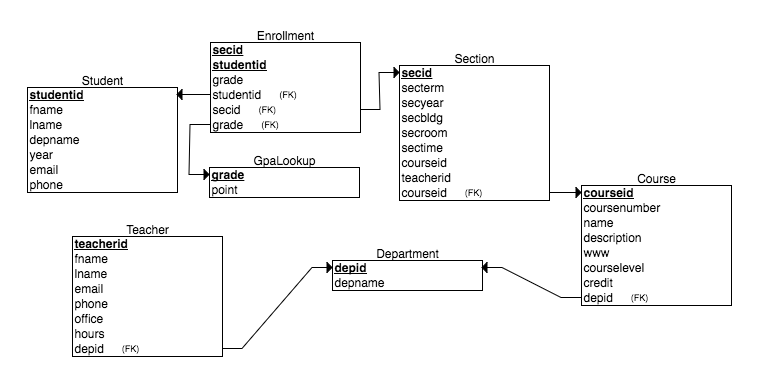
# **Rational Schema**



# **Tables**

|  |  |
| --- | --- |
| **Table** | **Purpose** |
| Student | Describes each student. |
| Enrollment | Bridge table for M:N Student-Section enrollments for the current term. Score recorded here. |
| Section | The particular instance of a course being offered at a specific term, year etc. |
| Course | The abstract course. Each courseid is like CS547 |
| Teacher | Each teacher. Not all teachers may currently be teaching a Section. |
| Department | An administrative unit of the University |
| GpaLookup | Grade : point are 1:1, such as grade = A, point =4.0 |

# **Query SQL**

-- Queries:

-- 1) How many people are exclusively students?

select count(\*) from Student s where s.year<=4;

-- 2) How many people are exclusively teachers?

select count(\*) from Teacher t where t.teacherid NOT in (select studentid from Student);

-- 3) How many people are both students and teachers?

select count(\*) from Teacher t where t.teacherid in (select studentid from Student);

-- 4) Assume you have a student name Mickey Mouse, what is his Data Structure & Algorithm Grade in Spring 2010?

select s.fname, s.lname, e.grade, c.coursenumber, c.name, st.secterm, st.secyear

from Student s, Course c, Section st, Enrollment e

where s.studentid=e.studentid and c.courseid=st.courseid

and st.secid = e.secid

and s.fname='Mickey' and s.lname='Mouse'

and c.courseid='100100'

and st.secterm ='Spring'

and st.secyear='2010';

-- 5) Assume you have a student name Minnie Mouse, what is her GPA?

select ROUND(sum(point) /count(point), 1) as GPA from (

select point, count(point) from GpaLookup where grade in (

select e.grade

from Student s, Course c, Section st, Enrollment e

where s.studentid=e.studentid and c.courseid=st.courseid

and st.secid = e.secid

and s.fname='Minnie' and s.lname='Mouse'

and st.secyear='2010')

group by point) as result;

-- 6) What is the median grade for all students taking Physics in Fall 2010?

select grade as medin\_grade from GpaLookup where point = (

select ROUND(avg(point), 1) as median from (

select point from GpaLookup where grade in (

select e.grade from Section st, Course c, Enrollment e

where

st.courseid = c.courseid

and st.secid = e.secid

and c.name = 'Physics'

and st.secterm = 'Fall'

and st.secyear = '2010' )) as foo);

-- 7) Assume you have a professor name Donald Duck, what courses did he teach in Summer 2010?

select c.name from Section st, Course c, Teacher t

where st.courseid = c.courseid and t.teacherid = st.teacherid

and st.secterm = 'Summer'

and st.secyear = '2010'

and t.fname ='Donald'

and t.lname ='Duck'

-- 8) What courses has Minnie Mouse taken with Donald Duck as the professor?

select c.name from Student s, Course c, Teacher t, Enrollment e, Section st

where st.teacherid = t.teacherid and c.courseid = st.courseid and s.studentid = e.studentid and e.secid = st.secid

and t.fname = 'Donald'

and t.lname = 'Duck'

and s.fname = 'Minnie'

and s.lname ='Mouse'

group by c.courseid

-- 9) Assume that Snow White is both a student and a teacher. What classes has Snow White and Minnie Mouse taken together as students?

select c.name from Course c, Student s, Enrollment e, Section st

where st.courseid = c.courseid and e.studentid = s.studentid and e.secid = st.secid

and (( s.fname = 'Snow'

and s.lname = 'White')

or ( s.fname = 'Minnie'

and s.lname = 'Mouse'))

group by c.courseid

having count(s.studentid) = 2;

-- 10) What classes has Snow White taught that Minnie Mouse has attended?

select c.name, st.secterm, st.secyear from Teacher t, Course c, Section st, Student s, Enrollment e

where st.teacherid = t.teacherid and st.courseid = c.courseid and st.secid = e.secid

and t.fname = 'Snow'

and t.lname = 'White'

and s.fname = 'Minnie'

and s.lname ='Mouse'

-- 11) What classes have been taught by both Donald Duck and Snow White?

select c.name as cname, count(distinct t.teacherid) as count from Course c, Teacher t, Section st

where t.teacherid = st.teacherid and st.courseid = c.courseid

and (( t.fname = 'Snow'

and t.lname = 'White')

or ( t.fname = 'Donald'

and t.lname = 'Duck'))

group by name

having count(t.teacherid)>=2;

-- 12) Assume that Mickey Mouse has taken Data Structures & Algorithms several times, Spring 2010 for a C-, Summer 2010 for a B+,

-- and Fall 2010 for a A-, and Winter 2010 for an A. What was his highest grade for Data Structure and Algorithms and what term was that in?

select e.grade, st.secterm, st.secyear from Section st, Course c, Enrollment e, Student s

where

st.courseid = c.courseid

and st.secid = e.secid

and s.fname = 'Mickey'

and s.lname ='Mouse'

and c.coursenumber = 'CS223'

and e.grade = ( select grade from GpaLookup where point = (

select max(point) from (

select point from GpaLookup where grade in (

select e.grade from Section st, Course c, Enrollment e, Student s

where

st.courseid = c.courseid

and st.secid = e.secid

and s.fname = 'Mickey'

and s.lname ='Mouse'

and c.coursenumber = 'CS223')) as foo)

);

-- 13) How many classes did Snow White take in 2010?

select count(c.courseid) from Course c, Student s, Section st, Enrollment e

where c.courseid = st.courseid and s.studentid = e.studentid and e.secid = st.secid

and st.secyear = '2010'

and s.fname = 'Snow'

and s.lname = 'White'

# **Create Tables SQL**

-- drop tables

drop table Student CASCADE;

drop table Department CASCADE;

drop table Teacher CASCADE;

drop table Course CASCADE;

drop table Section CASCADE;

drop table Enrollment CASCADE;

drop table GpaLookup CASCADE;

-- create tables

CREATE TABLE Student

(

studentid CHAR(9) NOT NULL,

fname VARCHAR(20) NOT NULL,

lname VARCHAR(20) NOT NULL,

depname VARCHAR(40) NOT NULL,

year int NOT NULL,

email VARCHAR(30) NOT NULL,

phone VARCHAR(20) NOT NULL,

PRIMARY KEY (studentid)

);

CREATE TABLE Department

(

depid CHAR(4) NOT NULL,

depname VARCHAR(40) NOT NULL,

PRIMARY KEY (depid)

);

CREATE TABLE Teacher

(

teacherid CHAR(9) NOT NULL,

fname VARCHAR(20) NOT NULL,

lname VARCHAR(20) NOT NULL,

email VARCHAR(30) NOT NULL,

phone VARCHAR(20) NOT NULL,

office VARCHAR(20) NOT NULL,

hours VARCHAR(20) NOT NULL,

depid CHAR(4) NOT NULL,

PRIMARY KEY (teacherid),

FOREIGN KEY (depid) REFERENCES Department(depid)

);

CREATE TABLE Course

(

courseid CHAR(6) NOT NULL,

coursenumber VARCHAR(30) NOT NULL,

name VARCHAR(60) NOT NULL,

description VARCHAR(200),

www VARCHAR(30),

courselevel VARCHAR(10),

credit NUMERIC(2,0) NOT NULL,

depid CHAR(4) NOT NULL,

PRIMARY KEY (courseid),

FOREIGN KEY (depid) REFERENCES Department(depid)

);

CREATE TABLE Section

(

secid INT NOT NULL,

secterm CHAR(8) NOT NULL,

secyear CHAR(4) NOT NULL,

secbldg CHAR(6),

secroom CHAR(4) ,

sectime CHAR(10) ,

courseid CHAR(6) NOT NULL,

teacherid CHAR(9) NOT NULL,

PRIMARY KEY (secid),

FOREIGN KEY (courseid) REFERENCES Course(courseid)

);

CREATE TABLE Enrollment

(

studentid CHAR(9) NOT NULL,

secid INT NOT NULL,

grade VARCHAR(4) NOT NULL,

FOREIGN KEY (studentid) REFERENCES Student(studentid),

FOREIGN KEY (secid) REFERENCES Section(secid)

PRIMARY KEY (studentid, secid)

);

CREATE TABLE GpaLookup

(

grade VARCHAR(4) NOT NULL,

point Numeric(2,1) NOT NULL,

PRIMARY KEY (grade)

);

# **Insert Data SQL**

-- insert data

insert into Student

(studentid, fname, lname, depname, year, email, phone)

values (100100100, 'Mickey','Mouse','ENCS',3,'mickey.mouse@wsu.edu','1-360-234-5678');

insert into Student

(studentid, fname, lname, depname, year, email, phone)

values (100100101, 'Minnie','Mouse','TPP',2,'minnie.mouse@wsu.edu','1-360-234-5432');

insert into Student

(studentid, fname, lname, depname, year, email, phone)

values (100100102, 'Snow','White','DUSP',5,'snow.white@wsu.edu','1-360-234-5238');

insert into Student

(studentid, fname, lname, depname, year, email, phone)

values (100100103, 'Jaecheol','kim','PHYS',5,'Jaecheol.kim@wsu.edu','1-360-234-5238');

insert into Student

(studentid, fname, lname, depname, year, email, phone)

values (100100104, 'Jacky','Lee','PHYS',3,'jack.lee@wsu.edu','1-360-234-5623');

insert into Student

(studentid, fname, lname, depname, year, email, phone)

values (100100105, 'Virat','Dang','Math',2,'virat.dang@wsu.edu','1-360-234-5432');

insert into Department

(depid, depname)

values ('v101','ENCS');

insert into Department

(depid, depname)

values ('v102','Engineering');

insert into Teacher

(teacherid, fname, lname, email, phone, office, hours, depid)

values (500100101, 'Donald','Duck','donald.duck@wsu.edu','1-360-674-3754','room 9-554','T1-2;W2-3', 'v101');

insert into Teacher

(teacherid, fname, lname, email, phone, office, hours, depid)

values (500100102, 'Marc','Johnson','marc.john@wsu.edu','1-360-674-4954','room 9-551','T1-2;W1-2','v102');

insert into Teacher

(teacherid, fname, lname, email, phone, office, hours,depid)

values (100100102, 'Snow','White','snow.white@wsu.edu','1-360-434-3438','room 9-552','T2-3;R3-4', 'v101');

insert into Course

(courseid, coursenumber, name, description, www, courselevel, credit, depid)

values (100100, 'CS223','Data Structure & Algorithm','http://schedules.wsu.edu/List/Vancouver/20163/CS/223/01','This course ...','low',12, 'v101');

insert into Course

(courseid, coursenumber, name, description, www, courselevel, credit, depid)

values (100101, 'Phys101','Physics','http://schedules.wsu.edu/List/Vancouver/20163/Phys/202/01','This course ...','low',12, 'v102');

insert into Course

(courseid, coursenumber, name, description, www, courselevel, credit, depid)

values (100102, 'CS547','Computer Game Design','http://schedules.wsu.edu/List/Vancouver/20163/CS/547/01','This course ...','high',12, 'v101');

insert into Section

(secid, secterm, secyear, secbldg, secroom, sectime, courseid, teacherid)

values(1000, 'Spring', '2010', '', '', '', 100100, 100100102);

insert into Section

(secid, secterm, secyear, secbldg, secroom, sectime, courseid, teacherid)

values(1001, 'Fall', '2010', '', '', '', 100101, 500100102);

insert into Section

(secid, secterm, secyear, secbldg, secroom, sectime, courseid, teacherid)

values(1002, 'Summer', '2010', '', '', '', 100102, 500100101);

insert into Section

(secid, secterm, secyear, secbldg, secroom, sectime, courseid, teacherid)

values(1003, 'Summer', '2010', '', '', '', 100100, 500100101);

insert into Section

(secid, secterm, secyear, secbldg, secroom, sectime, courseid, teacherid)

values(1004, 'Fall', '2010', '', '', '', 100100, 500100101);

insert into Section

(secid, secterm, secyear, secbldg, secroom, sectime, courseid, teacherid)

values(1005, 'Winter', '2010', '', '', '', 100100, 500100101);

insert into Enrollment

(studentid, secid, grade)

values (100100100, 1000, 'C-');

insert into Enrollment

(studentid, secid, grade)

values (100100101, 1001, 'B+');

insert into Enrollment

(studentid, secid, grade)

values (100100103, 1001, 'A');

insert into Enrollment

(studentid, secid, grade)

values (100100104, 1001, 'A-');

insert into Enrollment

(studentid, secid, grade)

values (100100101, 1002, 'A-');

insert into Enrollment

(studentid, secid, grade)

values (100100102, 1002, 'B-');

insert into Enrollment

(studentid, secid, grade)

values (100100100, 1003, 'B+');

insert into Enrollment

(studentid, secid, grade)

values (100100100, 1004, 'A-');

insert into Enrollment

(studentid, secid, grade)

values (100100100, 1005, 'A');

insert into GpaLookup

(grade, point)

values ('A', 4.0);

insert into GpaLookup

(grade, point)

values ('A-', 3.7);

insert into GpaLookup

(grade, point)

values ('B+', 3.3);

insert into GpaLookup

(grade, point)

values ('B', 3.0);

insert into GpaLookup

(grade, point)

values ('B-', 2.7);

insert into GpaLookup

(grade, point)

values ('C+', 2.3);

insert into GpaLookup

(grade, point)

values ('C', 2.0);

insert into GpaLookup

(grade, point)

values ('C-', 1.7);

insert into GpaLookup

(grade, point)

values ('D+', 1.3);

insert into GpaLookup

(grade, point)

values ('D', 1.0);

insert into GpaLookup

(grade, point)

values ('D-', 0.7);

insert into GpaLookup

(grade, point)

values ('F', 0);