

Exercise 1.

```
create table Classes(  
  class varchar(20),  
  type char(2),  
  country varchar(20),  
  numGuns int,  
  bore int,  
  displacement int,  
  primary key(class)  
);
```

```
create table Ships(  
  name varchar(20),  
  class varchar(20),  
  launched int,  
  primary key(name,class)  
);
```

```
create table Battles(  
  name varchar(20),  
  date_fought varchar(12),  
  primary key(name)  
);
```

```
create table Outcomes(  
  ship varchar(20),  
  battle varchar(20),  
  result varchar(10),  
  primary key(ship)  
);
```

```
INSERT INTO Classes VALUES('Bismarck','bb','Germany',8,15,42000);  
INSERT INTO Classes VALUES('Kongo','bc','Japan',8,14,32000);  
INSERT INTO Classes VALUES('North Carolina','bb','USA',9,16,37000);  
INSERT INTO Classes VALUES('Renown','bc','Gt. Britain',6,15,32000);  
INSERT INTO Classes VALUES('Revenge','bb','Gt. Britain',8,15,29000);  
INSERT INTO Classes VALUES('Tennessee','bb','USA',12,14,32000);  
INSERT INTO Classes VALUES('Yamato','bb','Japan',9,18,65000);
```

```

INSERT INTO ships VALUES('California','Tennessee',1921);
INSERT INTO ships VALUES('Haruna','Kongo',1915);
INSERT INTO ships VALUES('Hiei','Kongo',1914);
INSERT INTO ships VALUES('Iowa','Iowa',1943);
INSERT INTO ships VALUES('Kirishima','Kongo',1914);
INSERT INTO ships VALUES('Kongo','Kongo',1913);
INSERT INTO ships VALUES('Missouri','Iowa',1944);
INSERT INTO ships VALUES('Musashi','Yamato',1942);
INSERT INTO ships VALUES('New Jersey','Iowa',1943);
INSERT INTO ships VALUES('North Carolina','North Carolina',1941);
INSERT INTO ships VALUES('Ramilles','Revenge',1917);
INSERT INTO ships VALUES('Renown','Renown',1916);
INSERT INTO ships VALUES('Repulse','Renown',1916);
INSERT INTO ships VALUES('Resolution','Revenge',1916);
INSERT INTO ships VALUES('Revenge','Revenge',1916);
INSERT INTO ships VALUES('Royal Oak','Revenge',1916);
INSERT INTO ships VALUES('Royal Sovereign','Revenge',1916);
INSERT INTO ships VALUES('Tennessee','Tennessee',1920);
INSERT INTO ships VALUES('Washington','North Carolina',1941);
INSERT INTO ships VALUES('Wisconsin','Iowa',1944);
INSERT INTO ships VALUES('Yamato','Yamato',1941);

```

```

INSERT INTO Battles VALUES('North Atlantic','27-May-1941');
INSERT INTO Battles VALUES('Guadalcanal','15-Nov-1942');
INSERT INTO Battles VALUES('North Cape','26-Dec-1943');
INSERT INTO Battles VALUES('Surigao Strait','25-Oct-1944');

```

```

INSERT INTO Outcomes VALUES('Bismarck','North Atlantic', 'sunk');
INSERT INTO Outcomes VALUES('California','Surigao Strait', 'ok');
INSERT INTO Outcomes VALUES('Duke of York','North Cape', 'ok');
INSERT INTO Outcomes VALUES('Fuso','Surigao Strait', 'sunk');
INSERT INTO Outcomes VALUES('Hood','North Atlantic', 'sunk');
INSERT INTO Outcomes VALUES('King George V','North Atlantic', 'ok');
INSERT INTO Outcomes VALUES('Kirishima','Guadalcanal', 'sunk');
INSERT INTO Outcomes VALUES('Prince of Wales','North Atlantic', 'damaged');
INSERT INTO Outcomes VALUES('Rodney','North Atlantic', 'ok');
INSERT INTO Outcomes VALUES('Scharnhorst','North Cape', 'sunk');
INSERT INTO Outcomes VALUES('South Dakota','Guadalcanal', 'ok');
INSERT INTO Outcomes VALUES('West Virginia','Surigao Strait', 'ok');
INSERT INTO Outcomes VALUES('Yamashiro','Surigao Strait', 'sunk');

```

Exercise 2.

1.

```
select b.name from Classes a, ships b
where a.class=b.class and a.displacement >35000 and b.LAUNCHED>=1921;
```

2.

```
select d.ship,c.DISPLACEMENT,c.NUMGUNS
from
(SELECT *
FROM Outcomes a
FULL OUTER JOIN Ships b
ON a.ship=b.name) d
FULL OUTER JOIN classes c
on d.class=c.class
where d.battle='Guadalcanal';
```

3.

```
SELECT a.name as name
FROM ships a
union
SELECT b.ship as name
FROM outcomes b;
```

4.

```
SELECT a.country as country
FROM classes a
where a.type='bb'
INTERSECT
SELECT b.country as country
FROM classes b
where b.type='bc';
```

5.

```
CREATE VIEW a AS SELECT Outcomes.ship, Outcomes.battle, Outcomes.result,
Battles.date_fought FROM Outcomes JOIN Battles ON Outcomes.battle=Battles.name;
```

```
select b.ship
from a b,a c
where
(select TO_DATE(c.DATE_FOUGHT,'DD-MON-YYYY')
from dual)>(select TO_DATE(b.DATE_FOUGHT,'DD-MON-YYYY')
from dual) and b.RESULT='damaged' and b.ship=c.ship;
```

6.

```
SELECT country
FROM classes b
WHERE b.NUMGUNS =
  (SELECT max(NUMGUNS)
   FROM classes
  );
```

7.

```
create view ques777 as
(select a.class,a.numguns,a.bore,b.name
From classes a, ships b
Where a.class=b.class
);
```

```
select a.name
from ques777 a,(select bore,max(numguns) as maxx from ques777 group by bore) b
where a.bore=b.bore and a.numguns=b.maxx ;
```

8.

```
select x.class,NVL2(y.SUNK_SHIPS,y.SUNK_SHIPS,0) as SUNK_SHIPS
from
(select class
from ships
group by class
having count(*)>=3) x
left join
(select class,count(*) as SUNK_SHIPS
from
outcomes b,
ships c
where b.ship=c.name and b.result='sunk'
group by class) y
on x.class=y.class;
```

Exercise 3.

1.

```
INSERT INTO Classes (class, type, country, bore, displacement)
VALUES ('Vittorio Veneto','bb','Italia',15,41000);
```

```
INSERT INTO Ships(name, class, launched)
```

```
VALUES ('Vittorio Veneto','Vittorio Veneto',1940);
```

```
INSERT INTO Ships(name, class, launched)  
VALUES ('Italia','Vittorio Veneto',1940);
```

```
INSERT INTO Ships(name, class, launched)  
VALUES ('Roma','Vittorio Veneto',1942);
```

2.

```
delete from classes  
where class in  
(select class  
from classes  
minus  
select class  
from ships  
group by class  
having count(*)>=3);
```

3.

```
UPDATE classes  
SET bore=bore*2.5, DISPLACEMENT=DISPLACEMENT*1.1;
```

Exercise 4.

1.

```
ALTER TABLE Classes ADD CONSTRAINT classes_pk PRIMARY KEY(class);
```

```
CREATE TABLE Exceptions(  
row_id ROWID,  
owner VARCHAR2(30),  
table_name VARCHAR2(30),  
constraint VARCHAR2(30)  
);
```

```
ALTER TABLE Ships ADD CONSTRAINT ship_to_classes_fk FOREIGN KEY(class)  
REFERENCES Classes(class) EXCEPTIONS INTO Exceptions;
```

```
DELETE FROM Ships WHERE class IN ( SELECT class FROM Ships, Exceptions  
WHERE Ships.rowid = Exceptions.row_id );
```

```
ALTER TABLE Ships ADD CONSTRAINT ship_to_classes_fk FOREIGN KEY(class)  
REFERENCES Classes(class);
```

2.

```
ALTER TABLE battles ADD CONSTRAINT battles_pk PRIMARY KEY(name);
```

```
ALTER TABLE outcomes ADD CONSTRAINT o_to_b_fk  
FOREIGN KEY(battle) REFERENCES battles(name)  
EXCEPTIONS INTO Exceptions;
```

//not need for next steps,since there are no exceptions in this question:

```
DELETE FROM outcomes  
WHERE battle IN (  
SELECT battle  
FROM outcomes, Exceptions  
WHERE outcomes.rowid = Exceptions.row_id  
);
```

```
ALTER TABLE outcomes ADD CONSTRAINT o_to_b_fk  
FOREIGN KEY(battle) REFERENCES battles(name);
```

3.

```
ALTER TABLE ships ADD CONSTRAINT ships_pk PRIMARY KEY(name);
```

```
ALTER TABLE outcomes ADD CONSTRAINT o_to_s_fk  
FOREIGN KEY(ship) REFERENCES ships(name)  
EXCEPTIONS INTO Exceptions;
```

```
DELETE FROM outcomes  
WHERE ship IN (  
SELECT ship  
FROM outcomes, Exceptions  
WHERE outcomes.rowid = Exceptions.row_id  
);
```

```
ALTER TABLE outcomes ADD CONSTRAINT o_to_s_fk  
FOREIGN KEY(ship) REFERENCES ships(name);
```

4.

```
ALTER TABLE classes ADD CONSTRAINT check_bore Check(bore<=16)  
EXCEPTIONS INTO Exceptions;
```

```
ALTER TABLE ships drop CONSTRAINT ship_to_classes_fk;
```

```
DELETE FROM classes WHERE classes.bore IN ( SELECT distinct bore FROM classes,  
Exceptions WHERE classes.rowid = Exceptions.row_id );
```

```
ALTER TABLE classes ADD CONSTRAINT check_bore Check(bore<=16)
```

5.

```
ALTER TABLE classes ADD CONSTRAINT check_q6 Check(not(numguns>=9) or  
bore<=14)  
EXCEPTIONS INTO Exceptions;
```

```
DELETE FROM classes where class in(SELECT classes.class FROM classes,  
Exceptions WHERE classes.rowid = Exceptions.row_id)
```

6.

```
CREATE OR REPLACE VIEW OutcomesView AS  
SELECT ship, battle, result  
FROM Outcomes O  
WHERE NOT EXISTS (  
SELECT *  
FROM Ships S, Battles B  
WHERE S.name=O.ship AND O.battle=B.name AND  
S.launched > TO_NUMBER(TO_CHAR(B.date_fought, 'yyyy'))  
)  
WITH CHECK OPTION;
```

7.

```
CREATE OR REPLACE VIEW q9View AS  
SELECT a.name,a.class, launched  
FROM ships a  
WHERE NOT EXISTS (  
SELECT *  
FROM Ships S, classes b  
WHERE S.name=a.name AND a.CLASS=b.class and  
S.launched < (select min(launched) from ships d where d.class=a.class)  
)  
WITH CHECK OPTION;
```

8.

```
CREATE OR REPLACE VIEW a8 AS
SELECT ship, battle,d.date_fought
FROM Outcomes O,Battles d
WHERE NOT EXISTS (
SELECT *
FROM Ships S, Battles B
WHERE S.name=O.ship AND O.battle=B.name AND
TO_NUMBER(TO_CHAR(B.DATE_FOUGHT,'yyyy')) > TO_NUMBER(TO_CHAR((select
a.DATE_FOUGHT from battles a ,outcomes b
where b.result='sunk' and a.name=b.battle), 'yyyy'))
)
WITH CHECK OPTION;
```