10	ISS-1234	32	Flexable Airduct	2

Equipment_Table

Equipment *	Item Weight
Portable Water Dispenser	100KG
Flexable Airduct	0.5KG
Small Storage/Rack	2KG
Biofilter	0.2KG
Battery Pack	5KG
Urine Transfertubing	1.5KG
O2 Scrubber	50KG

Agency_Table

Agency_No *	Lead Agency	Country
178	JAXA	JAPAN
526	ESA	EU
167	NASA	USA
32	Roskosmos	Russia

Mission_Table

Mission_No *	Mission Date
ISS- 2237	14/12/2013
ISS- 3664	16/01/2014
ISS- 2356	12/02/2014
ISS-1234	16/04/2014

Create Entity-Relationship Diagram

Entity Relationship Diagram
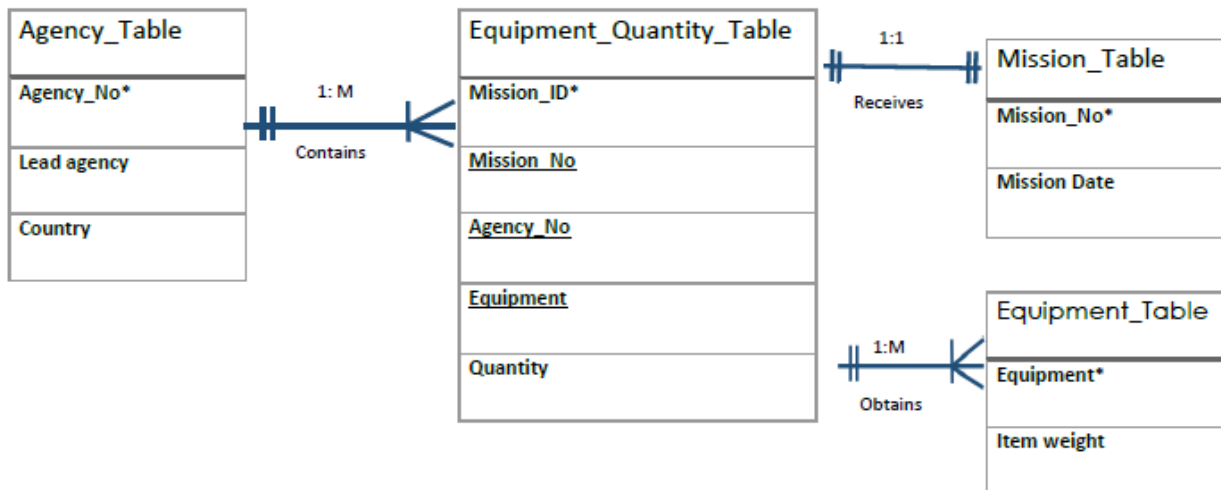
Create the tables using SQL commands

```
sql+

1 row created.
SQL> commit;
Commit complete.
SQL> select * from Agency_Table;
AGENCY_NO LEAD_AGENCY COUNTRY
--------- ----------- -------
      178 JAXA        JAPAN
      526 ESA         EU
      167 NASA        US
       32 Roskosmos   Russia
SQL> select * from Equipment_Table;
EQUIPMENT               ITEM_WEIGHT
----------------------- -----------
Portable Water Dispenser 100kg
Flexable Airduct         0.5kg
Biofilter                0.2kg
Small Storage/Rack       2.0kg
Battery Pack             5.0kg
Urine Transferturbing    1.5kg
O2 Scrubber              50kg
7 rows selected.
SQL> select * from Mission_Table;
MISSION_NO MISSION_DATE
---------- ------------
ISS-2237   14/12/2013
ISS-3664   16/01/2014
ISS-2356   12/02/2014
ISS-1234   16/04/2014
SQL> select * from Equipment_Quantity_Table;
MISSION_ID    MISSION_NO  AGENCY_NO EQUIPMENT               QUANTITY
---------- ------------- --------- ----------------------- --------
1          ISS-2237            178 Portable Water Dispenser       2
2          ISS-2237            178 Flexable Airduct               6
3          ISS-2237            178 Small Storage/Rack             4
4          ISS-3664            526 Biofilter                      6
5          ISS-2356            167 Small Storage/Rack             3
6          ISS-2356            167 Battery Pack                   2
7          ISS-2356            167 Urine Transferturbing          2
8          ISS-2356            167 O2 Scrubber                    1
9          ISS-1234             32 Small Storage/Rack             1
10         ISS-1234             32 Flexable Airduct               2
10 rows selected.
SQL>
```
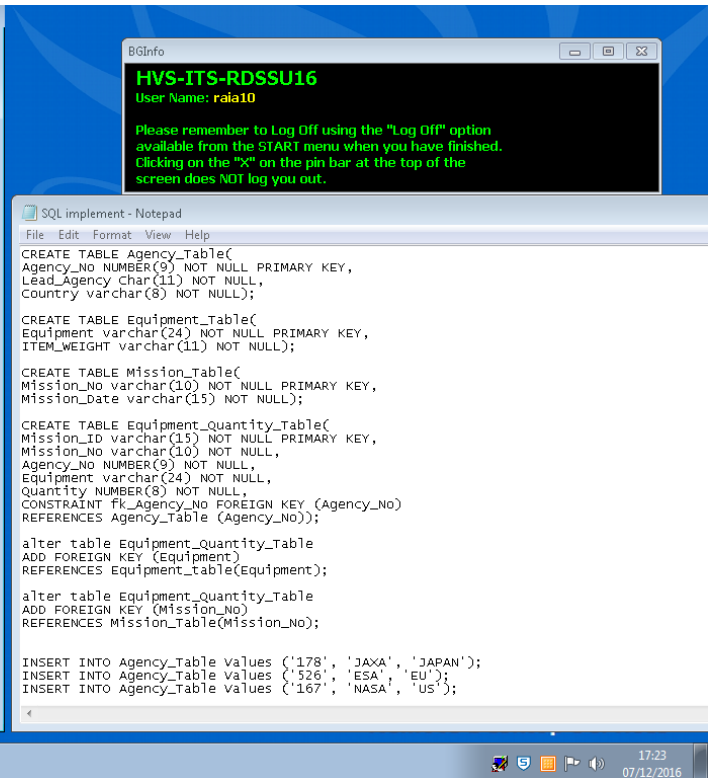
BGInfo

HVS-ITS-RDSSU16
User Name: raia10

Please remember to Log Off using the "Log Off" option
available from the START menu when you have finished.
Clicking on the "X" on the pin bar at the top of the
screen does NOT log you out.

SQL implement - Notepad
File   Edit   Format   View   Help

```
CREATE TABLE Agency_Table(
Agency_No NUMBER(9) NOT NULL PRIMARY KEY,
Lead_Agency Char(11) NOT NULL,
Country varchar(8) NOT NULL);

CREATE TABLE Equipment_Table(
Equipment varchar(24) NOT NULL PRIMARY KEY,
ITEM_WEIGHT varchar(11) NOT NULL);

CREATE TABLE Mission_Table(
Mission_No varchar(10) NOT NULL PRIMARY KEY,
Mission_Date varchar(15) NOT NULL);

CREATE TABLE Equipment_Quantity_Table(
Mission_ID varchar(15) NOT NULL PRIMARY KEY,
Mission_No varchar(10) NOT NULL,
Agency_No NUMBER(9) NOT NULL,
Equipment varchar(24) NOT NULL,
Quantity NUMBER(8) NOT NULL,
CONSTRAINT fk_Agency_No FOREIGN KEY (Agency_No)
REFERENCES Agency_Table (Agency_No));

alter table Equipment_Quantity_Table
ADD FOREIGN KEY (Equipment)
REFERENCES Equipment_table(Equipment);

alter table Equipment_Quantity_Table
ADD FOREIGN KEY (Mission_No)
REFERENCES Mission_Table(Mission_No);

INSERT INTO Agency_Table Values ('178', 'JAXA', 'JAPAN');
INSERT INTO Agency_Table Values ('526', 'ESA', 'EU');
INSERT INTO Agency_Table Values ('167', 'NASA', 'US');
```

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SQL implement - Notepad
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```
Mission_Date varchar(15) NOT NULL);

CREATE TABLE Equipment_Quantity_Table(
Mission_ID varchar(15) NOT NULL PRIMARY KEY,
Mission_No varchar(10) NOT NULL,
Agency_No NUMBER(9) NOT NULL,
Equipment varchar(24) NOT NULL,
Quantity NUMBER(8) NOT NULL,
CONSTRAINT fk_Agency_No FOREIGN KEY (Agency_No)
REFERENCES Agency_Table (Agency_No));

alter table Equipment_Quantity_Table
ADD FOREIGN KEY (Equipment)
REFERENCES Equipment_table(Equipment);

alter table Equipment_Quantity_Table
ADD FOREIGN KEY (Mission_No)
REFERENCES Mission_Table(Mission_No);

INSERT INTO Agency_Table Values ('178', 'JAXA', 'JAPAN');
INSERT INTO Agency_Table Values ('526', 'ESA', 'EU');
INSERT INTO Agency_Table Values ('167', 'NASA', 'US');
INSERT INTO Agency_Table Values ('32', 'Roskosmos', 'Russia');

INSERT INTO Equipment_Table Values ('Portable Water Dispenser', '100kg');
INSERT INTO Equipment_Table Values ('Flexable Airduct', '0.5kg');
INSERT INTO Equipment_Table Values ('Biofilter', '0.2kg');
INSERT INTO Equipment_Table Values ('Small Storage/Rack', '2.0kg');
INSERT INTO Equipment_Table Values ('Battery Pack', '5.0kg');
INSERT INTO Equipment_Table Values ('Urine Transferturbing', '1.5kg');
INSERT INTO Equipment_Table Values ('O2 Scrubber', '50kg');

INSERT INTO Mission_Table Values ('ISS-2237', '14/12/2013');
INSERT INTO Mission_Table Values ('ISS-3664', '16/01/2014');
INSERT INTO Mission_Table Values ('ISS-2356', '12/02/2014');
INSERT INTO Mission_Table Values ('ISS-1234', '16/04/2014');

INSERT INTO Equipment_Quantity_Table Values ('1', 'ISS-2237', '178', 'Portable Water Dispenser', '2');
INSERT INTO Equipment_Quantity_Table Values ('2', 'ISS-2237', '178', 'Flexable Airduct', '6');
INSERT INTO Equipment_Quantity_Table Values ('3', 'ISS-2237', '178', 'Small Storage/Rack', '4');
INSERT INTO Equipment_Quantity_Table Values ('4', 'ISS-3664', '526', 'Biofilter', '6');
INSERT INTO Equipment_Quantity_Table Values ('5', 'ISS-2356', '167', 'Small Storage/Rack', '3');
INSERT INTO Equipment_Quantity_Table Values ('6', 'ISS-2356', '167', 'Battery Pack', '2');
INSERT INTO Equipment_Quantity_Table Values ('7', 'ISS-2356', '167', 'Urine Transferturbing', '2');
INSERT INTO Equipment_Quantity_Table Values ('8', 'ISS-2356', '167', 'O2 Scrubber', '1');
INSERT INTO Equipment_Quantity_Table Values ('9', 'ISS-1234', '32', 'Small Storage/Rack', '1');
INSERT INTO Equipment_Quantity_Table Values ('10', 'ISS-1234', '32', 'Flexable Airduct', '2');
```

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SQL Commands:

```
CREATE TABLE Agency_Table(
Agency_No NUMBER(9) NOT NULL PRIMARY KEY,
Lead_Agency Char(11) NOT NULL,
Country varchar(8) NOT NULL);

CREATE TABLE Equipment_Table(
Equipment varchar(24) NOT NULL PRIMARY KEY,
ITEM_WEIGHT varchar(11) NOT NULL);

CREATE TABLE Mission_Table(
Mission_No varchar(10) NOT NULL PRIMARY KEY,
Mission_Date varchar(15) NOT NULL);

CREATE TABLE Equipment_Quantity_Table(
Mission_ID varchar(15) NOT NULL PRIMARY KEY,
Mission_No varchar(10) NOT NULL,
Agency_No NUMBER(9) NOT NULL,
Equipment varchar(24) NOT NULL,
Quantity NUMBER(8) NOT NULL,
CONSTRAINT fk_Agency_No FOREIGN KEY (Agency_No)
REFERENCES Agency_Table (Agency_No));

alter table Equipment_Quantity_Table
ADD FOREIGN KEY (Equipment)
REFERENCES Equipment_table(Equipment);

alter table Equipment_Quantity_Table
ADD FOREIGN KEY (Mission_No)
REFERENCES Mission_Table(Mission_No);


INSERT INTO Agency_Table Values ('178', 'JAXA', 'JAPAN');
INSERT INTO Agency_Table Values ('526', 'ESA', 'EU');
INSERT INTO Agency_Table Values ('167', 'NASA', 'US');
INSERT INTO Agency_Table Values ('32', 'Roskosmos', 'Russia');


INSERT INTO Equipment_Table Values ('Portable Water Dispenser', '100kg');
INSERT INTO Equipment_Table Values ('Flexable Airduct', '0.5kg');
INSERT INTO Equipment_Table Values ('Biofilter', '0.2kg');
INSERT INTO Equipment_Table Values ('Small Storage/Rack', '2.0kg');
INSERT INTO Equipment_Table Values ('Battery Pack', '5.0kg');
INSERT INTO Equipment_Table Values ('Urine Transferturbing', '1.5kg');
INSERT INTO Equipment_Table Values ('O2 Scrubber', '50kg');

INSERT INTO Mission_Table Values ('ISS-2237', '14/12/2013');
INSERT INTO Mission_Table Values ('ISS-3664', '16/01/2014');
INSERT INTO Mission_Table Values ('ISS-2356', '12/02/2014');
INSERT INTO Mission_Table Values ('ISS-1234', '16/04/2014');

INSERT INTO Equipment_Quantity_Table Values ('1', 'ISS-2237', '178', 'Portable Water Dispenser', '2');
INSERT INTO Equipment_Quantity_Table Values ('2', 'ISS-2237', '178', 'Flexable Airduct', '6');
INSERT INTO Equipment_Quantity_Table Values ('3', 'ISS-2237', '178', 'Small Storage/Rack', '4');
INSERT INTO Equipment_Quantity_Table Values ('4', 'ISS-3664', '526', 'Biofilter', '6');
INSERT INTO Equipment_Quantity_Table Values ('5', 'ISS-2356', '167', 'Small Storage/Rack', '3');
INSERT INTO Equipment_Quantity_Table Values ('6', 'ISS-2356', '167', 'Battery Pack', '2');
INSERT INTO Equipment_Quantity_Table Values ('7', 'ISS-2356', '167', 'Urine Transferturbing', '2');
INSERT INTO Equipment_Quantity_Table Values ('8', 'ISS-2356', '167', 'O2 Scrubber', '1');
INSERT INTO Equipment_Quantity_Table Values ('9', 'ISS-1234', '32', 'Small Storage/Rack', '1');
INSERT INTO Equipment_Quantity_Table Values ('10', 'ISS-1234', '32', 'Flexable Airduct', '2');
```