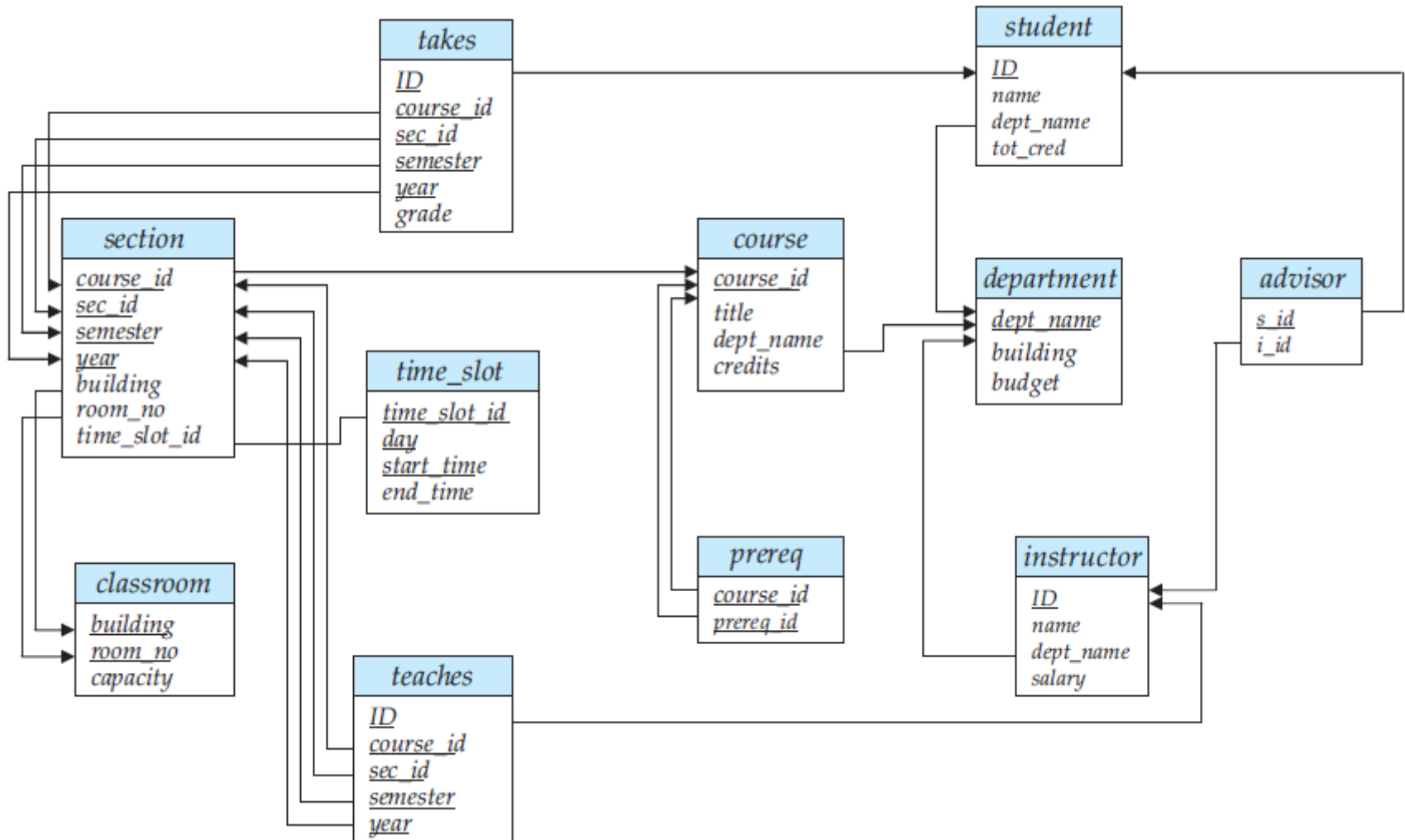


Exercise

Schema diagram for the university database



SQL data definition for part of the university database :

create table *department* (*dept_name* *varchar (20)***, *building* ***varchar (15)***, *budget* ***numeric (12,2)***, primary key (*dept_name*));**

create table *course* (*course_id* *varchar (7)***, *title* ***varchar (50)***, *dept_name* ***varchar (20)***, *credits* ***numeric (2,0)***, primary key (*course_id*), foreign key (*dept_name*) references *department*);**

create table *instructor* (*ID* *varchar (5)***, *name* ***varchar (20) not null***, *dept_name* ***varchar (20)***, *salary* ***numeric (8,2)***, primary key (*ID*), foreign key (*dept_name*) references *department*(*dept_name*));**

create table *section* (*course_id* *varchar (8)***, *sec_id* ***varchar (8)***, *semester* ***varchar (6)***, *year* ***numeric (4,0)***, *building* ***varchar (15)***, *room_number* ***varchar (7)***, *time_slot_id* ***varchar (4)***, primary key (*course_id*, *sec_id*, *semester*, *year*), foreign key (*course_id*) references *course* (*course_id*));**

create table *teaches* (*ID* *varchar (5)***, *course_id* ***varchar (8)***, *sec_id* ***varchar (8)***, *semester* ***varchar (6)***, *year* ***numeric (4,0)***, primary key (*ID*, *course_id*, *sec_id*, *semester*, *year*), foreign key (*course_id*, *sec_id*, *semester*, *year*) references *section* (*course_id*, *sec_id*, *semester*, *year*), foreign key (*ID*) references *instructor* (*ID*));**

etc....

The Tuples of some tables of the university database :

Teaches

ID	course_id	sec_id	semester	year
10101	CS-101	1	Fall	2009
10101	CS-315	1	Spring	2010
10101	CS-347	1	Fall	2009
12121	FIN-201	1	Spring	2010
15151	MU-199	1	Spring	2010
22222	PHY-101	1	Fall	2009
32343	HIS-351	1	Spring	2010
45565	CS-101	1	Spring	2010
45565	CS-319	1	Spring	2010
76766	BIO-101	1	Summer	2009
76766	BIO-301	1	Summer	2010
83821	CS-190	1	Spring	2009
83821	CS-190	2	Spring	2009
83821	CS-319	2	Spring	2010
98345	EE-181	1	Spring	2009

Section

course_id	sec_id	semester	year	building	room_number	time_slot_id
BIO-101	1	Summer	2009	Painter	514	B
BIO-301	1	Summer	2010	Painter	514	A
CS-101	1	Fall	2009	Packard	101	H
CS-101	1	Spring	2010	Packard	101	F
CS-190	1	Spring	2009	Taylor	3128	E
CS-190	2	Spring	2009	Taylor	3128	A
CS-315	1	Spring	2010	Watson	120	D
CS-319	1	Spring	2010	Watson	100	B
CS-319	2	Spring	2010	Taylor	3128	C
CS-347	1	Fall	2009	Taylor	3128	A
EE-181	1	Spring	2009	Taylor	3128	C
FIN-201	1	Spring	2010	Packard	101	B
HIS-351	1	Spring	2010	Painter	514	C
MU-199	1	Spring	2010	Packard	101	D
PHY-101	1	Fall	2009	Watson	100	A

Instructor

ID	name	dept_name	salary
10101	Srinivasan	Comp. Sci.	65000
12121	Wu	Finance	90000
15151	Mozart	Music	40000
22222	Einstein	Physics	95000
32343	El Said	History	60000
33456	Gold	Physics	87000
45565	Katz	Comp. Sci.	75000
58583	Califieri	History	62000
76543	Singh	Finance	80000
76766	Crick	Biology	72000
83821	Brandt	Comp. Sci.	92000
98345	Kim	Elec. Eng.	80000

Department

dept_name	building	budget
Comp. Sci.	Taylor	100000
Biology	Watson	90000
Elec. Eng.	Taylor	85000
Music	Packard	80000
Finance	Painter	120000
History	Painter	50000
Physics	Watson	70000

Course

course_id	title	dept_name	credits
BIO-101	Intro. to Biology	Biology	4
BIO-301	Genetics	Biology	4
BIO-399	Computational Biology	Biology	3
CS-101	Intro. to Computer Science	Comp. Sci.	4
CS-190	Game Design	Comp. Sci.	4
CS-315	Robotics	Comp. Sci.	3
CS-319	Image Processing	Comp. Sci.	3
CS-347	Database System Concepts	Comp. Sci.	3
EE-181	Intro. to Digital Systems	Elec. Eng.	3
FIN-201	Investment Banking	Finance	3
HIS-351	World History	History	3
MU-199	Music Video Production	Music	3
PHY-101	Physical Principles	Physics	4

Student

ID	name	dept_name	tot_cred
00128	Zhang	Comp. Sci.	102
12345	Shankar	Comp. Sci.	32
19991	Brandt	History	80
23121	Chavez	Finance	110
44553	Peltier	Physics	56
45678	Levy	Physics	46
54321	Williams	Comp. Sci.	54
55739	Sanchez	Music	38
70557	Snow	Physics	0
76543	Brown	Comp. Sci.	58
76653	Aoi	Elec. Eng.	60
98765	Bourikas	Elec. Eng.	98
98988	Tanaka	Biology	120

Practical Task :

1. Create a university database that consists of tables such as the schema diagram above (SQL data definition and tuples of some tables as shown above)
2. Please complete SQL data definition and tuples of some tables others
3. Fill the tuple of each table at least 10 tuples
4. Write the following queries in Relational Algebra and SQL :
 1. Finds the names of all instructors in the History department
 2. Finds the instructor ID and department name of all instructors associated with a department with budget of greater than \$95,000
 3. Finds the names of all instructors in the Comp. Sci. department together with the course titles of all the courses that the instructors teach
 4. Find the names of all students who have taken the course title of "Game Design".
 5. For each department, find the maximum salary of instructors in that department. You may assume that every department has at least one instructor.
 6. Find the lowest, across all departments, of the per-department maximum salary computed by the preceding query.
 7. Find the ID and names of all students who do not have an advisor.

the practical task will evaluate at next week, Thursday, 09.30-12.00 WIB, H.6.12