CS 586 Introduction to Databases
Assignment 3 – Basic SQL Queries
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Part I Relational Algebra
Question 1
True, they are equivalent. We are using bag mechanic in this problem. So, no duplicates.

Question 2
False, they are not equivalent.

```
SELECT * FROM f17tdb1.pokemon;
```

Submit

| Actions | character | ctype | stamina |
|---|---|---|---|
| Edit Delete | Caterpie | bug | 90 |
| Edit Delete | Metapod | bug | 100 |
| Edit Delete | Charmander | fire | 78 |
| Edit Delete | Squirtle | water | 98 |
| Edit Delete | Rattata | normal | 60 |
| Edit Delete | Raticate | normal | 85 |
| Edit Delete | Ekans | poison | 70 |

7 row(s)

```
SELECT * FROM f17tdb1.captured;
```

Submit

| Actions | location | character |
|---|---|---|
| Edit Delete | Salem | Caterpie |
| Edit Delete | Salem | Metapod |
| Edit Delete | Camas | Rattata |
| Edit Delete | Camas | Charmander |
| Edit Delete | Camas | Raticate |
| Edit Delete | Kelso | Caterpie |
| Edit Delete | Kelso | Squirtle |
| Edit Delete | Kelso | Raticate |
| Edit Delete | Kelso | Ekans |
| Edit Delete | Wasco | Metapod |
| Edit Delete | Wasco | Rattata |

11 row(s)

SQL

```
select distinct character
from captured
where location='Wasco' and location='Salem';
```

**Query Results**

No rows found.

SQL

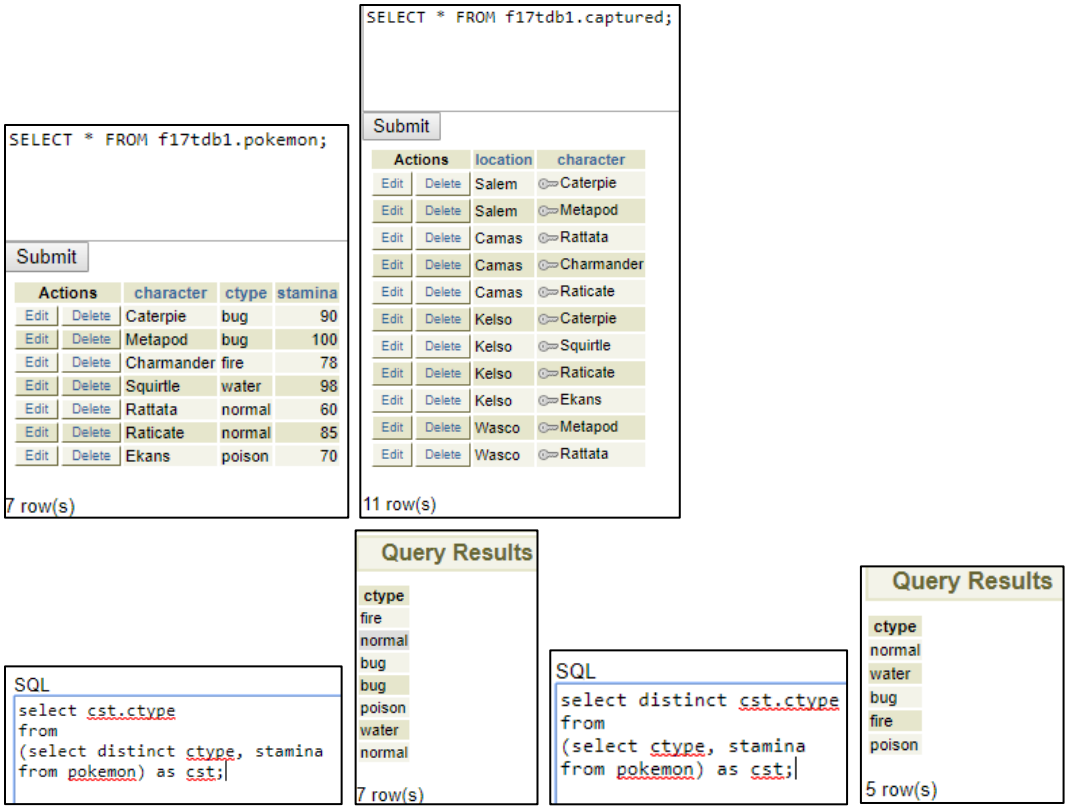
```
select distinct character
from captured
where location='Salem'

intersect

select distinct character
from captured
where location='Wasco' ;
```

**Query Results**

| character |
|---|
| Metapod |

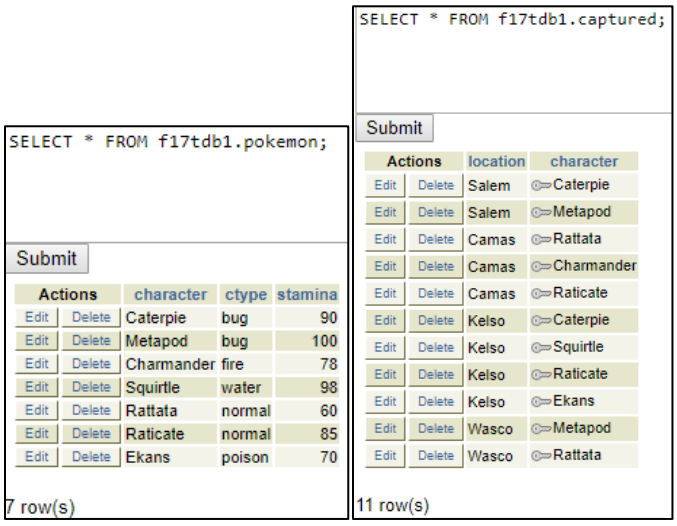
1 row(s)

Question 3
False, they are not equivalent.




Question 4

False, they are not equivalent.



SQL

```
select ctype, location
from pokemon natural join captured;
```

Query Results

| ctype | location |
|---|---|
| bug | Salem |
| bug | Salem |
| normal | Camas |
| fire | Camas |
| normal | Camas |
| bug | Kelso |
| water | Kelso |
| normal | Kelso |
| poison | Kelso |
| bug | Wasco |
| normal | Wasco |

11 row(s)

SQL

```
select distinct ctype, location
from pokemon natural join captured;
```

Query Results

| ctype | location |
|---|---|
| normal | Camas |
| bug | Salem |
| bug | Kelso |
| normal | Wasco |
| normal | Kelso |
| bug | Wasco |
| poison | Kelso |
| fire | Camas |
| water | Kelso |

9 row(s)

Part II: Group-by and subqueries

Question 5 (10 points): List the min and max salary for agents in each country.

```
select country, max(salary), min(salary)
from agent
group by country;
```

22 row(s)

| country | max | min |
|---|---|---|
| China | 90748 | 50175 |
| England | 89645 | 54152 |
| Turkey | 77777 | 51492 |
| Germany | 78903 | 50177 |
| Singapore | 56875 | 56875 |

Question 6 (10 points): List the number of agents and total salary for agents in each country with 6 or more cities.

```
select country, sum(salary), count(agent_id)
from agent
group by country
having count(distinct city) >= 6
;
```

| country | sum | count |
|---|---|---|
| USA | 32977189 | 319 |

1 row(s)

Question 7 (10 points): List the number of agents who have each affiliation. Include affiliation ID and title in the result.

```
select count(agent_id), affiliation.aff_id, affiliation.title
from agent natural join affiliationrel natural join affiliation
group by affiliation.aff_id, affiliation.title
;
```

34 row(s)

Query Results

| count | aff_id | title |
|---|---|---|
| 24 | 12 | FSB |
| 38 | 22 | SGI |
| 28 | 18 | BOSS |
| 21 | 2 | ASIO |
| 32 | 21 | JGI |

Question 8 (15 points): List the agents (id, first, last) who have been on a ‘Secret’ mission that failed. Write this query two ways, once using EXISTS and once using IN.

```
select a.agent_id, first, last
from agent a
where EXISTS
(select *
from mission m, securityclearance s, teamrel tr
where m.access_id = s.sc_id
and tr.team_id = m.team_id
and tr.agent_id = a.agent_id
and s.sc_level = 'Secret'
and m.mission_status ='failed'
and a.clearance_id = s.sc_id)
;
------------------------------------------------------------
select a.agent_id, first, last
from agent a
where a.agent_id IN
(select tr.agent_id
from mission m, securityclearance s, teamrel tr
where m.access_id = s.sc_id
and tr.team_id = m.team_id
and tr.agent_id = a.agent_id
and s.sc_level = 'Secret'
and m.mission_status ='failed'
and a.clearance_id = s.sc_id)
;
```

35 row(s)

| agent_id | first | last |
|---|---|---|
| 1 | Nick | Black |
| 5 | George | Fairley |
| 55 | John | House |
| 70 | George | Yang |
| 80 | Mathew | Hakanson |

Question 9 (15 points): Find the language and the number of speakers for the language(s) with the most speakers.

```
select language.language, temp1.speakernum
from language,
(select lang_id as langid, count(agent_id) as speakernum
from languagerel
group by lang_id) as temp1
where language.lang_id = temp1.langid
and temp1.speakernum =

(select max(temp2.speakernum) as maxspeakernum
from (select lang_id as langid, count(agent_id) as speakernum
from languagerel
group by lang_id) as temp2)
;
```

Query Results

| language | speakernum |
|---|---|
| German | 122 |

1 row(s)

Part III: Views

Question 10 (5 points). Create two tables for Characters and Quick Move information, as in Part I of HW2. Show the your CREATE statements.

```
CREATE TABLE PokemonGoData
(
Name VARCHAR(20) NOT NULL,
Stamina INT,
CaptureRate DECIMAL(6, 3),
FleeRate DECIMAL(6, 3),
Candy INT,
Attack INT,
Defense INT,
PRIMARY KEY(Name)
);

CREATE TABLE SecondTable
(
STID INT NOT NULL,
STName VARCHAR(20),
QuickMove VARCHAR(50),
```

PRIMARY KEY(STID),
FOREIGN KEY(STName) REFERENCES pokemongodata(Name)
);

Question 11 (5 points). Insert rows into both tables for the first 15 characters. Show the full contents of your two tables. Do not include your INSERT statements.

| Actions | | name | stamina | capturerate | fleerate | candy | attack | defense |
|---|---|---|---|---|---|---|---|---|
| Edit | Delete | Bulbasaur | 90 | 0.160 | 0.100 | 25 | 126 | 126 |
| Edit | Delete | Charmander | 78 | 0.160 | 0.100 | 25 | 128 | 108 |
| Edit | Delete | Charmeleon | 116 | 0.080 | 0.070 | 100 | 160 | 140 |
| Edit | Delete | Squirtle | 88 | 0.160 | 0.100 | 25 | 112 | 142 |
| Edit | Delete | Wartortle | 118 | 0.080 | 0.070 | 100 | 144 | 176 |
| Edit | Delete | Caterpie | 90 | 0.400 | 0.200 | 12 | 62 | 66 |
| Edit | Delete | Metapod | 100 | 0.200 | 0.090 | 50 | 56 | 86 |
| Edit | Delete | Weedle | 80 | 0.400 | 0.200 | 12 | 68 | 64 |
| Edit | Delete | Kakuna | 90 | 0.200 | 0.090 | 50 | 62 | 82 |
| Edit | Delete | Ivysaur | 120 | 0.080 | 0.070 | 100 | 156 | 158 |
| Edit | Delete | Butterfree | 120 | 0.100 | 0.060 | NULL | 144 | 144 |
| Edit | Delete | Venusaur | 160 | 0.040 | 0.050 | NULL | 198 | 200 |
| Edit | Delete | Beedrill | 130 | 0.100 | 0.060 | NULL | 144 | 130 |
| Edit | Delete | Charizard | 156 | 0.040 | 0.050 | NULL | 212 | 182 |
| Edit | Delete | Blastoise | 158 | 0.040 | 0.050 | NULL | 186 | 222 |

15 row(s)

| Actions | | stid | stname | quickmove |
|---|---|---|---|---|
| Edit | Delete | 1 | Bulbasaur | Tackle |
| Edit | Delete | 2 | Bulbasaur | Vine Whip |
| Edit | Delete | 3 | Ivysaur | Razor Leaf |
| Edit | Delete | 4 | Ivysaur | Vine Whip |
| Edit | Delete | 5 | Charmander | Ember |
| Edit | Delete | 6 | Charmander | Scratch |
| Edit | Delete | 7 | Charmeleon | Ember |
| Edit | Delete | 8 | Charmeleon | Scratch |
| Edit | Delete | 9 | Squirtle | Bubble |
| Edit | Delete | 10 | Squirtle | Tackle |
| Edit | Delete | 11 | Wartortle | Bite |
| Edit | Delete | 12 | Wartortle | Water Gun |
| Edit | Delete | 13 | Caterpie | Tackle |
| Edit | Delete | 14 | Caterpie | Bug Bite |
| Edit | Delete | 15 | Metapod | Tackle |
| Edit | Delete | 16 | Metapod | Bug Bite |
| Edit | Delete | 17 | Butterfree | Bug Bite |
| Edit | Delete | 18 | Butterfree | Confusion |
| Edit | Delete | 19 | Weedle | Bug Bite |
| Edit | Delete | 20 | Weedle | Poison Sting |
| Edit | Delete | 21 | Kakuna | Bug Bite |
| Edit | Delete | 22 | Kakuna | Poison Sting |
| Edit | Delete | 23 | Venusaur | Razor Leaf |
| Edit | Delete | 24 | Venusaur | Vine Whip |
| Edit | Delete | 25 | Charizard | Ember |
| Edit | Delete | 26 | Charizard | Wing Attack |
| Edit | Delete | 27 | Blastoise | Bite |
| Edit | Delete | 28 | Blastoise | Water Gun |
| Edit | Delete | 29 | Beedrill | Bug Bite |
| Edit | Delete | 30 | Beedrill | Poison Jab |

30 row(s)

Question 12 (10 points). Create an SQL view definition for a table CharInfo(quick_move, num_characters, max_stamina) that lists the number of different characters having each quick move and their maximum stamina. Show your CREATE VIEW statement and the full table that your view generates.

```
create view CharInfo as
(select s.quickmove as quick_move, count(p.name) as num_characters, max(p.stamina) as max_stamina
from pokemongodata p, secondtable s
where p.name = s.stname
group by s.quickmove);
```

| quick_move | num_characters | max_stamina |
|---|---|---|
| Confusion | 1 | 120 |
| Vine Whip | 3 | 160 |
| Razor Leaf | 2 | 160 |
| Scratch | 2 | 116 |
| Poison Jab | 1 | 130 |
| Bite | 2 | 158 |
| Bubble | 1 | 88 |
| Ember | 3 | 156 |
| Bug Bite | 6 | 130 |
| Tackle | 4 | 100 |
| Water Gun | 2 | 158 |
| Wing Attack | 1 | 156 |
| Poison Sting | 2 | 90 |

13 row(s)

Question 13 (10 points). Write an SQL query that finds the quick move(s) having the character(s) with the greatest stamina. Use the CharInfo view you defined in the previous question. Show your query and the result.

```
select CH.quick_move
from charinfo CH
where CH.max_stamina =
(select max(max_stamina)
from charinfo);
```

| quick_move |
|---|
| Vine Whip |
| Razor Leaf |

2 row(s)

Question 14 (10 points). Write one or more DELETE statements that remove all characters with the Bug Bite move. Note that removing those characters will also mean removing move information. Show your DELETE statement(s).

```
DELETE FROM secondtable
WHERE secondtable.quickmove = 'Bug Bite';

DELETE FROM secondtable
WHERE stname IN
(select stname
from secondtable
group by stname
having count(stname) < 2)
;
```

| Actions | | stid | stname | quickmove |
|---|---|---|---|---|
| Edit | Delete | 1 | Bulbasaur | Tackle |
| Edit | Delete | 2 | Bulbasaur | Vine Whip |
| Edit | Delete | 3 | Ivysaur | Razor Leaf |
| Edit | Delete | 4 | Ivysaur | Vine Whip |
| Edit | Delete | 5 | Charmander | Ember |
| Edit | Delete | 6 | Charmander | Scratch |
| Edit | Delete | 7 | Charmeleon | Ember |
| Edit | Delete | 8 | Charmeleon | Scratch |
| Edit | Delete | 9 | Squirtle | Bubble |
| Edit | Delete | 10 | Squirtle | Tackle |
| Edit | Delete | 11 | Wartortle | Bite |
| Edit | Delete | 12 | Wartortle | Water Gun |
| Edit | Delete | 23 | Venusaur | Razor Leaf |
| Edit | Delete | 24 | Venusaur | Vine Whip |
| Edit | Delete | 25 | Charizard | Ember |
| Edit | Delete | 26 | Charizard | Wing Attack |
| Edit | Delete | 27 | Blastoise | Bite |
| Edit | Delete | 28 | Blastoise | Water Gun |

18 row(s)

```
DELETE FROM pokemongodata
WHERE name IN
(select p.name
from pokemongodata p full outer join secondtable s
on p.name = s.stname
where s.quickmove is null)
;
```

| Actions | | name | stamina | capturerate | fleerate | candy | attack | defense |
|---|---|---|---|---|---|---|---|---|
| Edit | Delete | Bulbasaur | 90 | 0.160 | 0.100 | 25 | 126 | 126 |
| Edit | Delete | Charmander | 78 | 0.160 | 0.100 | 25 | 128 | 108 |
| Edit | Delete | Charmeleon | 116 | 0.080 | 0.070 | 100 | 160 | 140 |
| Edit | Delete | Squirtle | 88 | 0.160 | 0.100 | 25 | 112 | 142 |
| Edit | Delete | Wartortle | 118 | 0.080 | 0.070 | 100 | 144 | 176 |
| Edit | Delete | Ivysaur | 120 | 0.080 | 0.070 | 100 | 156 | 158 |
| Edit | Delete | Venusaur | 160 | 0.040 | 0.050 | *NULL* | 198 | 200 |
| Edit | Delete | Charizard | 156 | 0.040 | 0.050 | *NULL* | 212 | 182 |
| Edit | Delete | Blastoise | 158 | 0.040 | 0.050 | *NULL* | 186 | 222 |

9 row(s)

Question 15 (5 points). Rerun the query from Question 13 and give the full result.

```
select CH.quick_move
from charinfo CH
where CH.max_stamina =
(select max(max_stamina)
from charinfo);
```

| quick_move |
| --- |
| Razor Leaf |
| Vine Whip |

2 row(s)

```
SELECT * FROM f17tdb1.charinfo;
```

Submit

| quick_move | num_characters | max_stamina |
| --- | --- | --- |
| Vine Whip | 3 | 160 |
| Razor Leaf | 2 | 160 |
| Scratch | 2 | 116 |
| Bite | 2 | 158 |
| Bubble | 1 | 88 |
| Ember | 3 | 156 |
| Tackle | 2 | 90 |
| Water Gun | 2 | 158 |
| Wing Attack | 1 | 156 |

9 row(s)