KLE Technological University | Creating Value Leveraging Knowledge

COURSE PROJECT

Design Phase Report

Title : Space Agency Database

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Team Leader: Shuchith G.C.

List of Team Members:

NAME	USN	ROLL NUMBER
ABHISHEK	01FE21BCI004	104
JIYA LAMBA	01FE21BCI027	126
SHUCHITH G.C.	01FE21BCI029	127
MITALI KULKARNI	01FE21BCI031	129

Responsibilities: What is the role of each project member in the project? (Be specific)

NAME	RESPONSIBILITIES
ABHISHEK	E R Diagram, Identifying entities
JIYA LAMBA	Designing database, Documentation of all phases
SHUCHITH G.C.	E R Diagram, Relation Schema, Identifying attributes
MITALI KULKARNI	Designing of Queries, Documentation of all phases

Problem Description:

Create a space agency database in which employees working in different branches are working on missions built for launch vehicles that carry spacecraft which are located on different planets. The database contains information about relationships among the various entities that we have considered and their participation in the relation.

Requirements:

➢ We can access the employee general information which won't be confidential and can be shared to others by the concern of the respective employee.

➢ Every piece of information related to mission launched will be available in a single window.

➢ We can access the information related to the Branch missions including

the space-craft and launch vehicle.

➢ We can access the status of missions along the space craft and its respective planet.

➢ We can modify any information if we get any new improvements.

Design Questions to be answered :

Question 1: From the problem description, identify the entities that need to be represented in the database, the attributes of each entity, the relationships between the entities, and the cardinality ratios of each relationship.

Entities And Attributes:

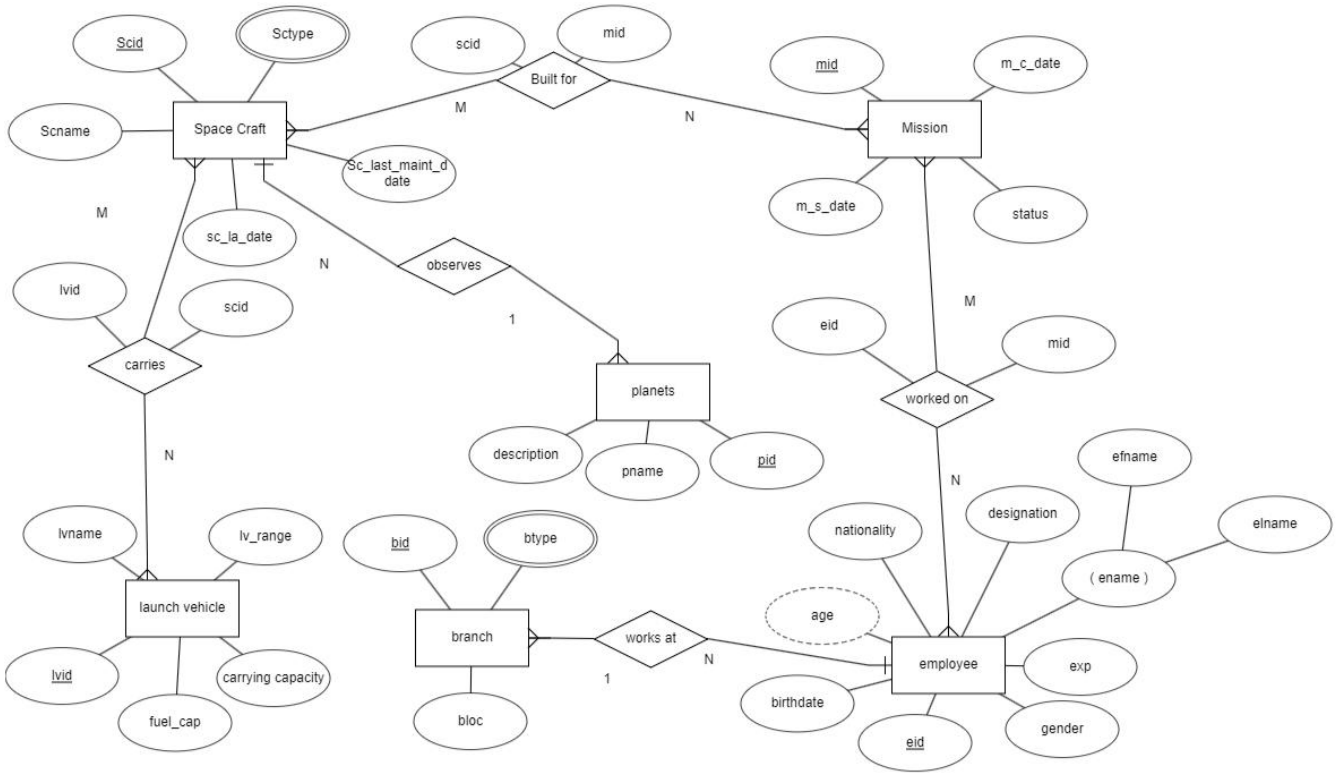
ENTITY	ATTRIBUTES
Spacecraft	**Scid**, scname, sc_la_date, sctype, sc_last_maint_date, pid
Launch vehicle	**Lvid,** lv_range, lvname, fuel_cap, carrying capacity
Branch	**Bid,** btype, block
Mission	**Mid,** m_c_date, m_s_date, status
Employee	**Eid,** ename, exp, gender, birthdate, nationality, designation, age, bid
Planets	**Pid,** pname, description

Question 2: Draw an Entity-Relationship Diagram illustrating the information you have identified in Question 1.

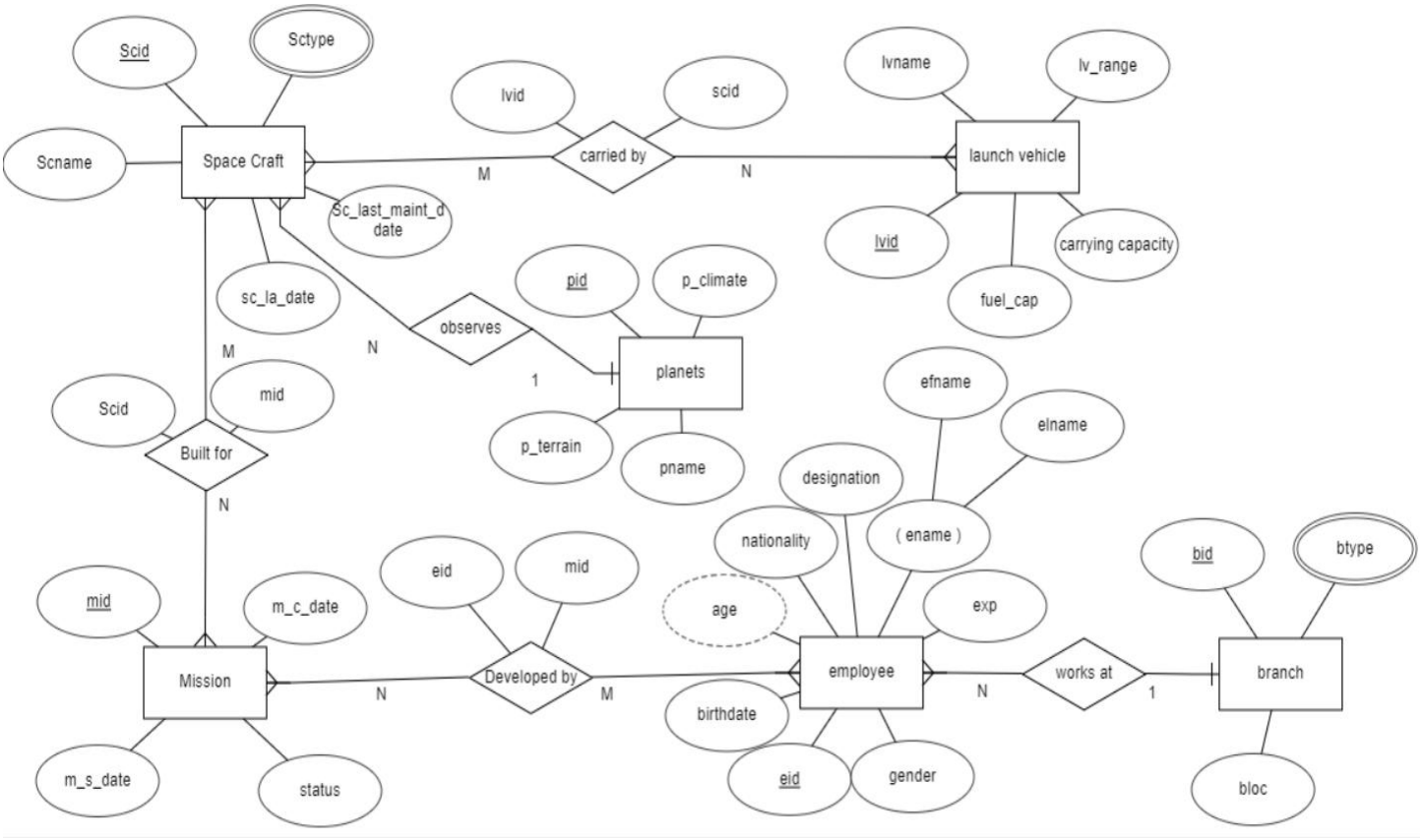
Relationship Table :

ENTITY-A	ENTITY-B	RELATION	CARDINALITY RATIO
Space_craft	Mission	Build for	M:N
Space_craft	Planets	Observes	N:1
Space_craft	Launch_vehicle	Carries	M:N
Branch	Employee	Works at	1:N
Mission	Employee	Worked on	M:N

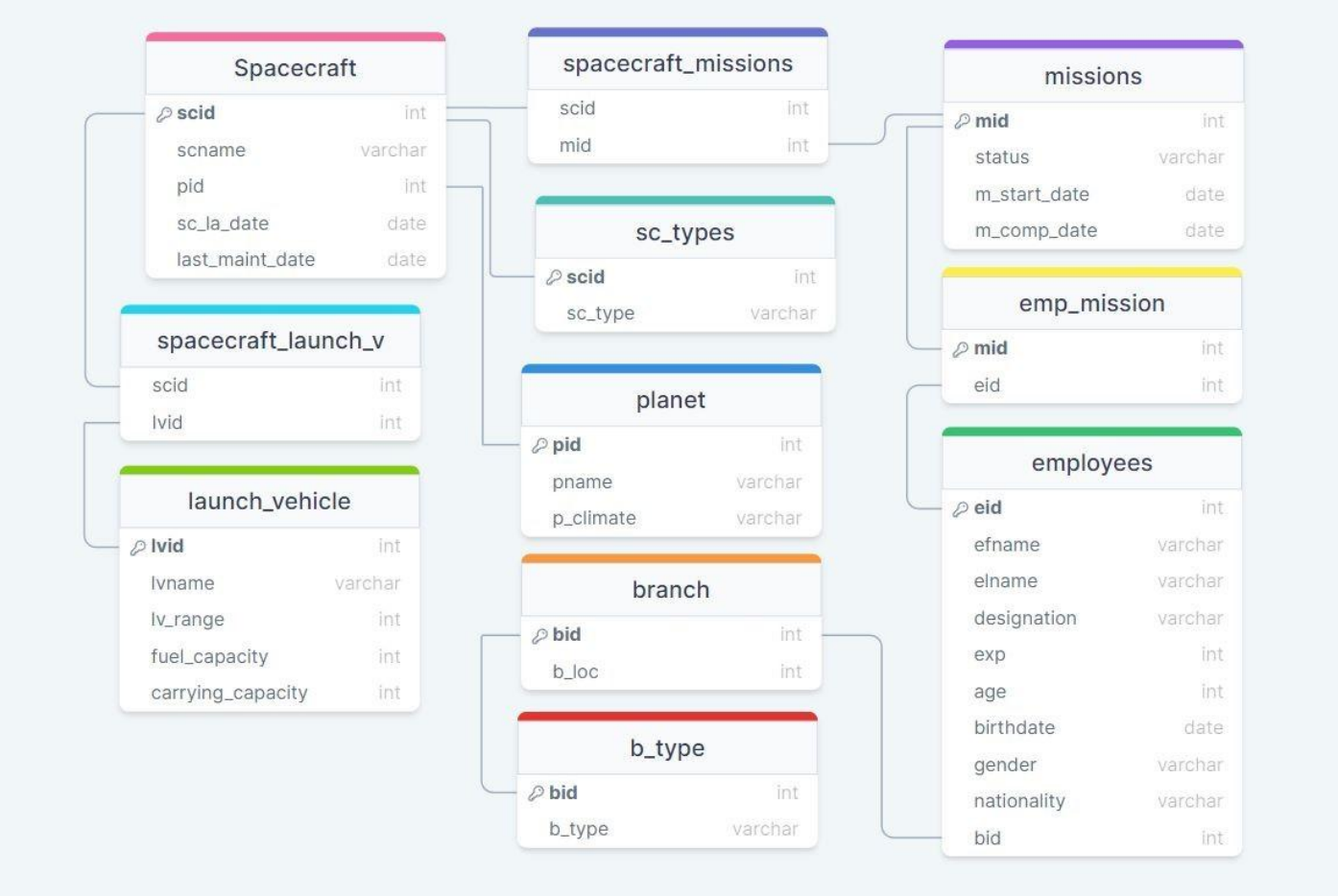
Question 3: Draw **alternate** Entity-Relationship Diagram illustrating the information you have identified in Question 1 that you think are most likely to occur.



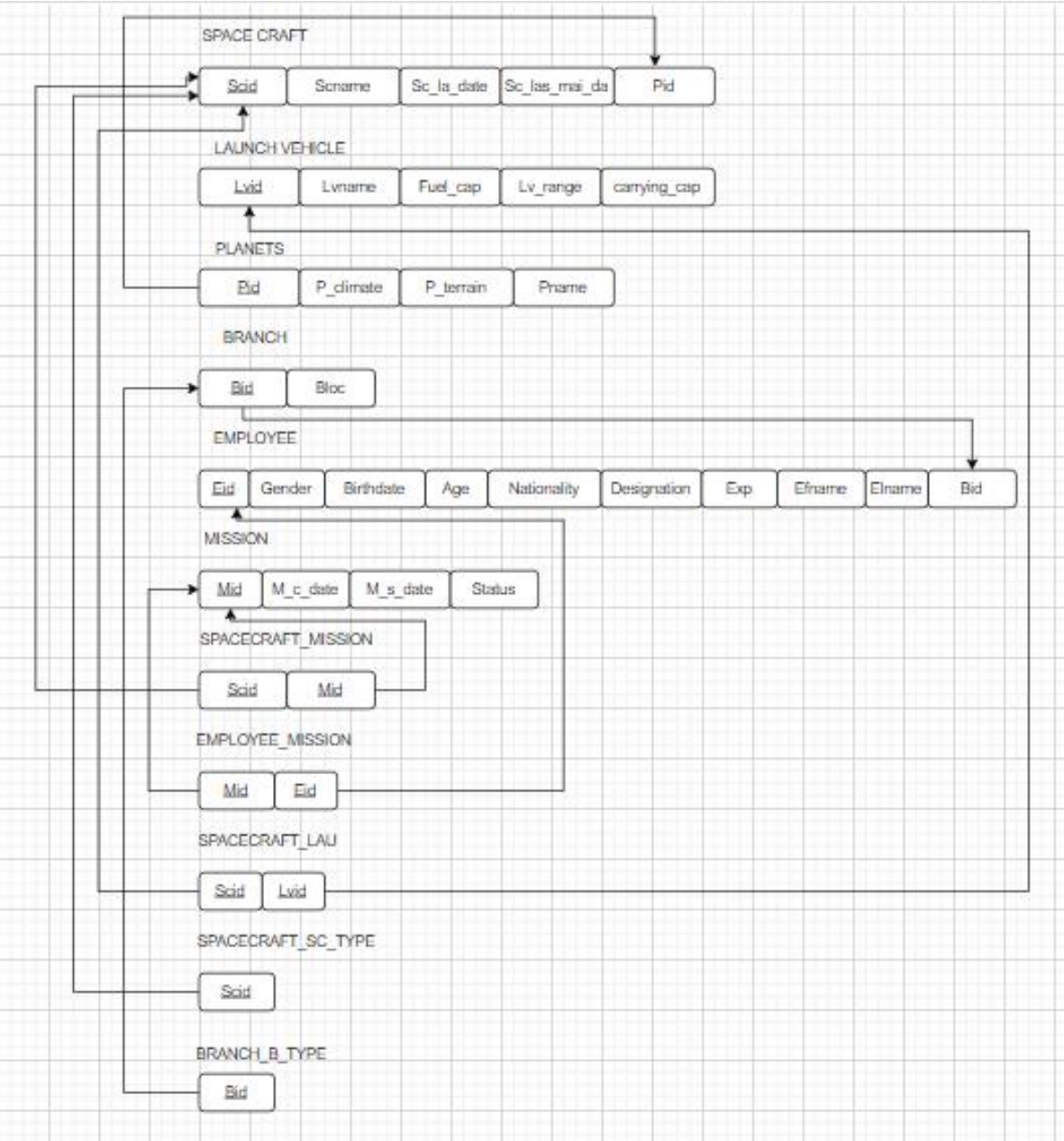
Question 4: Choose the **optimal** Entity-Relationship Diagram from the designs provided above and justify why you think this is an optimal solution for your identified problem specification.



Question 5: Draw an Object Model illustrating the information you have identified in Question 2.



Question 6: Draw an ER to Relation Mapping illustrating the information you have identified in Question 4.



Question 7: Draw a Data Dictionary illustrating the information you have identified in Question 6.

Object (Entity)	**Name (Attribute)**	**Type (Data type)**	**Description**	**Primary Key**	**Foreign Key**
Spacecraft	Scid	Number	UNIQUE IDENTIFICATION NUMBER FOR SPACECRAFT	Yes	No
	scname	Varchar	NAME OF SPACECRAFT	No	No
	Sc_la_date	Date	LAUNCH DATE OF SPACECRAFT	No	No
	sctype	Varchar	TYPE OF SPACECRAFT	No	No
	Sc_la_maint_date	Date	LAST MAINTAINANCE DATE OF SPACECRAFT	No	No
	pid	Number	UNIQUE IDENTIFICATION NUMBER FOR PLANET	No	Yes
Launch_vehicle	lvid	Number	UNIQUE IDENTIFICATION NUMBER FOR LAUNCH VEHICLE	Yes	No
	lvname	Varchar	LAUNCH VEHICLE	No	No

			NAME		
	capacity	Number	CAPACITY OF LAUNCH VEHICLE	No	No
	Fuel_cap	Number	FUEL CAPACITY	No	No
	Lv_range	Number	LAUNCH VEHICLE RANGE	No	No
Branch	bid	Number	UNIQUE IDENTIFICATION NUMBER FOR BRANCH	Yes	No
	btype	Varchar	TYPE OF BRANCH	No	No
	bloc	Varchar	BRANCH LOCATION	No	No
Mission	mid	Number	UNIQUE IDENTIFICATION NUMBER FOR MISSION	Yes	No
	M_s_date	Date	MISSION START DATE	No	No
	M_c_date	Date	MISSION COMPLETE DATE	No	No
	status	Varchar	STATUS OF THE MISSION	No	No
Employee	eid	Number	UNIQUE IDENTIFICATION NUMBER FOR EMPLOYEE	Yes	No
	E_f_name	Varchar	EMPLOYEE FIRST NAME	No	No

	E_l_name	Varchar	EMPLOYEE LAST NAME	No	No
	designation	Varchar	DESIGNATION OF EMPLOYEE	No	No
	age	Number	AGE OF EMPLOYEE	No	No
	birthdate	Date	BIRTH-DATE OF EMPLOYEE	No	No
	experience	Number	EXPERIENCE OF EMPLOYEE	No	No
	gender	Varchar	GENDER OF EMPLOYEE	No	No
	nationality	Varchar	NATIONALITY OF EMPLOYEE	No	No
	bid	Number	UNIQUE IDENTIFICATION NUMBER FOR BRANCH	No	Yes
Planets	pid	Number	UNIQUE IDENTIFICATION NUMBER FOR PLANET	Yes	No
	pname	Varchar	NAME OF THE PLANET	No	No
	Climate	Varchar	CLIMATE OF PLANET	No	No
	Terrain	Varchar	TERRAIN OF THE PLANET	Nn	No
Sc_type	scid	Number	UNIQUE IDENTIFICATION	No	Yes

			NUMBER FOR SPACE-TYPE		
	Sc_type	Varchar	TYPE OF SPACECRAFT	No	No
Branch_type	bid	Number	UNIQUE IDENTIFICATION NUMBER FOR BRANCH-TYPE	No	Yes
	btype	Varchar	TYPE OF BRANCH	No	No

Question 8: Normalization: : Are all the relations in your chosen schema in 3NF? Are they in BCNF? Explain
your answers. If any of your relations are not in BCNF, normalize them to BCNF. If you choose to normalize
your relations only till 2NF or 3NF, explain your reasons (e.g., the amount of redundancy introduced is limited
or some other valid reason).

1.) **Space_craft:**

- The table is in BCNF form as:

- All attributes have one value hence atomicity is preserved.
- There are no non-trivial functional dependencies.
- All non-prime attributes are fully functional dependent on the primary key.
- No transitive dependencies exist.

2.)**Launch_vehicle:**

- The table is in BCNF form as:

- All attributes have one value hence atomicity is preserved.
- There are no non-trivial functional dependencies.
- All non-prime attributes are fully functional dependent on the primary key.
- No transitive dependencies exist.

3.) **Branch:**

- The table is in BCNF form as:

- All attributes have one value hence atomicity is preserved.
- There are no non-trivial functional dependencies.
- All non-prime attributes are fully functional dependent on the primary key.
- No transitive dependencies exist.

4.) **Missions:**

- The table is in BCNF form as:

- All attributes have one value hence atomicity is preserved.
- There are no non-trivial functional dependencies.
- All non-prime attributes are fully functional dependent on the primary key.
- No transitive dependencies exist.

5.) **Employee:**

- The table is in BCNF form as:

- All attributes have one value hence atomicity is preserved.
- There are no non-trivial functional dependencies.
- All non-prime attributes are fully functional dependent on the primary key.
- No transitive dependencies exist.

6.) **Planets:**

- The table is in BCNF form as:

- All attributes have one value hence atomicity is preserved.
- There are no non-trivial functional dependencies.
- All non-prime attributes are fully functional dependent on the primary key.
- No transitive dependencies exist.

Question 9: Choose the **optimal** normalized schema from Question 8 and justify why you think this is an optimal solution.

ENTITY	ATTRIBUTES
Spacecraft	**Scid**, scname, sc_la_date, sctype, sc_last_maint_date
Launch vehicle	**Lvid,** lv_range, lvname, fuel_cap, carrying capacity
Branch	**Bid,** bloc
Mission	**Mid,** m_c_date, m_s_date, status
Employee	**Eid,** ename, exp, gender, birthdate, nationality, designation, age, bid
Planets	**Pid,** pname, description
Space_craft_launch_vehicle	**Scid, lvid**
Missions_space_craft	**Mid, scid**
Missions_employee	**Mid, eid**
Sc_type	**Scid, sctype**
Branch_type	**Bid, btype**

IMPLEMENTATION PHASE

```
drop table missions_employee cascade constraints;
drop table missions_space_craft cascade constraints;
drop table space_craft_launch_vehicle cascade constraints;
drop table planets cascade constraints;
Drop table space_craft cascade constraints;
drop table launch_vehicle cascade constraints;
drop table branches cascade constraints;
drop table employee cascade constraints;
drop table missions cascade constraints;
drop table sc_types cascade constraints;
drop table branch_type cascade constraints;
```

```
--CREATING TABLES--

CREATE TABLE planets (
_pid NUMBER(10) PRIMARY KEY,
_pname VARCHAR2(50),
_p_climate VARCHAR2(10),
_p_terrain VARCHAR2(10)
);
```

```
CREATE TABLE space_craft (
_scid NUMBER(10) PRIMARY KEY,
_scname VARCHAR2(20),
_sc_la_date DATE,
_sc_last_maint_d DATE,
_pid NUMBER(10) REFERENCES planets(pid)
);

create table sc_types(
scid number(10) references space_craft(scid),
sc_type varchar(30));

CREATE TABLE launch_vehicle (
```

```
_lvid NUMBER(10) PRIMARY KEY,
_lvname VARCHAR2(30),
_carry_capacity NUMBER(10),
_fuel_cap NUMBER(10),
_lv_range NUMBER(10)
);

CREATE TABLE branches (
_bid NUMBER(10) PRIMARY KEY,
_bloc VARCHAR2(20)
);

CREATE TABLE branch_type (
_bid NUMBER(10) references branches(bid),
_btype VARCHAR2(40)
);

CREATE TABLE employee (
_eid NUMBER(10) PRIMARY KEY,
_e_f_name VARCHAR2(50),
_e_l_name VARCHAR2(50),
_designation VARCHAR2(30),
_age NUMBER(3),
_birthdate DATE,
_experience NUMBER(3),
_gender VARCHAR2(10),
_nationality VARCHAR2(50),
_bid number(10) references branches(bid)
);

CREATE TABLE missions (
_mid NUMBER(10) PRIMARY KEY,
_m_s_date DATE,
_m_c_date DATE,
_status VARCHAR2(50)
);


CREATE TABLE space_craft_launch_vehicle (
_scid NUMBER(10) REFERENCES space_craft(scid),
_lvid NUMBER(10) REFERENCES launch_vehicle(lvid),
_PRIMARY KEY (scid, lvid)
);
```

```
CREATE TABLE missions_space_craft (
_mid NUMBER(10) REFERENCES missions(mid),
_scid NUMBER(10) REFERENCES space_craft(scid),
_PRIMARY KEY (mid, scid)
);

CREATE TABLE missions_employee (
_mid NUMBER(10) REFERENCES missions(mid),
_eid NUMBER(10) REFERENCES employee(eid),
_PRIMARY KEY (mid, eid)
);


--INSERT INTO TABLES--

--INSERT INTO PLANETS--

INSERT INTO planets  VALUES (1, 'Mars', 'cold', 'rocky');
INSERT INTO planets VALUES (2, 'Venus', 'hot', 'rocky');
INSERT INTO planets VALUES (3, 'Jupiter', 'cold', 'gaseous');
INSERT INTO planets VALUES (4, 'Saturn', 'cold', 'gaseous');
INSERT INTO planets VALUES (5, 'Mercury', 'hot', 'rocky');
INSERT INTO planets VALUES (6, 'Neptune', 'cold', 'gaseous');
INSERT INTO planets VALUES (7, 'Uranus', 'cold', 'gaseous');
INSERT INTO planets VALUES (8, 'Pluto', 'cold', 'rocky');
INSERT INTO planets VALUES (9, 'Earth', 'moderate', 'rocky');
INSERT INTO planets VALUES (10, 'Moon', 'cold', 'rocky');

SELECT * FROM PLANETS;
```

	PID	PNAME	DESCRIPTION
1	1	Mercury	The smallest planet.
2	2	Venus	The hottest planet.
3	3	Earth	The only known planet with life.
4	4	Mars	The possible candidate for future human colonization.
5	5	Jupiter	Has double the mass of all the other planets combined.
6	6	Saturn	The second-largest planet in our solar system, and is known for its prominent rings.
7	7	Uranus	The seventh planet from the Sun, and is tilted at a nearly 90-degree angle.
8	8	Neptune	The most distant planet from the Sun.
9	9	Pluto	A dwarf planet located in the Kuiper belt.
10	10	Eris	Located in the scattered disc region and is the most massive known dwarf planet.

--INSERT INTO SPACE_CRAFT--

```
INSERT INTO space_craft (scid, scname, sc_la_date, sc_last_maint_d,pid)
VALUES (1, 'Voyager 1', '05-09-1977', '15-09-1980',1);

INSERT INTO space_craft (scid, scname, sc_la_date, sc_last_maint_d,pid)_
VALUES (2, 'Voyager 2', '20-08-1977', '10-12-1989',2);

INSERT INTO space_craft (scid, scname, sc_la_date, sc_last_maint_d,pid)_
VALUES (3, 'Cassini', '15-10-1997', '15-09-2017',3);


INSERT INTO space_craft (scid, scname, sc_la_date, sc_last_maint_d,pid)_
VALUES (4, 'New Horizons', '19-01-2006', '15-10-2016',4);

INSERT INTO space_craft (scid, scname, sc_la_date, sc_last_maint_d,pid)_
VALUES (5, 'Apollo 11', '16-07-1969', '24-07-1969',5);

INSERT INTO space_craft (scid, scname, sc_la_date, sc_last_maint_d,pid)_
VALUES (6, 'Curiosity', '26-11-2011', '30-11-2019',6);

INSERT INTO space_craft (scid, scname, sc_la_date, sc_last_maint_d,pid)_
VALUES (7, 'Hubble Telescope', '24-04-1990', '15-05-2009',7);

INSERT INTO space_craft (scid, scname, sc_la_date, sc_last_maint_d,pid)_
VALUES (8, 'Mars Pathfinder', '04-12-1996', '27-09-1997',8);

INSERT INTO space_craft (scid, scname, sc_la_date, sc_last_maint_d,pid)_
```

```
VALUES (9, 'Juno', '05-08-2011', '30-10-2018',9);

INSERT INTO space_craft (scid, scname, sc_la_date, sc_last_maint_d,pid)_
VALUES (10, 'Rosetta', '02-03-2004', '30-09-2016',10);

INSERT INTO space_craft (scid, scname, sc_la_date, sc_last_maint_d,pid)_
VALUES (11, 'Huygens', TO_DATE('2005-01-14', 'yyyy-mm-dd'), TO_DATE('2005-01-14', 'yyyy-mm-
dd'),1);

INSERT INTO space_craft (scid, scname, sc_la_date, sc_last_maint_d,pid)_
VALUES (12, 'Kepler', TO_DATE('2009-03-07', 'yyyy-mm-dd'), TO_DATE('2013-05-15', 'yyyy-mm-dd'),2);

INSERT INTO space_craft (scid, scname, sc_la_date, sc_last_maint_d,pid)_
VALUES (13, 'Opportunity', TO_DATE('2003-07-07', 'yyyy-mm-dd'), TO_DATE('2018-06-10', 'yyyy-mm-
dd'),3);

INSERT INTO space_craft (scid, scname, sc_la_date, sc_last_maint_d,pid)_
VALUES (14, 'New Horizon', TO_DATE('2006-01-19', 'yyyy-mm-dd'), TO_DATE('2018-08-02', 'yyyy-mm-
dd'),4);

INSERT INTO space_craft (scid, scname, sc_la_date, sc_last_maint_d,pid)_
VALUES (15, 'Chandra XRay', TO_DATE('1999-07-23', 'yyyy-mm-dd'), TO_DATE('2019-07-20', 'yyyy-mm-
dd'),5);

INSERT INTO space_craft (scid, scname, sc_la_date, sc_last_maint_d,pid)_
VALUES (16, 'Curiosity', TO_DATE('2011-11-26', 'yyyy-mm-dd'), TO_DATE('2021-03-09', 'yyyy-mm-
dd'),6);

INSERT INTO space_craft (scid, scname, sc_la_date, sc_last_maint_d,pid)_
VALUES (17, 'Crew Dragon', TO_DATE('2020-05-30', 'yyyy-mm-dd'), TO_DATE('2020-05-30', 'yyyy-mm-
dd'),7);

INSERT INTO space_craft (scid, scname, sc_la_date, sc_last_maint_d,pid)_
VALUES (18, 'Mars 2020', TO_DATE('2020-07-30', 'yyyy-mm-dd'), TO_DATE('2020-07-30', 'yyyy-mm-
dd'),8);

INSERT INTO space_craft (scid, scname, sc_la_date, sc_last_maint_d,pid)_
VALUES (19, 'Jupiter Explo', TO_DATE('2022-02-22', 'YYYY-MM-DD'), TO_DATE('2023-01-15', 'YYYY-MM-
DD'),9);

INSERT INTO space_craft (scid, scname, sc_la_date, sc_last_maint_d,pid)_
VALUES (20, 'Venus Explo', TO_DATE('2022-06-18', 'YYYY-MM-DD'), TO_DATE('2023-02-22', 'YYYY-MM-
DD'),10);
```

select * from space_craft;

	SCID	SCNAME	SCTYPE	SCMISSION	SC_LA_DATE	SC_LAST_MAINT_D	PID
1	1	Voyager 1	Probe	Jupiter flyby	05-09-77	15-09-80	1
2	2	Voyager 2	Probe	Jupiter flyby	20-08-77	10-12-89	2
3	3	Cassini	Probe	Saturn exploration	15-10-97	15-09-17	3
4	4	New Horizons	Probe	Pluto flyby	19-01-06	15-10-16	4
5	5	Apollo 11	Lunar Lander	Lunar landing	16-07-69	24-07-69	5
6	6	Curiosity	Rover	Mars exploration	26-11-11	30-11-19	6
7	7	Hubble Space Telescope	Space Telescope	Astronomical observations	24-04-90	15-05-09	7
8	8	Mars Pathfinder	Lander	Mars exploration	04-12-96	27-09-97	8
9	9	Juno	Probe	Jupiter exploration	05-08-11	30-10-18	9
10	10	Rosetta	Probe	Comet exploration	02-03-04	30-09-16	10
11	11	Huygens	lander	Cassini-Huygens	14-01-05	14-01-05	1
12	12	Kepler	telescope	Kepler	07-03-09	15-05-13	2
13	13	Opportunity	rover	Mars Exploration Rover	07-07-03	10-06-18	3
14	14	New Horizons	probe	New Horizons	19-01-06	02-08-18	4
15	15	Chandra X-Ray Observatory	telescope	Chandra X-Ray Observatory	23-07-99	20-07-19	5
16	16	Curiosity	rover	Mars Science Laboratory	26-11-11	09-03-21	6
17	17	Crew Dragon	capsule	Commercial Crew Development	30-05-20	30-05-20	7
18	18	Mars 2020	rover	Mars 2020	30-07-20	30-07-20	8
19	19	Jupiter Explorer	Probe	Exploration of Jupiter	22-02-22	15-01-23	9
20	20	Venus Explorer	Probe	Exploration of Venus	18-06-22	22-02-23	10

--INSERT INTO SC_TYPES--

```
INSERT INTO sc_types (scid, sc_type) VALUES (1, 'orbital rocket');
INSERT INTO sc_types (scid, sc_type) VALUES (2, 'lunar lander');
INSERT INTO sc_types (scid, sc_type) VALUES (3, 'interplanetary probe');
INSERT INTO sc_types (scid, sc_type) VALUES (4, 'orbital rocket');
INSERT INTO sc_types (scid, sc_type) VALUES (5, 'lunar lander');
INSERT INTO sc_types (scid, sc_type) VALUES (5, 'orbital rocket');
INSERT INTO sc_types (scid, sc_type) VALUES (6, 'interplanetary probe');
INSERT INTO sc_types (scid, sc_type) VALUES (7, 'orbital rocket');
INSERT INTO sc_types (scid, sc_type) VALUES (8, 'lunar lander');
INSERT INTO sc_types (scid, sc_type) VALUES (8, 'interplanetary probe');
INSERT INTO sc_types (scid, sc_type) VALUES (9, 'interplanetary probe');
INSERT INTO sc_types (scid, sc_type) VALUES (10, 'orbital rocket');
INSERT INTO sc_types (scid, sc_type) VALUES (11, 'lunar lander');
INSERT INTO sc_types (scid, sc_type) VALUES (12, 'interplanetary probe');
INSERT INTO sc_types (scid, sc_type) VALUES (12, 'lunar lander');
INSERT INTO sc_types (scid, sc_type) VALUES (13, 'orbital rocket');
INSERT INTO sc_types (scid, sc_type) VALUES (14, 'lunar lander');
INSERT INTO sc_types (scid, sc_type) VALUES (14, 'orbital rocket');
INSERT INTO sc_types (scid, sc_type) VALUES (15, 'interplanetary probe');
```

```
INSERT INTO sc_types (scid, sc_type) VALUES (16, 'orbital rocket');
INSERT INTO sc_types (scid, sc_type) VALUES (17, 'lunar lander');
INSERT INTO sc_types (scid, sc_type) VALUES (18, 'interplanetary probe');
INSERT INTO sc_types (scid, sc_type) VALUES (19, 'orbital rocket');
INSERT INTO sc_types (scid, sc_type) VALUES (20, 'lunar lander');
INSERT INTO sc_types (scid, sc_type) VALUES (20, 'interplanetary probe');

SELECT * FROM SC_TYPES;

--INSERT INTO LAUNCH_VEHICLE--

INSERT INTO launch_vehicle (lvname, lvid, carry_capacity, fuel_cap, lv_range)_
VALUES ('Falcon Heavy', 101,  280,638, 4800);

INSERT INTO launch_vehicle (lvname, lvid, carry_capacity, fuel_cap, lv_range)_
VALUES ('Atlas V 551', 102,  102,206, 1900);

INSERT INTO launch_vehicle (lvname, lvid, carry_capacity, fuel_cap, lv_range)_
VALUES ('Soyuz-STB/Fregat-MT', 103, 104, 93, 4500);

INSERT INTO launch_vehicle (lvname, lvid, carry_capacity, fuel_cap, lv_range)_
VALUES ('Delta IV Heavy', 104, 288, 258, 9900);

INSERT INTO launch_vehicle (lvname, lvid, carry_capacity, fuel_cap, lv_range)_
VALUES ('Proton-M', 105, 225, 307, 8000);

INSERT INTO launch_vehicle (lvname, lvid, carry_capacity, fuel_cap, lv_range)_
VALUES ('Ariane 5 ECA', 106, 210, 175, 10000);

INSERT INTO launch_vehicle (lvname, lvid, carry_capacity, fuel_cap, lv_range)_
VALUES ('Long March 2F', 107, 84, 70, 8400);

INSERT INTO launch_vehicle (lvname, lvid, carry_capacity, fuel_cap, lv_range)_
VALUES ('GSLV Mk III', 108, 80, 110, 10000);

INSERT INTO launch_vehicle (lvname, lvid, carry_capacity, fuel_cap, lv_range)_
VALUES ('Angara 5', 109, 245, 396, 21000);

INSERT INTO launch_vehicle (lvname, lvid, carry_capacity, fuel_cap, lv_range)_
VALUES ('H-IIA', 110, 100, 53, 6200);

INSERT INTO launch_vehicle (lvname, lvid, carry_capacity, fuel_cap, lv_range)_
VALUES ('Atlas V', 111, 8800, 104700, 18000);
```

```
INSERT INTO launch_vehicle (lvname, lvid, carry_capacity, fuel_cap, lv_range)_
VALUES ('Falcon Heavy', 112, 63800, 258700, 14000);

INSERT INTO launch_vehicle (lvname, lvid, carry_capacity, fuel_cap, lv_range)_
VALUES ('Delta IV Heavy', 113, 28700, 152800, 14000);

INSERT INTO launch_vehicle (lvname, lvid, carry_capacity, fuel_cap, lv_range)_
VALUES ('Ariane 5', 114, 21500, 179100, 10000);

INSERT INTO launch_vehicle (lvname, lvid, carry_capacity, fuel_cap, lv_range)_

VALUES ('Proton-M', 115, 23600, 475600, 16000);

INSERT INTO launch_vehicle (lvname, lvid, carry_capacity, fuel_cap, lv_range)_
VALUES ('Soyuz-2', 116, 6400, 98500, 11000);

INSERT INTO launch_vehicle (lvname, lvid, carry_capacity, fuel_cap, lv_range)_
VALUES ('Long March 2F', 117, 8300, 81250, 13000);

INSERT INTO launch_vehicle (lvname, lvid, carry_capacity, fuel_cap, lv_range)_
VALUES ('H-2A', 118, 10400, 110000, 36000);

INSERT INTO launch_vehicle (lvname, lvid, carry_capacity, fuel_cap, lv_range)_
VALUES ('Vega-C', 119, 2300, 8800, 14000);

INSERT INTO launch_vehicle (lvname, lvid, carry_capacity, fuel_cap, lv_range)_
VALUES ('PSLV', 120, 3200, 12500, 7000);

select * from launch_vehicle;
```

	LVID	LVMNAME	CAPACITY	FUEL_CAP	LV_RANGE
1	101	Falcon Heavy	64	280	4800
2	102	Atlas V 551	21	102	1900
3	103	Soyuz-STB/Fregat-MT	10	93	4500
4	104	Delta IV Heavy	29	258	9900
5	105	Proton-M	23	307	8000
6	106	Ariane 5 ECA	21	175	10000
7	107	Long March 2F	8	70	8400
8	108	GSLV Mk III	8	110	10000
9	109	Angara 5	25	396	21000
10	110	H-IIA	10	53	6200
11	111	Atlas V	8800	104700	27000
12	112	Falcon Heavy	63800	258700	21000
13	113	Delta IV Heavy	28700	152800	21000
14	114	Ariane 5	21500	179100	15000
15	115	Proton-M	23600	475600	24000
16	116	Soyuz-2	6400	98500	16500
17	117	Long March 2F	8300	81250	19500
18	118	H-2A	10400	110000	54000
19	119	Vega-C	2300	8800	14000
20	120	PSLV	3200	12500	7000

--INSERT INTO branches--

```
INSERT INTO branches (bid, bloc)
VALUES (1,'Houston');

INSERT INTO branches (bid, bloc)
VALUES (2,'Cape Canaveral');

INSERT INTO branches (bid, bloc)
VALUES (3, 'Kennedy Space Center');

INSERT INTO branches (bid, bloc)
VALUES (4, 'Vandenberg AFB');
```

```
INSERT INTO branches (bid, bloc)_
VALUES (5,'White Sands');

INSERT INTO branches (bid, bloc)_
VALUES (6,'Goldstone');

INSERT INTO branches (bid, bloc)_
VALUES (7, 'Edwards AFB');

INSERT INTO branches (bid, bloc)_
VALUES (8, 'Wallops ');

INSERT INTO branches (bid, bloc)_
VALUES (9, 'Johnson ');

INSERT INTO branches (bid, bloc)_
VALUES (10, 'Langley');

INSERT INTO branches (bid, bloc)_
VALUES(11, 'Cape Canaveral');

INSERT INTO branches (bid, bloc)_
VALUES(12, 'Houston');

INSERT INTO branches (bid, bloc)_
VALUES(13,'Pasadena');

INSERT INTO branches (bid, bloc)_
VALUES(14,'New York City');

INSERT INTO branches (bid, bloc)_
VALUES(15,'White Sands');

INSERT INTO branches (bid, bloc)_
VALUES(16, 'Washington');

INSERT INTO branches (bid,bloc)_
VALUES(17, 'Miami');

INSERT INTO branches (bid, bloc)_
VALUES(18, 'Las Vegas');

INSERT INTO branches (bid, bloc)_
```

```
VALUES(19, 'San Francisco');

INSERT INTO branches (bid, bloc)
VALUES(20, 'Chicago');

SELECT * FROM branches;
```

	BID	BTYPE	BLOC
1	1	Engineering	Houston
2	2	Operations	Cape Canaveral
3	3	Research	Kennedy Space Center
4	4	Manufacturing	Vandenberg AFB
5	5	Logistics	White Sands Missile Range
6	6	Communications	Goldstone
7	7	Security	Edwards AFB
8	8	Training	Wallops Flight Facility
9	9	Pilot	Johnson Space Center
10	10	Administration	Langley Research Center
11	11	Research and Development	Cape Canaveral
12	12	Administration	Houston
13	13	Engineering	Pasadena
14	14	Public Relations	New York City
15	15	Testing	White Sands
16	16	Marketing	Washington D.C.
17	17	Logistics	Miami
18	18	Security	Las Vegas
19	19	Finance	San Francisco
20	20	Human Resources	Chicago

```
--INSERT INTO BRANCH_TYPE--
INSERT INTO branch_type (bid, btype)
VALUES (1, 'research fac');
INSERT INTO branch_type (bid, btype)
VALUES (2, 'observatory');
INSERT INTO branch_type (bid, btype)
VALUES(3, 'launch fac');
```

```
INSERT INTO branch_type (bid, btype)
VALUES(3, 'research fac');
INSERT INTO branch_type (bid, btype)
VALUES(4, 'observatory');
INSERT INTO branch_type (bid, btype)
VALUES(5, 'launch fac');
INSERT INTO branch_type (bid, btype)
VALUES(6, 'research fac');
INSERT INTO branch_type (bid, btype)
VALUES(6, 'launch fac');
INSERT INTO branch_type (bid, btype)
VALUES(7, 'research fac');
INSERT INTO branch_type (bid, btype)
VALUES(8, 'observatory');
INSERT INTO branch_type (bid, btype)
VALUES(9, 'launch fac');
INSERT INTO branch_type (bid, btype)
VALUES(10, 'research fac');
INSERT INTO branch_type (bid, btype)
VALUES(10, 'observatory');
INSERT INTO branch_type (bid, btype)
VALUES(11, 'launch fac');
INSERT INTO branch_type (bid, btype)
VALUES(12, 'observatory');
INSERT INTO branch_type (bid, btype)
VALUES(12, 'launch fac');
INSERT INTO branch_type (bid, btype)
VALUES(13, 'observatory');
INSERT INTO branch_type (bid, btype)
VALUES(14, 'research fac');
INSERT INTO branch_type (bid, btype)
VALUES(15, 'launch fac');
INSERT INTO branch_type (bid, btype)
VALUES(16, 'observatory');
INSERT INTO branch_type (bid, btype)
VALUES(17, 'observatory');
INSERT INTO branch_type (bid, btype)
VALUES(18, 'observatory');
INSERT INTO branch_type (bid, btype)
VALUES(19, 'observatory');
INSERT INTO branch_type (bid, btype)
VALUES(20, 'observatory');

SELECT * FROM BRANCH_TYPE;
```

--INSERT INTO EMPLOYEE--

INSERT INTO Employee (e_f_name, e_l_name, eid, designation, age, birthdate, experience, gender, nationality,bid)
VALUES ('John', 'Doe', 1, 'Engineer', 32, '15-05-1990', 5, 'Male', 'American',2);

INSERT INTO Employee (e_f_name, e_l_name, eid, designation, age, birthdate, experience, gender, nationality,bid)
VALUES ('Jane', 'Smith', 2, 'Designer', 28, '10-02-1994', 3, 'Female', 'Canadian',2);

INSERT INTO Employee (e_f_name, e_l_name, eid, designation, age, birthdate, experience, gender, nationality,bid)
VALUES ('David', 'Brown', 3, 'Programmer', 35, '22-09-1987', 8, 'Male', 'British',5);

INSERT INTO Employee (e_f_name, e_l_name, eid, designation, age, birthdate, experience, gender, nationality,bid)
VALUES ('Emily', 'Jones', 4, 'Manager', 40, '03-06-1982', 12, 'Female', 'Australian',6);

INSERT INTO Employee (e_f_name, e_l_name, eid, designation, age, birthdate, experience, gender, nationality,bid)
VALUES ('Michael', 'Lee', 5, 'Engineer', 27, '25-12-1995', 2, 'Male', 'Chinese',12);

INSERT INTO Employee (e_f_name, e_l_name, eid, designation, age, birthdate, experience, gender, nationality,bid)
VALUES ('Samantha', 'Wilson', 6, 'Designer', 30, '18-07-1991', 4, 'Female', 'American',12);

INSERT INTO Employee (e_f_name, e_l_name, eid, designation, age, birthdate, experience, gender, nationality,bid)
VALUES ('William', 'Chen', 7, 'Programmer', 33, '29-04-1988', 6, 'Male', 'Chinese',7);

INSERT INTO Employee (e_f_name, e_l_name, eid, designation, age, birthdate, experience, gender, nationality,bid)
VALUES ('Olivia', 'Taylor', 8, 'Manager', 38, '12-11-1983', 10, 'Female', 'British',9);

INSERT INTO Employee (e_f_name, e_l_name, eid, designation, age, birthdate, experience, gender, nationality,bid)
VALUES ('Daniel', 'Kim', 9, 'Engineer', 29, '08-08-1982', 3, 'Male', 'Korean',1);

INSERT INTO Employee (e_f_name, e_l_name, eid, designation, age, birthdate, experience, gender, nationality,bid)
VALUES ('Sophia', 'Martinez', 10, 'Designer', 25, '31-03-1996', 1, 'Female', 'Mexican',3);

```
INSERT INTO Employee (e_f_name, e_l_name, eid, designation, age, birthdate, experience, gender,
nationality,bid)_
VALUES ('Megan', 'Smith', 11, 'Software Developer', 32, '14-05-1989', 6, 'Female', 'American',5);

INSERT INTO Employee (e_f_name, e_l_name, eid, designation, age, birthdate, experience, gender,
nationality,bid)_
VALUES ('Chris', 'Johnson', 12, 'Marketing Manager', 40, '22-08-1982', 12, 'Male', 'Canadian',5);

INSERT INTO Employee (e_f_name, e_l_name, eid, designation, age, birthdate, experience, gender,
nationality,bid)_
VALUES ('Samantha', 'Lee', 13, 'Graphic Designer', 28, '10-02-1995', 3, 'Female', 'British',7);

INSERT INTO Employee (e_f_name, e_l_name, eid, designation, age, birthdate, experience, gender,
nationality,bid)_
VALUES ('John', 'Davis', 14, 'Human Resources Manager', 45, '18-11-1978', 18, 'Male', 'American',9);

INSERT INTO Employee (e_f_name, e_l_name, eid, designation, age, birthdate, experience, gender,
nationality,bid)_
VALUES ('Emily', 'Nguyen', 15, 'Data Analyst', 27, '30-04-1994', 2, 'Female', 'Vietnamese',10);

INSERT INTO Employee (e_f_name, e_l_name, eid, designation, age, birthdate, experience, gender,
nationality,bid)_
VALUES ('Mike', 'Wilson', 16, 'Operations Manager', 38, '09-12-1983', 10, 'Male', 'Australian',20);

INSERT INTO Employee (e_f_name, e_l_name, eid, designation, age, birthdate, experience, gender,
nationality,bid)_
VALUES ('Karen', 'Lopez', 17, 'Customer Support Specialist', 25, '25-09-1996', 1, 'Female', 'Mexican',17);

INSERT INTO Employee (e_f_name, e_l_name, eid, designation, age, birthdate, experience, gender,
nationality,bid)_
VALUES ('Ryan', 'Garcia', 18, 'Software Developer', 29, '12-07-1992', 4, 'Male', 'American',19);

INSERT INTO Employee (e_f_name, e_l_name, eid, designation, age, birthdate, experience, gender,
nationality,bid)_
VALUES ('Cynthia', 'Chen', 19, 'Business Analyst', 31, '01-11-1990', 5, 'Female', 'Chinese',15);

INSERT INTO Employee (e_f_name, e_l_name, eid, designation, age, birthdate, experience, gender,
nationality,bid)_
VALUES ('David', 'Kim', 20, 'Finance Manager', 43, '23-04-1978', 15, 'Male', 'Korean',16);

SELECT * FROM EMPLOYEE;
```

	EID	E_F_NAME	E_L_NAME	DESIGNATION	AGE	BIRTHDATE	EXPERIENCE	GENDER	NATIONALITY
1	1	John	Doe	Senior Engineer	32	15-05-90	5	Male	American
2	2	Jane	Smith	Designer	28	10-02-94	3	Female	Canadian
3	3	David	Brown	Senior Engineer	35	22-09-87	8	Male	British
4	4	Emily	Jones	Senior Engineer	40	03-06-82	12	Female	Australian
5	5	Michael	Lee	Engineer	27	25-12-95	2	Male	Chinese
6	6	Samantha	Wilson	Senior Engineer	30	18-07-91	4	Female	American
7	7	William	Chen	Senior Engineer	33	29-04-88	6	Male	Chinese
8	8	Olivia	Taylor	Senior Engineer	38	12-11-83	10	Female	British
9	9	Daniel	Kim	Engineer	29	08-08-82	3	Male	Korean
10	10	Sophia	Martinez	Designer	25	31-03-96	1	Female	Mexican
11	11	Megan	Smith	Senior Engineer	32	14-05-89	6	Female	American
12	12	Chris	Johnson	Senior Engineer	40	22-08-82	12	Male	Canadian
13	13	Samantha	Lee	Graphic Designer	28	10-02-95	3	Female	British
14	14	John	Davis	Senior Engineer	45	18-11-78	18	Male	American
15	15	Emily	Nguyen	Data Analyst	27	30-04-94	2	Female	Vietnamese
16	16	Mike	Wilson	Senior Engineer	38	09-12-83	10	Male	Australian
17	17	Karen	Lopez	Customer Support Specialist	25	25-09-96	1	Female	Mexican
18	18	Ryan	Garcia	Software Developer	29	12-07-92	4	Male	American
19	19	Cynthia	Chen	Senior Engineer	31	01-11-90	5	Female	Chinese
20	20	David	Kim	Senior Engineer	43	23-04-78	15	Male	Korean

--INSERT INTO MISSIONS--

```
INSERT INTO missions (mid, m_s_date, m_c_date, status)
VALUES (1, TO_DATE('2022-02-14', 'YYYY-MM-DD'), TO_DATE('2022-03-22', 'YYYY-MM-DD'),
'Completed');

INSERT INTO missions (mid, m_s_date, m_c_date, status)
VALUES (2, TO_DATE('2023-01-03', 'YYYY-MM-DD'), NULL, 'Ongoing');

INSERT INTO missions (mid, m_s_date, m_c_date, status)
VALUES (3, TO_DATE('2024-05-20', 'YYYY-MM-DD'), NULL, 'Planned');

INSERT INTO missions (mid, m_s_date, m_c_date, status)
VALUES (4, TO_DATE('2022-08-10', 'YYYY-MM-DD'), TO_DATE('2022-09-17', 'YYYY-MM-DD'),
'Completed');



INSERT INTO missions (mid, m_s_date, m_c_date, status)
```

```
VALUES (5, TO_DATE('2023-06-01', 'YYYY-MM-DD'), NULL, 'Ongoing');

INSERT INTO missions (mid, m_s_date, m_c_date, status)
VALUES (6, TO_DATE('2022-12-15', 'YYYY-MM-DD'), TO_DATE('2023-02-22', 'YYYY-MM-DD'),
'Completed');

INSERT INTO missions (mid, m_s_date, m_c_date, status)
VALUES (7, TO_DATE('2024-02-01', 'YYYY-MM-DD'), NULL, 'Planned');

INSERT INTO missions (mid, m_s_date, m_c_date, status)
VALUES (8, TO_DATE('2023-07-20', 'YYYY-MM-DD'), TO_DATE('2023-08-15', 'YYYY-MM-DD'),
'Completed');

INSERT INTO missions (mid, m_s_date, m_c_date, status)
VALUES (9, TO_DATE('2024-01-01', 'YYYY-MM-DD'), NULL, 'Planned');

INSERT INTO missions (mid, m_s_date, m_c_date, status)
VALUES (10, TO_DATE('2023-04-10', 'YYYY-MM-DD'), TO_DATE('2023-05-25', 'YYYY-MM-DD'),
'Completed');

INSERT INTO missions (mid, m_s_date, m_c_date, status)
VALUES (11, TO_DATE('2023-04-01', 'YYYY-MM-DD'), TO_DATE('2023-05-15', 'YYYY-MM-DD'),
'Ongoing');

INSERT INTO missions (mid, m_s_date, m_c_date, status)
VALUES (12, TO_DATE('2022-10-01', 'YYYY-MM-DD'), TO_DATE('2022-12-20', 'YYYY-MM-DD'),
'Completed');

 INSERT INTO missions (mid, m_s_date, m_c_date, status)
VALUES (13, TO_DATE('2022-08-15', 'YYYY-MM-DD'), TO_DATE('2022-09-30', 'YYYY-MM-DD'),
'Completed');

INSERT INTO missions (mid, m_s_date, m_c_date, status)
VALUES (14, TO_DATE('2023-01-01', 'YYYY-MM-DD'), TO_DATE('2023-02-20', 'YYYY-MM-DD'),
'Ongoing');

INSERT INTO missions (mid, m_s_date, m_c_date, status)
VALUES (15, TO_DATE('2024-06-01', 'YYYY-MM-DD'), TO_DATE('2024-08-15', 'YYYY-MM-DD'), 'Failed');

INSERT INTO missions (mid, m_s_date, m_c_date, status)
VALUES (16, TO_DATE('2022-05-15', 'YYYY-MM-DD'), TO_DATE('2022-06-30', 'YYYY-MM-DD'),
'Completed');

INSERT INTO missions (mid, m_s_date, m_c_date, status)
```

```
VALUES (17, TO_DATE('2023-09-01', 'YYYY-MM-DD'), TO_DATE('2023-11-20', 'YYYY-MM-DD'), 'Failed');

INSERT INTO missions (mid, m_s_date, m_c_date, status)
VALUES (18, TO_DATE('2022-12-01', 'YYYY-MM-DD'), TO_DATE('2023-01-20', 'YYYY-MM-DD'),
'Completed');

INSERT INTO missions (mid, m_s_date, m_c_date, status)
VALUES (19, TO_DATE('2024-03-01', 'YYYY-MM-DD'), TO_DATE('2024-04-30', 'YYYY-MM-DD'), 'Failed');

INSERT INTO missions (mid, m_s_date, m_c_date, status)
VALUES (20, TO_DATE('2023-07-01', 'YYYY-MM-DD'), TO_DATE('2023-08-20', 'YYYY-MM-DD'),
'Ongoing');

SELECT * FROM MISSIONS;
```

	MID	M_S_DATE	M_C_DATE	STATUS
1	1	14-02-22	22-03-22	Completed
2	2	03-01-23	(null)	Ongoing
3	3	20-05-24	(null)	Planned
4	4	10-08-22	17-09-22	Completed
5	5	01-06-23	(null)	Ongoing
6	6	15-12-22	22-02-23	Completed
7	7	01-02-24	(null)	Planned
8	8	20-07-23	15-08-23	Completed
9	9	01-01-24	(null)	Planned
10	10	10-04-23	25-05-23	Completed
11	11	01-04-23	15-05-23	Ongoing
12	12	01-10-22	20-12-22	Completed
13	13	15-08-22	30-09-22	Completed
14	14	01-01-23	20-02-23	Ongoing
15	15	01-06-24	15-08-24	Failed
16	16	15-05-22	30-06-22	Completed
17	17	01-09-23	20-11-23	Failed
18	18	01-12-22	20-01-23	Completed
19	19	01-03-24	30-04-24	Failed
20	20	01-07-23	20-08-23	Ongoing

--INSERT INTO space_craft_launch_vehicle--

```
INSERT INTO space_craft_launch_vehicle (scid, lvid)
VALUES (1, 101);

INSERT INTO space_craft_launch_vehicle (scid, lvid)
VALUES (2, 101);

INSERT INTO space_craft_launch_vehicle (scid, lvid)
VALUES (3, 102);

INSERT INTO space_craft_launch_vehicle (scid, lvid)
VALUES (4, 102);

INSERT INTO space_craft_launch_vehicle (scid, lvid)
VALUES (5, 103);

INSERT INTO space_craft_launch_vehicle (scid, lvid)
VALUES (6, 103);

INSERT INTO space_craft_launch_vehicle (scid, lvid)
VALUES (7, 104);

INSERT INTO space_craft_launch_vehicle (scid, lvid)
VALUES (8, 104);

INSERT INTO space_craft_launch_vehicle (scid, lvid)
VALUES (9, 105);

INSERT INTO space_craft_launch_vehicle (scid, lvid)
VALUES (10, 105);

INSERT INTO space_craft_launch_vehicle (scid, lvid)
VALUES (11, 106);

INSERT INTO space_craft_launch_vehicle (scid, lvid)
VALUES (12, 107);

INSERT INTO space_craft_launch_vehicle (scid, lvid)
VALUES (13, 108);

INSERT INTO space_craft_launch_vehicle (scid, lvid)
VALUES (14, 109);
```

```
 INSERT INTO space_craft_launch_vehicle (scid, lvid)
VALUES (15, 110);

INSERT INTO space_craft_launch_vehicle (scid, lvid)
VALUES (16, 111);

INSERT INTO space_craft_launch_vehicle (scid, lvid)
VALUES (17, 112);

INSERT INTO space_craft_launch_vehicle (scid, lvid)
VALUES (18, 113);

INSERT INTO space_craft_launch_vehicle (scid, lvid)
VALUES (19, 114);

INSERT INTO space_craft_launch_vehicle (scid, lvid)
VALUES (20, 115);

SELECT * FROM space_craft_launch_vehicle;
```

	SCID	LVID
1	1	101
2	2	101
3	3	102
4	4	102
5	5	103
6	6	103
7	7	104
8	8	104
9	9	105
10	10	105
11	11	106
12	12	107
13	13	108
14	14	109
15	15	110
16	16	111
17	17	112
18	18	113
19	19	114
20	20	115

--INSERT INTO missions_employee--

```
INSERT INTO missions_employee (mid, eid)
VALUES(1,2);

INSERT INTO missions_employee (mid, eid)
VALUES(2,4);

INSERT INTO missions_employee (mid, eid)
VALUES(3,1);

INSERT INTO missions_employee (mid, eid)
VALUES(4,5);

INSERT INTO missions_employee (mid, eid)
VALUES(5,7);

INSERT INTO missions_employee (mid, eid)
VALUES(6,11);

INSERT INTO missions_employee (mid, eid)
VALUES(7,9);

INSERT INTO missions_employee (mid, eid)
VALUES(8,8);

INSERT INTO missions_employee (mid, eid)
VALUES(9,10);

INSERT INTO missions_employee (mid, eid)
VALUES(10,4);

INSERT INTO missions_employee (mid, eid)
VALUES(11,15);

INSERT INTO missions_employee (mid, eid)
VALUES(12,12);

INSERT INTO missions_employee (mid, eid)
VALUES(13,6);

INSERT INTO missions_employee (mid, eid)
VALUES(14,7);
```

```
 INSERT INTO missions_employee (mid, eid)
VALUES(15,13);

INSERT INTO missions_employee (mid, eid)
VALUES(16,15);

INSERT INTO missions_employee (mid, eid)
VALUES(17,20);

INSERT INTO missions_employee (mid, eid)
VALUES(18,10);

INSERT INTO missions_employee (mid, eid)
VALUES(19,17);

INSERT INTO missions_employee (mid, eid)
VALUES(20,6);


SELECT * FROM missions_employee;
```

	MID	EID
1	1	2
2	2	4
3	3	1
4	4	5
5	5	7
6	6	11
7	7	9
8	8	8
9	9	10
10	10	4
11	11	15
12	12	12
13	13	6
14	14	7
15	15	13
16	16	15
17	17	20
18	18	10
19	19	17
20	20	6

--INSERT INTO MISSIONS_SPACE_CRAFT--

```
INSERT INTO  missions_space_craft (mid, scid)
VALUES(1,2);

INSERT INTO  missions_space_craft (mid, scid)
VALUES(2,4);

INSERT INTO  missions_space_craft (mid, scid)
VALUES (3, 102);

INSERT INTO  missions_space_craft (mid, scid)
VALUES(4,5);

INSERT INTO  missions_space_craft (mid, scid)
VALUES(5,7);

INSERT INTO  missions_space_craft (mid, scid)
VALUES(6,11);

INSERT INTO  missions_space_craft (mid, scid)
VALUES(7,9);

INSERT INTO  missions_space_craft (mid, scid)
VALUES(8,8);

INSERT INTO  missions_space_craft (mid, scid)
VALUES(9,10);

INSERT INTO  missions_space_craft (mid, scid)
VALUES(10,4);

INSERT INTO  missions_space_craft (mid, scid)
VALUES(11,15);

INSERT INTO  missions_space_craft (mid, scid)
VALUES(12,12);

INSERT INTO  missions_space_craft (mid, scid)
VALUES(13,6);

INSERT INTO  missions_space_craft (mid, scid)
VALUES(14,7);
```

```
 INSERT INTO  missions_space_craft (mid, scid)
VALUES(15,13);

INSERT INTO  missions_space_craft (mid, scid)
VALUES(16,15);

INSERT INTO  missions_space_craft (mid, scid)
VALUES(17,20);

INSERT INTO  missions_space_craft (mid, scid)
VALUES(18,10);

INSERT INTO  missions_space_craft (mid, scid)
VALUES(19,17);

INSERT INTO  missions_space_craft (mid, scid)
VALUES(20,6);

SELECT * FROM  missions_space_craft;
```

	MID	SCID
1	1	2
2	2	4
3	4	5
4	5	7
5	6	11
6	7	9
7	8	8
8	9	10
9	10	4
10	11	15
11	12	12
12	13	6
13	14	7
14	15	13
15	16	15
16	17	20
17	18	10
18	19	17
19	20	6

--QUERRIES--

--AGGREGATE FUNCTIONS--

1.Get the maximum capacity of all launch vehicles:

>>SELECT MAX (capacity) FROM launch_vehicle;

	MAX(CAPACITY)
1	63800

2.Get the earliest launch date of any space craft:

>>SELECT MIN (sc_la_date) FROM space_craft;

	MIN(SC_LA_DATE)
1	16-07-69

3.Get the number of space crafts for each type:

>> SELECT sc_type, COUNT (*) FROM sc_types GROUP BY sc_type;

	SC_TYPE	COUNT(*)
1	lunar lander	8
2	orbital rocket	9
3	interplanetary probe	8

4.Get the average experience of employees by gender:

>>SELECT gender, AVG (experience) FROM employee GROUP BY gender;

	GENDER	AVG(EXPERIENCE)
1	Male	8.3
2	Female	4.7

5.Get the total number of missions for each status:

>>SELECT status, COUNT (*) FROM missions GROUP BY status;

	STATUS	COUNT(*)
1	Failed	3
2	Ongoing	5
3	Completed	9
4	Planned	3

6.Count the number of missions for each launch vehicle type:

```
>>SELECT lv.lvmname, COUNT(*) AS num_missions

FROM launch_vehicle lv

JOIN space_craft_launch_vehicle sclv ON lv.lvid = sclv.lvid


JOIN space_craft sc ON sclv.scid = sc.scid

JOIN missions_space_craft msc ON sc.scid = msc.scid

GROUP BY lv.lvmname;
```

	LVNAME	NUM_MISSIONS
1	H-IIA	2
2	Proton-M	5

9.Find the maximum range for each launch vehicle type used in a mission:

```
>>SELECT lv.lvmname, MAX (lv.lv_range) AS max_range

FROM launch_vehicle lv

JOIN space_craft_launch_vehicle sclv ON lv.lvid = sclv.lvid

JOIN space_craft sc ON sclv.scid = sc.scid

JOIN missions_space_craft msc ON sc.scid = msc.scid
 GROUP BY lv.lvmname;
```

	LVMNAME	MAX_RANGE
1	Ariane 5 ECA	10000
2	H-IIA	6200
3	Falcon Heavy	21000
4	Proton-M	24000
5	Delta IV Heavy	9900
6	Atlas V 551	1900
7	Soyuz-STB/Fregat-MT	4500
8	GSLV Mk III	10000
9	Long March 2F	8400

10. Find the maximum range and fuel capacity for each launch vehicle type used by employees who have more than 10 years of experience:

```
>>SELECT lv.lvmname, MAX (lv.lv_range) AS max_range, MAX (lv.fuel_cap) AS max_fuel_cap

FROM launch_vehicle lv

JOIN space_craft_launch_vehicle sclv ON lv.lvid = sclv.lvid

JOIN space_craft sc ON sclv.scid = sc.scid

JOIN missions_space_craft msc ON sc.scid = msc.scid

JOIN missions_employee me ON msc.mid = me.mid

JOIN employee e ON me.eid = e.eid

WHERE e.experience > 10

GROUP BY lv.lvmname;
```

	LVMNAME	MAX_RANGE	MAX_FUEL_CAP
1	Proton-M	24000	475600
2	Atlas V 551	1900	102
3	Long March 2F	8400	70

12. Calculate the average age of employees who have been on a mission launched by a specific launch vehicle:

```
>>SELECT lv.lvmname, AVG (e.age) AS avg_age

FROM launch_vehicle lv

JOIN space_craft_launch_vehicle sclv ON lv.lvid = sclv.lvid

JOIN space_craft sc ON sclv.scid = sc.scid

JOIN missions_space_craft msc ON sc.scid = msc.scid
JOIN missions_employee me ON msc.mid = me.mid
JOIN employee e ON me.eid = e.eid
GROUP BY lv.lvmname;
```

	LVMNAME	AVG_AGE
1	Ariane 5 ECA	32
2	H-IIA	27
3	Falcon Heavy	26.5
4	Proton-M	30.5
5	Delta IV Heavy	34.666666666666666666666666666666666666667
6	Atlas V 551	40
7	Soyuz-STB/Fregat-MT	29
8	GSLV Mk III	28
9	Long March 2F	40

--COMPLEX QUERIES--

13. Retrieve the number of missions that each employee has worked on:

```
>>SELECT e.eid, e.e_f_name || ' ' || e.e_l_name AS employee_name, COUNT (msc.mid) AS
mission_count

FROM employee e
LEFT JOIN missions_employee me ON e.eid = me.eid
LEFT JOIN missions_space_craft msc ON me.mid = msc.mid
GROUP BY e.eid, e.e_f_name, e.e_l_name;
```

	EID	EMPLOYEE_NAME	MISSION_COUNT
1	4	Emily Jones	2
2	8	Olivia Taylor	1
3	5	Michael Lee	1
4	3	David Brown	0
5	18	Ryan Garcia	0
6	16	Mike Wilson	0
7	11	Megan Smith	1
8	6	Samantha Wilson	2
9	17	Karen Lopez	1
10	10	Sophia Martinez	2
11	19	Cynthia Chen	0
12	2	Jane Smith	1
13	1	John Doe	0
14	15	Emily Nguyen	2
15	9	Daniel Kim	1
16	7	William Chen	2
17	12	Chris Johnson	1
18	13	Samantha Lee	1
19	20	David Kim	1
20	14	John Davis	0

14.Retrieve the names of all the launch vehicles along with their capacity and fuel capacity that have been used for a particular mission:

```
>>SELECT lv.lvmname, lv.capacity, lv.fuel_cap

FROM launch_vehicle lv

JOIN space_craft_launch_vehicle sclv ON lv.lvid = sclv.lvid

JOIN space_craft sc ON sclv.scid = sc.scid

JOIN missions_space_craft msc ON sc.scid = msc.scid

JOIN missions m ON msc.mid = m.mid

WHERE m.mid = 1;
```

	LVMNAME	CAPACITY	FUEL_CAP
1	Falcon Heavy	64	280

15. Retrieve the names of all the employees who have worked on a mission along with the name of the mission:

```
>>SELECT e.e_f_name || ' ' || e.e_l_name AS employee_name, m.mid, m.status
FROM employee e
JOIN missions_employee me ON e.eid = me.eid.
JOIN missions m ON me.mid = m.mid;
```

	EMPLOYEE_NAME	MID	STATUS
1	John Doe	3	Planned
2	Jane Smith	1	Completed
3	Emily Jones	10	Completed
4	Emily Jones	2	Ongoing
5	Michael Lee	4	Completed
6	Samantha Wilson	20	Ongoing
7	Samantha Wilson	13	Completed
8	William Chen	14	Ongoing
9	William Chen	5	Ongoing
10	Olivia Taylor	8	Completed
11	Daniel Kim	7	Planned
12	Sophia Martinez	18	Completed
13	Sophia Martinez	9	Planned
14	Megan Smith	6	Completed
15	Chris Johnson	12	Completed
16	Samantha Lee	15	Failed
17	Emily Nguyen	16	Completed
18	Emily Nguyen	11	Ongoing
19	Karen Lopez	19	Failed
20	David Kim	17	Failed

16. Find the name of all space crafts that have not been maintained in the last 6 months:

```
>>SELECT sc.scname
```

```
FROM space_craft sc

WHERE sc.sc_last_maint_d < ADD_MONTHS(SYSDATE, -6);
```

	SCNAME
1	Voyager 1
2	Voyager 2
3	Cassini
4	New Horizons
5	Apollo 11
6	Curiosity
7	Hubble Space Telescope
8	Mars Pathfinder
9	Juno
10	Rosetta
11	Huygens
12	Kepler
13	Opportunity
14	New Horizons
15	Chandra X-Ray Observatory
16	Curiosity
17	Crew Dragon
18	Mars 2020

17.Find the names of all space crafts and their launch vehicles that have been used for a mission:

```
>>SELECT sc.scname, lv.lvmname

FROM space_craft sc

JOIN space_craft_launch_vehicle sclv ON sc.scid = sclv.scid

JOIN launch_vehicle lv ON sclv.lvid = lv.lvid
```

JOIN missions_space_craft msc ON sc.scid = msc.scid;

	SCNAME	LVMNAME
1	Voyager 2	Falcon Heavy
2	New Horizons	Atlas V 551
3	New Horizons	Atlas V 551
4	Curiosity	Soyuz-STB/Fregat-MT
5	Curiosity	Soyuz-STB/Fregat-MT
6	Apollo 11	Soyuz-STB/Fregat-MT
7	Mars Pathfinder	Delta IV Heavy
8	Hubble Space Telescope	Delta IV Heavy
9	Hubble Space Telescope	Delta IV Heavy
10	Rosetta	Proton-M
11	Rosetta	Proton-M
12	Juno	Proton-M
13	Huygens	Ariane 5 ECA
14	Kepler	Long March 2F
15	Opportunity	GSLV Mk III
16	Chandra X-Ray Observatory	H-IIA
17	Chandra X-Ray Observatory	H-IIA
18	Crew Dragon	Falcon Heavy
19	Venus Explorer	Proton-M

18.Find all missions that used a specific launch vehicle:

>>SELECT m.mid, m.m_s_date, m.m_c_date, m.status

FROM missions m
INNER JOIN missions_space_craft m_sc ON m.mid = m_sc.mid
INNER JOIN space_craft_launch_vehicle sc_lv ON m_sc.scid = sc_lv.scid
WHERE sc_lv.lvid = 101;

	MID	M_S_DATE	M_C_DATE	STATUS
1	1	14-02-22	22-03-22	Completed

19.List all space crafts that have not been maintained in the last 6 months:

>>SELECT *

FROM space_craft

WHERE sc_last_maint_d <= SYSDATE - INTERVAL '6' MONTH;

	SCID	SCNAME	SCTYPE	SCMISSION	SC_LA_DATE	SC_LAST_MAINT_D	PID
1	1	Voyager 1	Probe	Jupiter flyby	05-09-77	15-09-80	1
2	2	Voyager 2	Probe	Jupiter flyby	20-08-77	10-12-89	2
3	3	Cassini	Probe	Saturn exploration	15-10-97	15-09-17	3
4	4	New Horizons	Probe	Pluto flyby	19-01-06	15-10-16	4
5	5	Apollo 11	Lunar Lander	Lunar landing	16-07-69	24-07-69	5
6	6	Curiosity	Rover	Mars exploration	26-11-11	30-11-19	6
7	7	Hubble Space Telescope	Space Telescope	Astronomical observations	24-04-90	15-05-09	7
8	8	Mars Pathfinder	Lander	Mars exploration	04-12-96	27-09-97	8
9	9	Juno	Probe	Jupiter exploration	05-08-11	30-10-18	9
10	10	Rosetta	Probe	Comet exploration	02-03-04	30-09-16	10
11	11	Huygens	lander	Cassini-Huygens	14-01-05	14-01-05	1
12	12	Kepler	telescope	Kepler	07-03-09	15-05-13	2
13	13	Opportunity	rover	Mars Exploration Rover	07-07-03	10-06-18	3
14	14	New Horizons	probe	New Horizons	19-01-06	02-08-18	4
15	15	Chandra X-Ray Observatory	telescope	Chandra X-Ray Observatory	23-07-99	20-07-19	5
16	16	Curiosity	rover	Mars Science Laboratory	26-11-11	09-03-21	6
17	17	Crew Dragon	capsule	Commercial Crew Development	30-05-20	30-05-20	7
18	18	Mars 2020	rover	Mars 2020	30-07-20	30-07-20	8

20.Retrieve the average age of all the employees who have worked on a mission involving a given planet name.
>>SELECT AVG (e.age)

FROM employee e

JOIN missions_employee me ON e.eid = me.eid

JOIN missions_space_craft msc ON me.mid = msc.mid

JOIN space_craft sc ON msc.scid = sc.scid

JOIN planets p ON sc.scmission = p.pname

WHERE p.pname = 'Uranus';

	AVG(E.AGE)
1	(null)

21.Retrieve the number of missions that each launch vehicle has been used in.

```
>>SELECT lv.lvmname, COUNT (*) AS num_missions
FROM launch_vehicle lv
JOIN space_craft_launch_vehicle sclv ON lv.lvid = sclv.lvid
JOIN space_craft sc ON sclv.scid = sc.scid
JOIN missions_space_craft msc ON sc.scid = msc.scid
GROUP BY lv.lvmname;
```

	LVMNAME	NUM_MISSIONS
1	Ariane 5 ECA	1
2	H-IIA	2
3	Falcon Heavy	2
4	Proton-M	4
5	Delta IV Heavy	3
6	Atlas V 551	2
7	Soyuz-STB/Fregat-MT	3
8	GSLV Mk III	1
9	Long March 2F	1

22.Retrieve the names of all launch vehicles used in a mission and their respective spacecraft:

```
>>SELECT lv.lvmname, sc.scname

FROM launch_vehicle lv

INNER JOIN space_craft_launch_vehicle sclv ON lv.lvid = sclv.lvid

INNER JOIN space_craft sc ON sclv.scid = sc.scid

INNER JOIN missions_space_craft msc ON sc.scid = msc.scid

INNER JOIN missions m ON msc.mid = m.mid;
```

	LVMNAME	SCNAME
1	Falcon Heavy	Voyager 2
2	Atlas V 551	New Horizons
3	Atlas V 551	New Horizons
4	Soyuz-STB/Fregat-MT	Curiosity
5	Soyuz-STB/Fregat-MT	Curiosity
6	Soyuz-STB/Fregat-MT	Apollo 11
7	Delta IV Heavy	Mars Pathfinder
8	Delta IV Heavy	Hubble Space Telescope
9	Delta IV Heavy	Hubble Space Telescope
10	Proton-M	Rosetta
11	Proton-M	Rosetta
12	Proton-M	Juno
13	Ariane 5 ECA	Huygens
14	Long March 2F	Kepler
15	GSLV Mk III	Opportunity
16	H-IIA	Chandra X-Ray Observatory
17	H-IIA	Chandra X-Ray Observatory
18	Falcon Heavy	Crew Dragon
19	Proton-M	Venus Explorer

23.Retrieve the details of all space crafts that have been used in a mission along with the launch vehicle used in that mission:

>>SELECT sc.scname, sc.sctype, m.mid, m.status, lv.lvmname

FROM space_craft sc

JOIN missions_space_craft msc ON sc.scid = msc.scid

JOIN missions m ON msc.mid = m.mid

JOIN space_craft_launch_vehicle sclv ON sc.scid = sclv.scid

JOIN launch_vehicle lv ON sclv.lvid = lv.lvid;

	SCNAME	SCTYPE	MID	STATUS	LVMNAME
1	Voyager 2	Probe	1	Completed	Falcon Heavy
2	New Horizons	Probe	2	Ongoing	Atlas V 551
3	New Horizons	Probe	10	Completed	Atlas V 551
4	Curiosity	Rover	13	Completed	Soyuz-STB/Fregat-MT
5	Curiosity	Rover	20	Ongoing	Soyuz-STB/Fregat-MT
6	Apollo 11	Lunar Lander	4	Completed	Soyuz-STB/Fregat-MT
7	Mars Pathfinder	Lander	8	Completed	Delta IV Heavy
8	Hubble Space Telescope	Space Telescope	5	Ongoing	Delta IV Heavy
9	Hubble Space Telescope	Space Telescope	14	Ongoing	Delta IV Heavy
10	Rosetta	Probe	9	Planned	Proton-M
11	Rosetta	Probe	18	Completed	Proton-M
12	Juno	Probe	7	Planned	Proton-M
13	Huygens	lander	6	Completed	Ariane 5 ECA
14	Kepler	telescope	12	Completed	Long March 2F
15	Opportunity	rover	15	Failed	GSLV Mk III
16	Chandra X-Ray Observatory	telescope	11	Ongoing	H-IIA
17	Chandra X-Ray Observatory	telescope	16	Completed	H-IIA
18	Crew Dragon	capsule	19	Failed	Falcon Heavy
19	Venus Explorer	Probe	17	Failed	Proton-M

24.Retrieve the details of all space crafts and launch vehicles, along with the details of the missions they have been used in:

```
>>SELECT sc.scname, sc.sctype, lv.lvmname, m.mid, m.status

FROM space_craft sc

LEFT JOIN space_craft_launch_vehicle sclv ON sc.scid = sclv.scid

LEFT JOIN launch_vehicle lv ON sclv.lvid = lv.lvid

LEFT JOIN missions_space_craft msc ON sc.scid = msc.scid

LEFT JOIN missions m ON msc.mid = m.mid

UNION

SELECT sc.scname, sc.sctype, lv.lvmname, m.mid, m.status

FROM launch_vehicle lv
```

LEFT JOIN space_craft_launch_vehicle sclv ON lv.lvid = sclv.lvid

LEFT JOIN space_craft sc ON sclv.scid = sc.scid

LEFT JOIN missions_space_craft msc ON sc.scid = msc.scid

LEFT JOIN missions m ON msc.mid = m.mid;

	SCNAME	SCTYPE	LVMNAME	MID	STATUS
1	Apollo 11	Lunar Lander	Soyuz-STB/Fregat-MT	4	Completed
2	Cassini	Probe	Atlas V 551	(null)	(null)
3	Chandra X-Ray Observatory	telescope	H-IIA	11	Ongoing
4	Chandra X-Ray Observatory	telescope	H-IIA	16	Completed
5	Crew Dragon	capsule	Falcon Heavy	19	Failed
6	Curiosity	Rover	Soyuz-STB/Fregat-MT	13	Completed
7	Curiosity	Rover	Soyuz-STB/Fregat-MT	20	Ongoing
8	Curiosity	rover	Atlas V	(null)	(null)
9	Hubble Space Telescope	Space Telescope	Delta IV Heavy	5	Ongoing
10	Hubble Space Telescope	Space Telescope	Delta IV Heavy	14	Ongoing
11	Huygens	lander	Ariane 5 ECA	6	Completed
12	Juno	Probe	Proton-M	7	Planned
13	Jupiter Explorer	Probe	Ariane 5	(null)	(null)
14	Kepler	telescope	Long March 2F	12	Completed
15	Mars 2020	rover	Delta IV Heavy	(null)	(null)
16	Mars Pathfinder	Lander	Delta IV Heavy	8	Completed
17	New Horizons	Probe	Atlas V 551	2	Ongoing
18	New Horizons	Probe	Atlas V 551	10	Completed
19	New Horizons	probe	Angara 5	(null)	(null)
20	Opportunity	rover	GSLV Mk III	15	Failed
21	Rosetta	Probe	Proton-M	9	Planned
22	Rosetta	Probe	Proton-M	18	Completed
23	Venus Explorer	Probe	Proton-M	17	Failed
24	Voyager 1	Probe	Falcon Heavy	(null)	(null)
25	Voyager 2	Probe	Falcon Heavy	1	Completed

25.Retrieve the total capacity of all launch vehicles used in missions:

>>SELECT SUM (lv.capacity)

FROM launch_vehicle lv

INNER JOIN space_craft_launch_vehicle sclv ON lv.lvid = sclv.lvid

INNER JOIN missions_space_craft msc ON sclv.scid = msc.scid

INNER JOIN missions m ON msc.mid = m.mid;

	SUM(LV.CAPACITY)
1	87749

26.Retrieve the names of all employees who have more than 5 years of experience and are currently working on a mission with status "Ongoing":

>>SELECT e.e_f_name, e.e_l_name, m.status

FROM employee e

INNER JOIN missions_employee me ON e.eid = me.eid

INNER JOIN missions m ON me.mid = m.mid
WHERE e.experience > 5 AND m.status = 'Ongoing';

	E_F_NAME	E_L_NAME	STATUS
1	Emily	Jones	Ongoing
2	William	Chen	Ongoing
3	William	Chen	Ongoing

27.retrieve employee names and their missions:

>>SELECT e.e_f_name, e.e_l_name, m.mid, m.status

FROM employee e

JOIN missions_employee me ON e.eid = me.eid

JOIN missions m ON me.mid = m.mid;

	E_F_NAME	E_L_NAME	MID	STATUS
1	John	Doe	3	Planned
2	Jane	Smith	1	Completed
3	Emily	Jones	10	Completed
4	Emily	Jones	2	Ongoing
5	Michael	Lee	4	Completed
6	Samantha	Wilson	20	Ongoing
7	Samantha	Wilson	13	Completed
8	William	Chen	14	Ongoing
9	William	Chen	5	Ongoing
10	Olivia	Taylor	8	Completed
11	Daniel	Kim	7	Planned
12	Sophia	Martinez	18	Completed
13	Sophia	Martinez	9	Planned
14	Megan	Smith	6	Completed
15	Chris	Johnson	12	Completed
16	Samantha	Lee	15	Failed
17	Emily	Nguyen	16	Completed
18	Emily	Nguyen	11	Ongoing
19	Karen	Lopez	19	Failed
20	David	Kim	17	Failed

--Simple nested, correlated queries and views--
28.Retrieve the names of all the space crafts launched by a launch vehicle with the name "Falcon Heavy".

```
>>SELECT scname FROM space_craft

WHERE scid IN (

 SELECT scid FROM space_craft_launch_vehicle

 WHERE lvid IN (

  SELECT lvid FROM launch_vehicle WHERE lvmname = 'Falcon Heavy'

 )
```

);

	SCNAME
1	Voyager 1
2	Voyager 2
3	Crew Dragon

29.Retrieve the names of all the space crafts that have participated in a mission with status "planned".

```
>>SELECT scname FROM space_craft
WHERE scid IN (
 SELECT scid FROM missions_space_craft

  WHERE mid IN (
   SELECT mid FROM missions WHERE status = 'Planned'
  )
);
```

	SCNAME
1	Juno
2	Rosetta

30.Retrieve the names of all the space crafts that have not undergone maintenance in the last 6 months and were launched by atlas.

```
>>SELECT scname FROM space_craft

WHERE sc_last_maint_d < ADD_MONTHS(SYSDATE, -6) AND scid IN (
 SELECT scid FROM space_craft_launch_vehicle
 WHERE lvid IN (
  SELECT lvid FROM launch_vehicle
  WHERE lvmname LIKE '%Atlas%'
 ) );
```

	SCNAME
1	Cassini
2	New Horizons
3	Curiosity

31.Retrieve the names of all the employees who have participated in a mission with status "Completed" and have more than 5 years of experience.

```
>>SELECT e_f_name, e_l_name FROM employee
WHERE eid IN (


 SELECT eid FROM missions_employee
 WHERE mid IN (
  SELECT mid FROM missions
  WHERE status = 'Completed'
 )
) AND experience > 5;
```

	E_F_NAME	E_L_NAME
1	Emily	Jones
2	Olivia	Taylor
3	Megan	Smith
4	Chris	Johnson

32.Retrieve the names of all the employees who have participated in a mission to Mars.

```
>>SELECT e_f_name, e_l_name FROM employee
 WHERE eid IN (
 SELECT eid FROM missions_employee
 WHERE mid IN (
  SELECT mid FROM missions_space_craft
  WHERE scid IN (
   SELECT scid FROM space_craft
   WHERE scmission LIKE '%Mars%'
  )
 ) );
```

	E_F_NAME	E_L_NAME
1	Emily	Jones
2	Olivia	Taylor
3	Megan	Smith
4	Chris	Johnson

33.Retrieve the names of all the spacecrafts that have participated in a mission with the status "ongoing" and have been launched using a launch vehicle with the range of less than 81250 km.

```
>>SELECT scname FROM space_craft
WHERE scid IN (
  SELECT scid FROM space_craft_launch_vehicle
  WHERE lvid IN (
    SELECT lvid FROM launch_vehicle WHERE lv_range < 81250
   )
) AND scid IN (
  SELECT scid FROM missions_space_craft
  WHERE mid IN (
    SELECT mid FROM missions WHERE status = 'Ongoing'
  )
);
```

	SCNAME
1	New Horizons
2	Curiosity
3	Hubble Space Telescope
4	Chandra X-Ray Observatory

34.Retrieve the names of all the space crafts that have not undergone maintenance in the last 6 months and have been launched using a launch vehicle with the fuel capacity of more than 23600 liters.

```
>>SELECT scname FROM space_craft
WHERE scid IN (
  SELECT scid FROM space_craft_launch_vehicle
  WHERE lvid IN (
    SELECT lvid FROM launch_vehicle WHERE fuel_cap > 23600
  )
) AND sc_last_maint_d < ADD_MONTHS(SYSDATE, -6);
```

	SCNAME
1	Curiosity
2	Crew Dragon
3	Mars 2020

35.Retrieve the names of all the space crafts that have been launched using a launch vehicle with the capacity of more than 15000 kg.

```
>>SELECT scname FROM space_craft
WHERE scid IN (
 SELECT scid FROM space_craft_launch_vehicle
 WHERE lvid IN (
  SELECT lvid FROM launch_vehicle WHERE capacity > 15000
 )
);
```

	SCNAME
1	Venus Explorer
2	Crew Dragon
3	Mars 2020
4	Jupiter Explorer

36.Retrieve the names of all the missions that have been completed by an employee with the age of less than 30

```
>>SELECT mid FROM missions_employee
WHERE eid IN (
 SELECT eid FROM employee WHERE age < 30
) AND mid IN (
  SELECT mid FROM missions WHERE status = 'Completed'

);
```

	MID
1	1
2	4
3	16
4	18

37.Retrieve the names of all the employees who have worked on missions that were launched after January 1st, 2020:

```
>>SELECT e.e_f_name, e.e_l_name

FROM employee e

WHERE e.eid IN (

 SELECT me.eid FROM missions_employee me

 INNER JOIN missions_space_craft msc ON me.mid = msc.mid

 INNER JOIN space_craft_launch_vehicle sclv ON msc.scid = sclv.scid

 INNER JOIN space_craft sc ON sclv.scid = sc.scid

 WHERE sc.sc_la_date > TO_DATE('01-JAN-2020', 'DD-MON-YYYY')

);
```

	E_F_NAME	E_L_NAME
1	David	Kim
2	Karen	Lopez

38.Retrieve the names of all employees who have worked on a mission that has been completed:

```
>>SELECT e.e_f_name, e.e_l_name

FROM employee e

WHERE EXISTS (

 SELECT 1

 FROM missions_employee me

 JOIN missions m ON me.mid = m.mid

 WHERE me.eid = e.eid

 AND m.status = 'Completed'
```

);

	E_F_NAME	E_L_NAME
1	Megan	Smith
2	Samantha	Wilson
3	Jane	Smith
4	Michael	Lee
5	Emily	Jones
6	Olivia	Taylor
7	Chris	Johnson
8	Emily	Nguyen
9	Sophia	Martinez

39.Retrieve the names of all employees who have been a part of a mission and their age at the time of the mission:

```
>>SELECT e.e_f_name, e.e_l_name, e.age, me.mid

FROM employee e

INNER JOIN missions_employee me ON e.eid = me.eid

WHERE e.age = (

 SELECT e1.age

 FROM employee e1

 WHERE e1.eid = e.eid

);
```

	E_F_NAME	E_L_NAME	AGE	MID
1	Jane	Smith	28	1
2	Emily	Jones	40	2
3	John	Doe	32	3
4	Michael	Lee	27	4
5	William	Chen	33	5
6	Megan	Smith	32	6
7	Daniel	Kim	29	7
8	Olivia	Taylor	38	8
9	Sophia	Martinez	25	9
10	Emily	Jones	40	10
11	Emily	Nguyen	27	11
12	Chris	Johnson	40	12
13	Samantha	Wilson	30	13
14	William	Chen	33	14
15	Samantha	Lee	28	15
16	Emily	Nguyen	27	16
17	David	Kim	43	17
18	Sophia	Martinez	25	18
19	Karen	Lopez	25	19
20	Samantha	Wilson	30	20

40.Retrieve the names of all space crafts that have not been maintained in the last year:

```
>>SELECT sc.scname, sc.sc_last_maint_d
FROM space_craft sc
WHERE sc.sc_last_maint_d < (
  SELECT ADD_MONTHS(SYSDATE, -12)
  FROM DUAL
```

);

	SCNAME	SC_LAST_MAINT_D
1	Voyager 1	15-09-80
2	Voyager 2	10-12-89
3	Cassini	15-09-17
4	New Horizons	15-10-16
5	Apollo 11	24-07-69
6	Curiosity	30-11-19
7	Hubble Space Telescope	15-05-09
8	Mars Pathfinder	27-09-97
9	Juno	30-10-18
10	Rosetta	30-09-16
11	Huygens	14-01-05
12	Kepler	15-05-13
13	Opportunity	10-06-18
14	New Horizons	02-08-18
15	Chandra X-Ray Observatory	20-07-19
16	Curiosity	09-03-21
17	Crew Dragon	30-05-20
18	Mars 2020	30-07-20

41.Retrieve the names of all space crafts that have been used on a mission with a launch vehicle that has a capacity greater than the average capacity of all launch vehicles:

```
>>SELECT sc.scname

FROM space_craft sc

WHERE EXISTS (

 SELECT 1

 FROM missions_space_craft msc
```

```
JOIN missions m ON msc.mid = m.mid

JOIN space_craft_launch_vehicle sclv ON msc.scid = sclv.scid

JOIN launch_vehicle lv ON sclv.lvid = lv.lvid

WHERE lv.capacity > (

  SELECT AVG(lv2.capacity)

  FROM launch_vehicle lv2

)

AND sclv.scid = sc.scid
);
```

	SCNAME
1	Venus Explorer
2	Crew Dragon

42.Find the total number of employees who have worked on missions that are currently ongoing.

```
>>SELECT COUNT (DISTINCT eid)

FROM missions_employee

WHERE mid IN (

  SELECT mid

  FROM missions

  WHERE status = 'ongoing'

);
```

	COUNT(DISTINCTEID)
1	0

43. Create a view that shows the names of all spacecrafts and the names of the launch vehicles used to launch them.

```
>>CREATE VIEW sc_lv_names AS

SELECT sc.scname, lv.lvmname

FROM space_craft sc

JOIN space_craft_launch_vehicle sclv ON sc.scid = sclv.scid

JOIN launch_vehicle lv ON sclv.lvid = lv.lvid;
View SC_LV_NAMES created.
```

44.Create a view that shows the names of all employees who have worked on missions, along with the start and completion dates of the missions.

```
>>CREATE VIEW employee_mission_dates AS

SELECT e.e_f_name || ' ' || e.e_l_name AS employee_name, m.m_s_date, m.m_c_date

FROM employee e

JOIN missions_employee me ON e.eid = me.eid

JOIN missions m ON me.mid = m.mid;
View EMPLOYEE_MISSION_DATES created.
```

46.Create a view that shows the names of all space crafts and the names of the employees who have worked on their missions.

```
>>CREATE VIEW sc_employee_names AS

SELECT sc.scname, e.e_f_name || ' ' || e.e_l_name AS employee_name

FROM space_craft sc

JOIN missions_space_craft msc ON sc.scid = msc.scid
```

```
JOIN missions_employee me ON msc.mid = me.mid

JOIN employee e ON me.eid = e.eid;
View SC_EMPLOYEE_NAMES created.
```

47.Create a view that shows the names of all launch vehicles and the names of the branches where they are located.

```
>>CREATE VIEW lv_branch_names AS

SELECT lv.lvmname, b.bloc

FROM launch_vehicle lv

JOIN branch b ON lv.capacity > 5000 AND lv.fuel_cap > 5000 AND lv.lv_range > 100000000 AND b.bid =
(

 SELECT MAX(bid)

 FROM branch

 WHERE btype = 'launch vehicle'

);
View LV_BRANCH_NAMES created.
```

49.Create a view that shows the details of all space crafts along with their launch vehicle information and the details of the missions they have been a part of:

```
>>CREATE VIEW sc_lv_mission_details AS

SELECT sc.scid, sc.scname, sc.sctype, sc.scmission, sc.sc_la_date,

 lv.lvmname, lv.capacity, lv.fuel_cap, lv.lv_range,

 m.mid, m.m_s_date, m.m_c_date, m.status
```

```
FROM space_craft sc

JOIN space_craft_launch_vehicle sclv ON sc.scid = sclv.scid

JOIN launch_vehicle lv ON sclv.lvid = lv.lvid

LEFT JOIN missions_space_craft msc ON sc.scid = msc.scid

LEFT JOIN missions m ON msc.mid = m.mid;
```

```
View SC_LV_MISSION_DETAILS created.
```

--PL SQL QUERIES--

SET SERVEROUTPUT ON;

50.Create a stored procedure to insert a new record into the "space_craft" table:

```
>>CREATE OR REPLACE PROCEDURE insert_spacecraft(
   p_scid IN space_craft.scid%TYPE,
   p_scname IN space_craft.scname%TYPE,
   p_sctype IN space_craft.sctype%TYPE,
   p_scmission IN space_craft.scmission%TYPE,
   p_sc_la_date IN space_craft.sc_la_date%TYPE,
   p_sc_location IN space_craft.sc_location%TYPE,
   p_sc_last_maint_d IN space_craft.sc_last_maint_d%TYPE
)
IS
BEGIN
   INSERT INTO space_craft(scid, scname, sctype, scmission, sc_la_date, sc_location, sc_last_maint_d)
```

```
  VALUES(p_scid, p_scname, p_sctype, p_scmission, p_sc_la_date, p_sc_location, p_sc_last_maint_d);

  COMMIT;

END;
```

51.Create a cursor to retrieve the names and ages of all employees who have more than 5 years of experience:

```
>>DECLARE

  CURSOR c_employee IS

    SELECT e_f_name || ' ' || e_l_name AS full_name, age

    FROM employee

    WHERE experience > 5;

BEGIN

  FOR emp IN c_employee LOOP

    DBMS_OUTPUT.PUT_LINE('Name: ' || emp.full_name || ', Age: ' || emp.age);

  END LOOP;

END;
```

52.Update the "designation" of an employee in the "employee" table:

```
>>DECLARE

 v_eid NUMBER(10) := 1001;

 v_designation VARCHAR2(100) := 'Senior Engineer';

BEGIN

 UPDATE employee SET designation = v_designation WHERE eid = v_eid;
```

```
 DBMS_OUTPUT.PUT_LINE('Record updated successfully.');
END;
```

53.Delete a record from the "missions" table:

```
>>DECLARE
 v_mid NUMBER(10) := 2002;
BEGIN
 DELETE FROM missions WHERE mid = v_mid;
 DBMS_OUTPUT.PUT_LINE('Record deleted successfully.');
END;
```

54.to check if an employee is older than 30 years:

```
>>DECLARE
 emp_age NUMBER := 35;
BEGIN
 IF emp_age > 30 THEN
   DBMS_OUTPUT.PUT_LINE('Employee is older than 30 years');
 END IF;
END;
```

55.Loop through all the employees and print their names and ages:

```
>>DECLARE
```

```
 emp_name employee.e_f_name%TYPE;
 emp_age employee.age%TYPE;
BEGIN
 FOR emp_rec IN (SELECT e_f_name, age FROM employee) LOOP
  emp_name := emp_rec.e_f_name;
  emp_age := emp_rec.age;
  DBMS_OUTPUT.PUT_LINE(emp_name || ' is ' || emp_age || ' years old.');
 END LOOP;
END;
```

56.Loop through all the space crafts and their launch vehicles and print their names:

```
>>DECLARE
 sc_name space_craft.scname%TYPE;
 lv_name launch_vehicle.lvmname%TYPE;
BEGIN
 FOR sc_rec IN (SELECT scname FROM space_craft) LOOP
  sc_name := sc_rec.scname;
  FOR lv_rec IN (SELECT lvmname FROM launch_vehicle
          WHERE lvid IN (SELECT lvid FROM space_craft_launch_vehicle
                  WHERE scid = (SELECT scid FROM space_craft WHERE scname = sc_name))) LOOP
    lv_name := lv_rec.lvmname;
    DBMS_OUTPUT.PUT_LINE(sc_name || ' with ' || lv_name);
```

```
  END LOOP;
 END LOOP;
END;
```

57.Loop through all the missions and their assigned employees, and print their names and designation:

```
>>DECLARE
 mission_id missions.mid%TYPE;
 emp_id employee.eid%TYPE;
 emp_name employee.e_f_name%TYPE;
 emp_designation employee.designation%TYPE;
BEGIN
 FOR mission_rec IN (SELECT mid FROM missions) LOOP
  mission_id := mission_rec.mid;
  FOR emp_rec IN (SELECT eid, e_f_name, designation FROM employee
            WHERE eid IN (SELECT eid FROM missions_employee WHERE mid = mission_id)) LOOP
    emp_id := emp_rec.eid;
    emp_name := emp_rec.e_f_name;
    emp_designation := emp_rec.designation;
    DBMS_OUTPUT.PUT_LINE(emp_name || ' (' || emp_designation || ') was assigned to mission ' ||
mission_id);
  END LOOP;
 END LOOP;
```

```
END;
```

58.Updating the employee table based on a specific age:

```
>>DECLARE
  v_age NUMBER(3) := 30;
BEGIN
  UPDATE employee
  SET designation = 'Senior Engineer'
  WHERE age >= v_age;
END;
```

59. Inserting data into the missions_employee table based on a specific mission ID:

```
>>DECLARE
  v_mid NUMBER(10) := 1001;
BEGIN
  INSERT INTO missions_employee(mid, eid)
  SELECT v_mid, eid
  FROM employee
  WHERE designation = 'Astronaut';
END;
```

60.Deleting data from the space_craft table based on a specific location:

```
>>DECLARE
 v_location VARCHAR2(100) := 'Mars';
BEGIN
 DELETE FROM space_craft
 WHERE sc_location = v_location;
END;
```

61.Updating the launch_vehicle table based on a specific capacity:

```
>>DECLARE
 v_capacity NUMBER(10) := 5000;
BEGIN
UPDATE launch_vehicle
 SET lv_range = lv_range * 1.5
 WHERE capacity >= v_capacity;
END;
```

- **References:**
  - drawio - diagrams.net
  - https://erdplus.com

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