Question-1

Answer-1-1: (Approach: PostgreSQL's exclude constraint and range operators)
(Test Environment: PostgreSql version 9.x)

Note regarding URL: "Not a problem, Lohith - just submit the code, and include a note that contains what you wrote me. - Prof. Saty"

```
CREATE EXTENSION btree_gist;

CREATE TABLE HotelStays (
roomNum INTEGER NOT NULL,
arrDate DATE NOT NULL,
depDate DATE NOT NULL,
guestName CHAR(30) NOT NULL,
PRIMARY KEY (roomNum, depDate),
CONSTRAINT chkdate_1 CHECK (arrDate < depDate),
EXCLUDE USING GIST ( roomNum WITH =, daterange(arrDate,depDate) WITH && )
);

INSERT INTO HotelStays(roomNum, arrDate, depDate, guestName) VALUES
(123, '2016-02-02', '2016-02-06', 'A'),
(123, '2016-02-04', '2016-02-08', 'B'),
(201, '2016-02-10', '2016-02-06', 'C');
```

Output:

```
INSERT INTO HotelStays(roomNum, arrDate, depDate, guestName) VALUES
(123, '2016-02-02', '2016-02-06', 'A');
```

>>>>> INSERT 0 1

```
INSERT INTO HotelStays(roomNum, arrDate, depDate, guestName) VALUES
(123, '2016-02-04','2016-02-08','B');
```

>>>>> Error 1: ERROR: conflicting key value violates exclusion constraint "hotelstays_roomnum_daterange_excl"
DETAIL: Key (roomnum, daterange(arrdate, depdate))=(123, [2016-02-04,2016-02-08)) conflicts with existing key (roomnum, daterange(arrdate, depdate))=(123, [2016-02-02,2016-02-06)).

```
INSERT INTO HotelStays(roomNum, arrDate, depDate, guestName) VALUES
(201, '2016-02-10','2016-02-06','C');
```

>>>>> Error 2: new row for relation "hotelstays" violates check constraint "chkdate_1"
DETAIL: Failing row contains (201, 2016-02-10, 2016-02-06, C).

Answer-1-2: (Approach: PostgreSQL's function) http://sqlfiddle.com/#!15/26b86/3

```
create or replace function checkRoomAvailability(roomNum_1 integer, arrDate_1 date)
returns boolean as $$
declare
statusRoomNum integer := 11111;
begin
	select roomNum into statusRoomNum
	from hotelstays h
	where h.roomNum = roomNum_1 and h.depDate > arrDate_1;

	if statusRoomNum != 11111 then
	  return False;
	else
	  return True;
	end if;
end;
$$ language plpgsql;

create table hotelstays (
roomNum integer not null,
arrDate date not null,
depDate date not null,
guestName varchar(255) not null,
constraint hotelstays_pk primary key (roomNum, arrDate),
constraint arrDate_chk check (depDate > arrDate),
constraint availability_chk check(checkRoomAvailability (roomNum, arrDate) = True)
);

insert into hotelstays values
(123, to_date('20160202', 'YYYYMMDD'), to_date('20160206','YYYYMMDD'), 'A'),
(123, to_date('20160204', 'YYYYMMDD'), to_date('20160208','YYYYMMDD'), 'B'),
(201, to_date('20160210', 'YYYYMMDD'), to_date('20160206','YYYYMMDD'), 'C');
```

Question-2:

```
create table Enrollment (
SID integer not null,
ClassName varchar(250) not null,
Grade char not null,
constraint pk_enrollment primary key (SID, ClassName)
);

insert into Enrollment values
(123,'ART123','A'),
(123,'BUS456','B'),
(666,'REL100','D'),
(666,'ECO966','A'),
(666,'BUS456','B'),
(345,'BUS456','A'),
(345,'ECO966','F');
```

Answer-2: http://sqlfiddle.com/#!9/6e4530/1

```
create view course_registrations as
select ClassName, count(SID) as Total from enrollment
group by ClassName
order by Total asc, ClassName asc;

select * from course_registrations;
```

Question-3:

```
create table work_order_projects (
ProjectID varchar2(5) not null,
Step integer not null,
Status char not null,
Constraint wop_pk primary key (ProjectID, Step)
);

insert into work_order_projects values
('P100',0,'C'),
('P100',1,'W'),
('P100',2,'W'),
('P201',0,'C'),
('P201',1,'C'),
('P333',0,'W'),
('P333',1,'W'),
('P333',2,'W'),
('P333',3,'W');
```

Answer-3:

According to Grader/TA: Rijuta Kapoor's response on handling special cases and responses on D2L discussion forum:

http://sqlfiddle.com/#!5/c162f/1

```
SELECT ProjectID FROM work_order_projects
WHERE ProjectID =
(SELECT ProjectId FROM work_order_projects
WHERE Step!=0 and Status='W')
and Step=0 and Status='C';
```

According to Grader/TA: Bhavnit Kaur's response on handling special cases:

http://sqlfiddle.com/#!5/c162f/2

```
select * from work_order_projects
where step = 0 and status = 'C' and projectid in
(select projectid from work_order_projects
where step != 0 and status != 'C');
```

Question-4:

Answer-4: http://sqlfiddle.com/#!7/92de8/1

```
create table junkmail (
name varchar2(250),
address char,
id number(3),
samefam number(3)
);

insert into junkmail values
('Alice','A',10,NULL),
('Bob','B',15,NULL),
('Carmen','C',22,NULL),
('Diego','A',9,10),
('Ella','B',3,15),
('Farkhad','D',11,NULL);
```

Query:

```
delete from junkmail
where samefam is null and id in
(select samefam from junkmail);

select * from junkmail;
```

Question-5:

Answer-5-1: http://sqlfiddle.com/#!7/bb9528/4

```
create table chefs (
Chef char,
Dish varchar(250)
);

insert into chefs values
('A', 'Mint chocolate brownie'),
('B', 'Upside down pineapple cake'),
('B', 'Creme brulee'),
('B', 'Mint chocolate brownie'),
('C', 'Upside down pineapple cake'),
('C', 'Creme brulee'),
('D', 'Apple pie'),
('D', 'Upside down pineapple cake'),
('D', 'Creme brulee'),
('E', 'Apple pie'),
('E', 'Upside down pineapple cake'),
('E', 'Creme brulee'),
('E', 'Bananas Foster');

create table dishes (
Dish varchar(250)
);

insert into dishes values
('Apple pie'),
('Upside down pineapple cake'),
('Creme brulee');
```

Query:

```
select chef from (select * from chefs c natural join dishes d)
group by chef
having count(chef) = (select count(*) from dishes);
```

Answer-5-2: http://sqlfiddle.com/#!7/bb9528/2

```
create table chefs (
Chef char,
Dish varchar(250)
);

insert into chefs values
('A', 'Mint chocolate brownie'),
('B', 'Upside down pineapple cake'),
('B', 'Creme brulee'),
('B', 'Mint chocolate brownie'),
('C', 'Upside down pineapple cake'),
('C', 'Creme brulee'),
('D', 'Apple pie'),
('D', 'Upside down pineapple cake'),
('D', 'Creme brulee'),
('E', 'Apple pie'),
('E', 'Upside down pineapple cake'),
('E', 'Creme brulee'),
('E', 'Bananas Foster');

create table dishes (
Dish varchar(250)
);

insert into dishes values
('Apple pie'),
('Upside down pineapple cake'),
('Creme brulee');
```

Query:

```
select distinct chef from chefs c1
where not exists ( select * from dishes d
where not exists ( select * from chefs c2
where c1.chef = c2.chef and c2.dish = d.dish
));
```

Answer-5-3: http://sqlfiddle.com/#!7/bb9528/3

```
create table chefs (
Chef char,
Dish varchar(250)
);

insert into chefs values
('A', 'Mint chocolate brownie'),
('B', 'Upside down pineapple cake'),
('B', 'Creme brulee'),
('B', 'Mint chocolate brownie'),
('C', 'Upside down pineapple cake'),
('C', 'Creme brulee'),
('D', 'Apple pie'),
('D', 'Upside down pineapple cake'),
('D', 'Creme brulee'),
('E', 'Apple pie'),
('E', 'Upside down pineapple cake'),
('E', 'Creme brulee'),
('E', 'Bananas Foster');

create table dishes (
Dish varchar(250)
);

insert into dishes values
('Apple pie'),
('Upside down pineapple cake'),
('Creme brulee');
```

Query:

```
select c.chef from
chefs as c join dishes as d
where c.dish = d.dish
group by c.chef
having count(*) = (select count(*) from dishes)
```