

Problem 1

Output for department ,section and takes table respectively

History	Taylor	699140.86				
Physics	Wrigley	942162.76				
Marketing	Lambeau	210627.58				
Pol. Sci.	Whitman	573745.09				
English	Palmer	611042.66				
Accounting	Saucon	441840.92				
Comp. Sci.	Lamberton	106378.69				
Languages	Linderman	601283.60				

course_id	sec_id	semester	year	building	room_number	time_slot_id
313	1	Fall	2010	Chandler	804	N
747	1	Spring	2004	Gates	314	K
443	1	Spring	2010	Whitman	434	O
893	1	Fall	2007	Fairchild	145	B
663	1	Spring	2005	Fairchild	145	D
457	1	Spring	2001	Saucon	844	D
445	1	Spring	2001	Alumni	547	J
559	1	Fall	2002	Lamberton	134	J
239	1	Fall	2006	Taylor	183	C
802	1	Spring	2003	Saucon	113	J

id	course_id	sec_id	semester	year	grade
65901	401	1	Fall	2003	C-
24932	802	1	Spring	2003	B-
61332	200	1	Spring	2007	A-
73492	760	1	Spring	2004	A
65715	843	1	Fall	2010	B+
58300	408	1	Spring	2007	B-
760	571	1	Spring	2004	B
69730	313	1	Fall	2010	A
94836	626	1	Fall	2006	C+
49391	603	1	Fall	2003	B-

Problem 2

Output for course id and title of all the prerequisites for the following courses: 276, 647, 496

course_id	prereq_id	title
276	403	Immunology
276	352	Compiler Design
276	345	Race Car Driving

course_id	prereq_id	title
647	792	Image Processing
647	814	Compiler Design

course_id	prereq_id	title
496	489	Journalism
496	416	Data Mining
496	443	Journalism
496	852	World History
496	267	Hydraulics
496	133	Antidisestablishmentarianism in Modern America

Problem 3

1) consider the case insert into teaches(id,course_id,sec_id,semester,year) values (43779,237,2,'Fall',2009);

	course_id character varying (8) 🔒	sec_id character varying (8) 🔒	semester character varying (6) 🔒	year numeric (4) 🔒	id character varying (5) 🔒	building character varying (15) 🔒	room_number character varying (7) 🔒	time_slot_id character varying (4) 🔒
1	105	1	Fall	2009	43779	Chandler	375	C
2	105	2	Fall	2002	43779	Taylor	183	C
3	476	1	Fall	2010	43779	Drown	757	C
4	489	1	Fall	2007	43779	Lamberton	143	D

Now here if we see in same semester same year only he has c slot so when added 237,2,'Fall',2009 he gets j (this can be obtained by section table) slot so no clash as expected we get no error.

2) consider the case insert into teaches(id,course_id,sec_id,semester,year) values (22591,735,1,'Spring',2003); already a time slot D exists if we insert then in same semester and same year he gets same time slot but in different place so not possible

	course_id character varying (8) 🔒	sec_id character varying (8) 🔒	semester character varying (6) 🔒	year numeric (4) 🔒	id character varying (5) 🔒	building character varying (15) 🔒	room_number character varying (7) 🔒	time_slot_id character varying (4) 🔒
1	599	1	Spring	2003	22591	Chandler	804	D

It must throw error.

	course_id [PK] character varying (8) ✎	sec_id [PK] character varying (8) ✎	semester [PK] character varying (6) ✎	year [PK] numeric (4) ✎	building character varying (15) ✎	room_number character varying (7) ✎	time_slot_id character varying (4) ✎
1	319	1	Spring	2003	Rathbone	261	E
2	408	2	Spring	2003	Taylor	183	J
3	599	1	Spring	2003	Chandler	804	D
4	629	1	Spring	2003	Stabler	105	F
5	735	1	Spring	2003	Drown	757	D
6	802	1	Spring	2003	Saucon	113	J

3) update teaches set (id,course_id,sec_id,semester,year)=('22591','735','1','Spring',2003) where (id,course_id,sec_id,semester,year)=('22591','599','1','Spring',2003); Similar to above but here we are updating so we should not have a problem As expected we don't get any error.

4) update section set

(course_id,sec_id,semester,year,building,room_number,time_slot_id)=('843','1','Fall','2010','Power','300','I') where (course_id,sec_id,semester,year,building,room_number,time_slot_id)=('843','1','Fall','2010','Fairchild','145','J');

```
ERROR: insert or update on table "section" violates foreign key constraint "section_building_room_number_fkey"
DETAIL: Key (building, room_number)=(Power, 300) is not present in table "classroom".
SQL state: 23503
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Any changes to first 4 columns trigger foreign key constraint so if it is used by teaches table It shows error as shown but if not used by any then there is no worry to check time slot clash only changes to timeslot the trigger must be created.

5) update section set

(course_id,sec_id,semester,year,building,room_number,time_slot_id)=('571','1','Spring','2004','Power','972','K') where

(course_id,sec_id,semester,year,building,room_number,time_slot_id)=('571','1','Spring','2004','Power','972','I');

	course_id character varying (8)	sec_id character varying (8)	semester character varying (6)	year numeric (4)	id character varying (5)	building character varying (15)	room_number character varying (7)	time_slot_id character varying (4)
32	747	1	Spring	2004	34175	Gates	314	K
33	571	1	Spring	2004	34175	Power	972	I

As we update we see 34175 teaches those two courses so if updated there is time clash

Problem 4

the CGPA for the following roll numbers: 76672, 90567, 4582, 81258

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<terminated> ex4 [java Application] /Lib
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id	cgpa
76672	5.0810810810810811
90567	5.8412698412698413
4582	5.3611111111111111
81258	6.4761904761904762

Problem 5

Print the top-5 students in terms of CGPA

id	cgpa	ranking
19362	8.2682926829268293	1
81207	8.2000000000000000	2
78637	8.1714285714285714	3
98619	8.0333333333333333	4
18286	8.0000000000000000	5

Print the top-5 students with highest CGPA for departments: Psychology, Elec. Eng., and Civil Eng.

id	dept_name	cgpa	departmental_rank
17676	Psychology	7.5641025641025641	1
40116	Psychology	7.5000000000000000	2
32886	Psychology	7.4285714285714286	3
26494	Psychology	7.3684210526315789	4
51093	Psychology	7.1500000000000000	5

id	dept_name	cgpa	departmental_rank
29140	Elec. Eng.	7.7647058823529412	1
64401	Elec. Eng.	7.6279069767441860	2
52057	Elec. Eng.	7.4909090909090909	3
59517	Elec. Eng.	7.3823529411764706	4
38712	Elec. Eng.	6.8644067796610169	5

id	dept_name	cgpa	departmental_rank
98619	Civil Eng.	8.0333333333333333	1
13753	Civil Eng.	7.7352941176470588	2
40677	Civil Eng.	7.7073170731707317	3
99660	Civil Eng.	7.6415094339622642	4
32419	Civil Eng.	7.4615384615384615	5

Print the top-5 students with highest CGPA for course ids: 237, 349, 735

course_id	id	cgpa	ranking
237	78637	8.1714285714285714	1
237	66469	7.9433962264150943	2
237	64196	7.9411764705882353	3
237	77898	7.9111111111111111	4
237	99289	7.8947368421052632	5

course_id	id	cgpa	ranking
349	23506	7.6585365853658537	1
349	40116	7.5000000000000000	2
349	16311	7.4883720930232558	3
349	70021	7.4285714285714286	4
349	14094	7.4000000000000000	5

course_id	id	cgpa	ranking
735	18286	8.0000000000000000	1
735	77898	7.9111111111111111	2
735	52707	7.8421052631578947	3
735	11441	7.8235294117647059	4
735	39901	7.5588235294117647	5