Assignment 6 CMPSC431W

Problem 1:

$\Pi_{(Projection)}$

$\Pi_{sid, gpa}$ (SENIORS)

sid	gpa
401	3.9
402	3.7
403	3.5
404	3.3

SQL Statement:

SELECT sid, gpa FROM SENIORS;

Problem 2:

$\Pi_{creditsSoFar}$ (SENIORS)

creditsSoFar
120
130
130
135

Question: Do you have three or four rows? Why?

A: There is four rows because there are four seniors: Debbie, Elaine, Frank, and George.

SQL Statement:

SELECT creditsSoFar FROM SENIORS;

Problem 3:

JUNIORS U SENIORS

sid	sname	creditsSoFar	gpa
301	Adam	85	4
302	Betty	90	3.8
303	Charlie	95	3.9
401	Debbie	120	3.9
402	Elaine	130	3.7
403	Frank	130	3.5
404	George	135	3.3

SQL Statement:

SELECT sid, sname, creditsSoFar, gpa
FROM JUNIORS UNION SELECT
sid, sname, creditsSoFar, gpa FROM
SENIORS;

Problem 4:

$$\sigma_{gpa} > 3.5 \ (SENIORS)$$

sid	sname	creditsSoFar	gpa
401	Debbie	120	3.9
402	Elaine	130	3.7

SQL Statement:

SELECT sid, sname, creditsSoFar, gpa
FROM SENIORS WHERE gpa > 3.5;

Problem 5A: ⋈ (JOIN)

SENIORS ⋈_{s.sid = t.sid} TAKEN

sid	sname	creditsSoFar	gpa	cid	grade
401	Debbie	120	3.9	501	B
401	Debbie	120	3.9	506	B-
401	Debbie	120	3.9	502	C+
404	George	135	3.3	503	D
404	George	135	3.3	504	F

SQL Statement:

SELECT s.sid, sname, creditsSoFar, gpa, cid,
grade FROM SENIORS s, TAKEN t WHERE
s.sid = t.sid;

Problem 5B:

JUNIORS ⋈_{s.sid = t.sid} TAKEN

sid	sname	creditsSoFar	gpa	cid	grade
302	Betty	90	3.8	502	A
302	Betty	90	3.8	501	A-
303	Charlie	95	3.9	501	B+

SQL Statement?

SELECT s.sid, sname, creditsSoFar, gpa, cid, grade FROM JUNIORS s, TAKEN t WHERE s.sid = t.sid;

Problem 6:

SENIORS ⋈ s.sid = t.sid TAKEN
UNION
JUNIORS ⋈ s.sid = t.sid TAKEN

sid	sname	creditsSoFar	gpa	cid	grade
401	Debbie	120	3.9	501	B
401	Debbie	120	3.9	506	B-
401	Debbie	120	3.9	502	C+
404	George	135	3.3	503	D
404	George	135	3.3	504	F
302	Betty	90	3.9	502	A
302	Betty	90	3.9	501	A-
303	Charlie	95	3.8	501	B+

SQL Statement:

SELECT s.sid, sname, creditsSoFar, gpa, cid, grade FROM SENIORS s, TAKEN t WHERE s.sid = t.sid UNION SELECT s.sid, sname, creditsSoFar, gpa, cid, grade FROM JUNIORS s, TAKEN t WHERE s.sid = t.sid;

Problem 7:

Find the names of students who have taken the course with id number of 502

$$\Pi_{sname}(\sigma_{t.cid=502}(SENIORS\ s \bowtie TAKEN\ t)) \cup$$
$$\Pi_{sname}(\sigma_{t.cid=502}(SENIORS\ s \bowtie TAKEN\ t))$$

Show the results in tabular form.

Sname
Debbie
Betty

SQL Statement?

SELECT sname FROM SENIORS s,
TAKEN t WHERE t.cid=502 UNION
SELECT sname FROM JUNIORS j,
TAKEN t WHERE t.cid=502;

Other way:

Problem 8.

Find the names of students who have taken CMPSC465

$$\Pi_{sname}[(\text{JUNIORS} \cup \text{SENIORS}) \bowtie (\sigma_{cname="465"}\text{CLASSES} \bowtie \text{TAKEN})]$$

Show the results in tabular form:

sname
Betty
Charlie
Debbie
George

SQL Statement:

```
SELECT sname FROM ((SELECT* FROM
JUNIORS UNION SELECT* FROM
SENIORS) NATURAL JOIN (SELECT sid
FROM CLASSES NATURAL JOIN TAKEN
WHERE cname="465"));
```

Problem 9.

Find the courses taken by anyone with a GPA greater than or equal to 3.9

$$\Pi_{ctype,cname}[\sigma_{gpa \geq 3.9}[(\text{JUNIORS} \cup \text{SENIORS}) \bowtie \text{CLASSES} \bowtie \text{TAKEN}]]$$

Show results in tabular form:

ctype	cname
CMPSC	465
PHYS	211
ENG	202C

SQL Statement:

SELECT ctype, cname FROM ([(SELECT *
FROM JUNIORS) U (SELECT * FROM SENIORS)]
NATURAL JOIN (CLASSES NATURAL JOIN
TAKEN) WHERE gpa >= 3.9;

Problem 10.
Find the name of all students who
have taken atleast one class.

Π_{sname} [(TAKEN ⋈ (SENIORS U JUNIORS)]

Show results in tabular form:

sname
Betty
Charlie
Debbie
George

SQL Statement:

SELECT DISTINCT sname FROM
(SELECT * FROM JUNIORS UNION SELECT *

FROM SENIORS NATURAL JOIN
TAKEN

Problem 11.
Find the names

Π_{sname} [(JUNIORS U SENIORS) $\bowtie$
($\sigma_{cname="211"}$ U $\sigma_{cname="2020"}$ CLASSES $\bowtie$
TAKEN)]

Show the results in tabular form:

sname
Betty
Debbie

SQL Statement:

SELECT sname FROM ((SELECT * FROM
JUNIORS UNION SELECT * FROM
SENIORS) NATURAL JOIN (SELECT sid
FROM CLASSES NATURAL JOIN TAKEN
WHERE cname="211" OR cname="2020"));