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Faculty of Design and Creative Technologies

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Paper Name	Database System design	**Paper Code:**	Comp 508	**Assignment Due Date**	07/05/22	
Lecturer:	Mali Senapathi	**Tutorial Day**	Friday	**Date Submitted**	31/05/22	
Tutor:		**Tutorial Time**	4:00 pm	**No.Words/Pages**		

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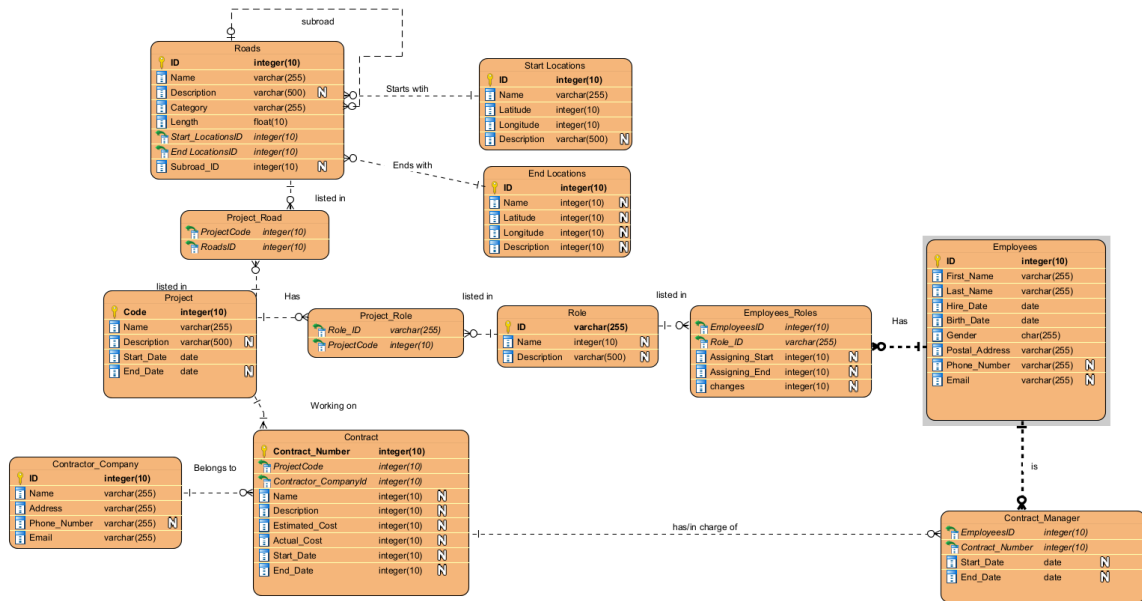
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By: Mark Soluiman

ID:18039781

Part B:

Task 4)

--Creating tables

create table roads(

road_id varchar2(10) PRIMARY key,road_name varchar2(30) , road_desc varchar2(50),road_categ varchar2(15) not null, road_length number(3),start_id varchar2(10),

end_id varchar2(10),constraint start_id_fk FOREIGN key (start_id) REFERENCES startlocation (start_id),CONSTRAINT end_id_fk FOREIGN key (end_id)REFERENCES

endlocation (end_id)

);

alter table roads

add(subroad_id varchar2(10));

alter table roads modify(road_length number(4,2));

create table startlocation(

start_id varchar2(10) primary key,start_name varchar2(30), start_longitude number (4,2),start_latitude number(4,2),start_desc varchar2(50)

);

alter table startlocation modify(start_longitude varchar2(10));

alter table startlocation modify(start_latitude varchar2(10));

create table endlocation(

end_id varchar2(10) primary key, end_name varchar2(30), end_longitude number(4,2),end_latitude number (4,2), end_desc varchar2(50)

```
);

alter table endlocation modify(end_longitude varchar2(10));

alter table endlocation modify(end_latitude varchar2(10));



create table project(

project_code varchar2(10) PRIMARY key, project_name varchar2(15), projcet_desc varchar2(50),
project_start date, project_end date

);



alter table project modify( project_name varchar2(20));



create table project_road(

project_code varchar2(10), road_id varchar2(10),CONSTRAINT project_code_road_id_pk PRIMARY
key(project_code,road_id),CONSTRAINT project_code_fk

FOREIGN key (project_code)references project(project_code), CONSTRAINT road_id_fk FOREIGN key
(road_id)references roads(road_id)

);



create table role(

role_id varchar2(10) PRIMARY key, role_name varchar2(20), role_desc varchar2(30)

);



alter table role modify(role_desc varchar2(50));



create table project_role(

role_id varchar2(10), project_code varchar2(10), CONSTRAINT role_id_project_code_pk PRIMARY key
(role_id,project_code),CONSTRAINT role_id_fk FOREIGN key
```

(role_id) references role(role_id),CONSTRAINT project_role_project_code_fk FOREIGN key (project_code)references project (project_code)

);

create table arc_employees(

employee_id varchar2(10) primary key, first_name varchar2(10) not null, last_name varchar2(10) not null, hire_date date not null, birth_date date Not null,   gender

char(1) not null,postal_address varchar2(50), phone_number varchar2(30),email varchar2(50)

);

create table employees_roles(

employee_id varchar2(10), role_id varchar2(10), assigning_start date, assigning_end date, changes varchar2(50),CONSTRAINT employee_id_role_id_pk PRIMARY key

(employee_id,role_id),CONSTRAINT employee_id_fk FOREIGN key (employee_id)references arc_employees(employee_id),CONSTRAINT employees_role_id_fk FOREIGN

key (role_id)references role(role_id)

);

create table company(

company_id varchar2(10) primary key, company_name varchar2(20), company_address varchar2(50)not null ,company_phone varchar2(15), company_email

varchar2(30) not null

);

alter table company modify(company_name varchar2(25) not null);

alter table company modify(company_email varchar2(35));

```sql
create table contract (

contract_id varchar2(10) primary key, project_code varchar2(10),company_id varchar2(10),
contract_name varchar2(20), contract_desc varchar2(50), contract_est_cost

number (6,2), contract_act_cost number(6,2), contract_start date, contract_end date, CONSTRAINT
contract_project_code_fk FOREIGN key (project_code)

references project (project_code),CONSTRAINT company_id_fk FOREIGN key (company_id) references
company (company_id)

);


alter table contract modify (contract_name varchar2 (50));


create table contract_manager(

employee_id varchar2(10),contract_id varchar2(10), manager_start date,manager_end
date,CONSTRAINT manager_employee_fk foreign key (employee_id) references

arc_employees (employee_id),CONSTRAINT manager_contract_id_fk FOREIGN key (contract_id)
references contract (contract_id)

);


alter table contract_manager

modify(constraint employee_id_contract_id_pk PRIMARY key (employee_id,contract_id) );
```

Task 5)

--Roads

```sql
insert into roads values('1', 'Abbey Road',null ,'Sub Road', 1.5, 'S-5', 'E-2',null);
insert into roads values('2', 'Adelaid Road',null ,'Main Road', 3.7, 'S-5', 'E-1',1);
insert into roads values('3', 'Mission Place','More than 5 Kilometers'  ,'Main Road', 7.8, 'S-1', 'E-1',2);
insert into roads values('4', 'High Way 18','more than 25 Kilometers' ,'Motor Way', 28.5, 'S-2', 'E-4',3);
insert into roads values('5', 'Bow Lane',null ,'Unseald Road', 2, 'S-3', 'E-3',null);


select * from roads;
```

--Start Location

```sql
insert into startlocation values('1','Glenfield','34E ','32S',null);


update startlocation set start_id='S-1';


insert into startlocation values('S-2','Albany','30E','34.5S',null);


insert into startlocation values('S-3','South Auckland','6E','15.5S',null);


insert into startlocation values('S-4','Takapuna','30.5E','1.7S',null);


insert into startlocation values('S-5','North Cote','110E','50S','Has 2 roads');
```

select * from startlocation;

commit;

--End Location

insert into endlocation values('E-1','Bay view','120E','20.5S','Has 2 roads');

insert into endlocation values('E-2','Albany','30E','34,5S',null);

insert into endlocation values('E-3','Eden Terrace','130.5E','27.5S',null);

insert into endlocation values('E-4','Hill Crest','136.5E','70S',null);

insert into endlocation values('E-5','Clover Park','10.5E','10S',null);

select * from endlocation;

--Project

insert into project values('P-1','Sub Road fix','Rebilding Abby Road after Earthquake','1-1-2000','1-3-2001');

insert into project values('P-2','Road build','Making a new road','10-1-2002','10-3-2003');

insert into project values('P-3','Long Road build','Making a long road','1-1-2004','1-7-2005');

insert into project values('P-4','High way fix','Maintaining the high way','1-7-2000','1-1-2001');

insert into project values('P-5','Small road build','Making a new small sub road','1-5-2005','20-12-2005');

```sql
select * from project;


commit;


--Project Road


insert into project_road values('P-1','1');
insert into project_road values('P-2','2');
insert into project_road values('P-3','3');
insert into project_road values('P-4','4');
insert into project_road values('P-5','5');


select * from project_road;


commit;



insert into role values('R-1','Manager','The Manager of the Project');
insert into role values('R-2','Supervisor ','The supervisor of the Project');
insert into role values('R-3','Accountant','Manages the expenses of the project');
insert into role values('R-4','labour-cheif','Suprvise over the workers');
insert into role values('R-5','labour',null);


select * from role;
commit;


--Project Role


insert into project_role values('R-1','P-1');
```

```sql
insert into project_role values('R-1','P-2');

insert into project_role values('R-1','P-3');

insert into project_role values('R-1','P-4');

insert into project_role values('R-1','P-5');

insert into project_role values('R-2','P-3');

insert into project_role values('R-3','P-2');

insert into project_role values('R-4','P-5');

insert into project_role values('R-5','P-5');


select* from project_role;

commit;
```

--Employees

```sql
insert into arc_employees values('EM-1','Mark','Johnson','20-06-2011','18-07-1990','M','1 Alexandra
Road, Auckland',null,'Mark.J@mail.com');

insert into arc_employees values('EM-2','Max','Winter','20-06-2011','20-01-1987','M','20
        Morden Lane, Auckland',null,'Max.W@mail.com');

insert into arc_employees values('EM-3','Jessica','Heart','20-07-2015','02-11-1995','F','39 Ball Court,
Auckland','0-154-7532','Jessica.H@mail.com');

insert into arc_employees values('EM-4','Mandy','Brown','12-07-2021','30-01-1995','F','100 Charlotte
Street, Auckland','0-585-5998','Mandy.B@mail.com');

insert into arc_employees values('EM-5','Mary','Scoot','09-09-1998','07-02-1975','F','56  Standard Place,
Auckland','0-154-6632',null);

insert into arc_employees values('EM-6','Mary','Halter','10-10-2011','19-09-1991','F','100 Standard
Drive, Auckland',null,'Mary.H@mail.com');
```

```sql
select * from arc_employees;

commit;
```

--Employees Roles

```sql
insert into employees_roles values('EM-1','R-1','30-03-2019',null ,null);

insert into employees_roles values('EM-2','R-2','30-03-2019',null ,null);

insert into employees_roles values('EM-4','R-1','30-03-2017','01-04-2019' ,null);

insert into employees_roles values('EM-5','R-5','30-03-2020','15-04-2020' ,'got sick');

insert into employees_roles values('EM-3','R-5','30-06-2021',null ,null);


select * from employees_roles;


commit;
```

--Contract Company

```sql
insert into company values('C-1','Majesty Contractors','120 Main road, Auckland','123-4567','Majesty.C@companymail.com');

insert into company values('C-2','Radical Contractors','20 Queen road, Auckland','123-2286','Queen.C@companymail.com');

insert into company values('C-3','High Quality Contractors','39 Hazelnut Lane, Auckland',null,'High_Quality.C@companymail.com');

insert into company values('C-4','Friends Contractors','55 Bolton Road, Auckland',null,'Friends.C@companymail.com');
```

```sql
insert into company values('C-5','International Contractors','55 Silver Avenue, Auckland','123-
0161','International.C@companymail.com');



select * from company;


commit;


--Contract


insert into contract values('CT-1','P-1','C-1','Majesty Contractors Contract',null,123.24,123,'10-10-
2012',null);

insert into contract values('CT-2','P-2','C-2','Radical Contractors Contract','very low cost',10.5,11,'10-10-
2017','1-3-2018');

insert into contract values('CT-3','P-3','C-3','High Quality Contractors Contract','Very high
cost',700,700,'1-7-2013','1-5-2015');

insert into contract values('CT-4','P-4','C-4','Friends Contractors Contract',null,200,205,'25-04-
2021',null);

insert into contract values('CT-5','P-5','C-5','International Contractors Contract','no start date or
cost',null,null,null,null);


commit;
select* from contract;


--Contract Manager


insert into contract_manager values('EM-1','CT-1','10-10-2015','15-11-2016');

insert into contract_manager values('EM-2','CT-2','16-04-2017','12-06-2019');

insert into contract_manager values('EM-3','CT-3','10-03-2021',null);

insert into contract_manager values('EM-4','CT-4','10-10-2014','05-01-2015');

insert into contract_manager values('EM-5','CT-5','18-03-2022',null);
```

commit;

select * from contract_manager;

The results of select statements for each table:

Company:

COMPANY_ID	COMPANY_NAME	COMPANY_ADDRESS	COMPANY_PHONE	COMPANY_EMAIL
1 C-1	Majesty Contractors	120 Main road, Auckland	123-4567	Majesty.C@companymail.com
2 C-2	Radical Contractors	20 Queen road, Auckland	123-2286	Queen.C@companymail.com
3 C-3	High Quality Contractors	39 Hazelnut Lane, Auckland	(null)	High Quality.C@companymail.com
4 C-4	Friends Contractors	55 Bolton Road, Auckland	(null)	Friends.C@companymail.com
5 C-5	International Contractors	55 Silver Avenue, Auckland	123-0161	International.C@companymail.com

Contract:

CONTRACT_ID	PROJECT_CODE	COMPANY_ID	CONTRACT_NAME	CONTRACT_DESC	CONTRACT_EST_COST	CONTRACT_ACT_COST	CONTRACT_START	CONTRACT_END
1 CT-1	P-1	C-1	Majesty Contractors Contract	(null)	123.24	123	10/10/12	(null)
2 CT-2	P-2	C-2	Radical Contractors Contract	very low cost	10.5	11	10/10/17	01/03/18
3 CT-3	P-3	C-3	High Quality Contractors Contract	Very high cost	700	700	01/07/13	01/05/15
4 CT-4	P-4	C-4	Friends Contractors Contract	(null)	200	205	25/04/21	(null)
5 CT-5	P-5	C-5	International Contractors Contract	no start date or cost	(null)	(null)	(null)	(null)

Contract Manager:

EMPLOYEE_ID	CONTRACT_ID	MANAGER_START	MANAGER_END
1 EM-1	CT-1	10/10/15	15/11/16
2 EM-2	CT-2	16/04/17	12/06/19
3 EM-3	CT-3	10/03/21	(null)
4 EM-4	CT-4	10/10/14	05/01/15
5 EM-5	CT-5	18/03/22	(null)

Arc Employee:

EMPLOYEE_ID	FIRST_NAME	LAST_NAME	HIRE_DATE	BIRTH_DATE	GENDER	POSTAL_ADDRESS	PHONE_NUMBER	EMAIL
1 EM-1	Mark	Johnson	20/06/11	18/07/90	M	1 Alexandra Road, Auckland	(null)	Mark.J@mail.com
2 EM-2	Max	Winter	20/06/11	20/01/87	M	20 Morden Lane, Auckland	(null)	Max.W@mail.com
3 EM-3	Jessica	Heart	20/07/15	02/11/95	F	39 Ball Court, Auckland	0-154-7532	Jessica.H@mail.com
4 EM-4	Mandy	Brown	12/07/21	30/01/95	F	100 Charlotte Street, Auckland	0-585-5998	Mandy.B@mail.com
5 EM-5	Mary	Scoot	09/09/98	07/02/75	F	56 Standard Place, Auckland	0-154-6632	(null)
6 EM-6	Mary	Halter	10/10/11	19/09/91	F	100 Standard Drive, Auckland	(null)	Mary.H@mail.com

Employee Role:

EMPLOYEE_ID	ROLE_ID	ASSIGNING_START	ASSIGNING_END	CHANGES
1 EM-1	R-1	30/03/19	(null)	(null)
2 EM-2	R-2	30/03/19	(null)	(null)
3 EM-4	R-1	30/03/17	01/04/19	(null)
4 EM-5	R-5	30/03/20	15/04/20	got sick
5 EM-3	R-5	30/06/21	(null)	(null)

End Location:

END_ID	END_NAME	END_LONGITUDE	END_LATITUDE	END_DESC
1 E-1	Bay view	120E	20.5S	Has 2 roads
2 E-2	Albany	30E	34.5S	(null)
3 E-3	Eden Terrace	130.5E	27.5S	(null)
4 E-4	Hill Crest	136.5E	70S	(null)
5 E-5	Clover Park	10.5E	10S	(null)

Project:

PROJECT_CODE	PROJECT_NAME	PROJCET_DESC	PROJECT_START	PROJECT_END
1 P-1	Sub Road fix	Rebilding Abby Road after Earthquake	01/01/00	01/03/01
2 P-2	Road build	Making a new road	10/01/02	10/03/03
3 P-3	Long Road build	Making a long road	01/01/04	01/07/05
4 P-4	High way fix	Maintaining the high way	01/07/00	01/01/01
5 P-5	Small road build	Making a new small sub road	01/05/05	20/12/05

Project Road:

PROJECT_CODE	ROAD_ID
1 P-1	1
2 P-2	2
3 P-3	3
4 P-4	4
5 P-5	5

Road:

ROAD_ID	ROAD_NAME	ROAD_DESC	ROAD_CATEG	ROAD_LENGTH	START_ID	END_ID	SUBROAD_ID
1 1	Abbey Road	(null)	Sub Road	1.5	S-5	E-2	(null)
2 2	Adelaid Road	(null)	Main Road	3.7	S-5	E-1	1
3 3	Mission Place	More than 5 Kilometers	Main Road	7.8	S-1	E-1	2
4 4	High Way 18	more than 25 Kilometers	Motor Way	28.5	S-2	E-4	3
5 5	Bow Lane	(null)	Unseald Road	2	S-3	E-3	(null)

Role:

ROLE_ID	ROLE_NAME	ROLE_DESC
1 R-1	Manager	The Manager of the Project
2 R-2	Supervisor	The supervisor of the Project
3 R-3	Accountant	Manages the expenses of the project
4 R-4	labour-cheif	Suprvise over the workers
5 R-5	labour	(null)

Project Role:

ROLE_ID	PROJECT_CODE
1 R-1	P-1
2 R-1	P-2
3 R-1	P-3
4 R-1	P-4
5 R-1	P-5
6 R-2	P-3
7 R-3	P-2
8 R-4	P-5
9 R-5	P-5

Start Location:

START_ID	START_NAME	START_LONGITUDE	START_LATITUDE	START_DESC
1 S-1	Glenfield	34E	32S	(null)
2 S-2	Albany	30E	34.5S	(null)
3 S-3	South Auckland	6E	15.5S	(null)
4 S-4	Takapuna	30.5E	1.7S	(null)
5 S-5	North Cote	110E	50S	Has 2 roads

Part C

Task 6)

--1

--Purpose: Fitching ID and and names of all the roads that don't have subroads

```
select road_id, road_name
from roads
where subroad_id is null;
```

ROAD_ID	ROAD_NAME
1 1	Abbey Road
2 5	Bow Lane

--2

--Purpose: Fitching the end location and the start location IDs and names of each road with the road's

 --name

```
select s.start_id as"Start location ID",e.end_id as "End location ID", s.start_name as "Start location
name",e.end_name as"End location name", r.road_name
from startlocation s,endlocation e, roads r
where s.start_id=r.start_id
and e.end_id=r.end_id;
```

Start location ID	End location ID	Start location name	End location name	ROAD_NAME
1 S-1	E-1	Glenfield	Bay view	Mission Place
2 S-5	E-1	North Cote	Bay view	Adelaid Road
3 S-5	E-2	North Cote	Albany	Abbey Road
4 S-3	E-3	South Auckland	Eden Terrace	Bow Lane
5 S-2	E-4	Albany	Hill Crest	High Way 18

--3

--Purpose: Fitching each road's name and id that has subroad and its name and id

select r.road_name,r.road_id,s.road_name as "Subroad name",s.road_id as "Subroad ID"

from roads r, roads s

where r.subroad_id=s.road_id;

ROAD_NAME	ROAD_ID	Subroad name	Subroad ID
1 Adelaid Road	2	Abbey Road	1
2 Mission Place	3	Adelaid Road	2
3 High Way 18	4	Mission Place	3

--4

--Purpose: Fitching employees names and ids that have been into the role of contract manager

select e.first_name||' '|| e.last_name as"Employee's Name",e.employee_id

from contract_manager c, arc_employees e

where e.employee_id=c.employee_id;

Employee's Name	EMPLOYEE_ID
1 Mark Johnson	EM-1
2 Max Winter	EM-2
3 Jessica Heart	EM-3
4 Mandy Brown	EM-4
5 Mary Scoot	EM-5

--5 :

--Purpose:showing the rounded to the closeset int number of actual cost of contracts in descinding

--order, showing the each of the contract's id, name and the project name that

-- is associated with

select c.contract_id,contract_name,p.project_name,concat(round(c.contract_act_cost,0),' M$') as "Actual Cost"

from contract c,project p

where c.project_code=p.project_code
 and c.contract_act_cost is not null

order by c.contract_act_cost desc;

CONTRACT_ID	CONTRACT_NAME	PROJECT_NAME	Actual Cost
1 CT-3	High Quality Contractors Contract	Long Road build	700 M$
2 CT-4	Friends Contractors Contract	High way fix	205 M$
3 CT-1	Majesty Contractors Contract	Sub Road fix	123 M$
4 CT-2	Radical Contractors Contract	Road build	11 M$

--6 :

 --Purpose:Showing the lengh of each road the to closeset int number in Kilometers, showing the roads

--names, category and the code of each project that is associated with

select r.road_id,r.road_name,r.road_categ as"Road Category",concat(round(r.road_length,0),'
Km'),p.project_code

from roads r, project_road pr, project p

where r.road_id=pr.road_id

and p.project_code=pr.project_code;

ROAD_ID	ROAD_NAME	Road Category	CONCAT(ROUND(R.ROAD_LENGTH,0),'KM')	PROJECT_CODE
1	Abbey Road	Sub Road	2 Km	P-1
2	Adelaid Road	Main Road	4 Km	P-2
3	Mission Place	Main Road	8 Km	P-3
4	High Way 18	Motor Way	29 Km	P-4
5	Bow Lane	Unseald Road	2 Km	P-5

--7:

--Purpose:Showing the hire date of the employees in the format of :MM-DD-YYYY in ascending order

--alongside with their Full names and emails:

select e.first_name||' '|| e.last_name as" Full name" ,nvl(e.email,'No email found') as "Email address",
to_char(e.hire_date,'MM DD YYYY') as" Hire date"

from arc_employees e

order by e.hire_date;

Full name	Email address	Hire date
1 Mary Scoot	No email found	09 09 1998
2 Mark Johnson	Mark.J@mail.com	06 20 2011
3 Max Winter	Max.W@mail.com	06 20 2011
4 Mary Halter	Mary.H@mail.com	10 10 2011
5 Jessica Heart	Jessica.H@mail.com	07 20 2015
6 Mandy Brown	Mandy.B@mail.com	07 12 2021

--8

--Purpose:Showing each project code and name with its contract's manager full name and id:

select p.project_code,p.project_name,e.employee_id,e.first_name||' '||e.last_name as "Manager Full Name"

from project p, contract c, contract_manager m, arc_employees e

where e.employee_id=m.employee_id

and c.contract_id=m.contract_id

and c.project_code=p.project_code;

PROJECT_CODE	PROJECT_NAME	EMPLOYEE_ID	Manager Full Name
1 P-1	Sub Road fix	EM-1	Mark Johnson
2 P-2	Road build	EM-2	Max Winter
3 P-3	Long Road build	EM-3	Jessica Heart
4 P-4	High way fix	EM-4	Mandy Brown
5 P-5	Small road build	EM-5	Mary Scoot

--9

--Purpose:Showing each project's code and name and each contractor company's name and email that is

-- responsible for that projcet.

```sql
select p.project_code,p.project_name,c.company_name,c.company_email

from company c, project p, contract ct

where p.project_code=ct.project_code
and ct.company_id=c.company_id;
```

	PROJECT_CODE	PROJECT_NAME	COMPANY_NAME	COMPANY_EMAIL
1	P-1	Sub Road fix	Majesty Contractors	Majesty.C@companymail.com
2	P-2	Road build	Radical Contractors	Queen.C@companymail.com
3	P-3	Long Road build	High Quality Contractors	High Quality.C@companymail.com
4	P-4	High way fix	Friends Contractors	Friends.C@companymail.com
5	P-5	Small road build	International Contractors	International.C@companymail.com

```sql
--10
--Purpose:Showing each project's name that worked on a road that is Main Road Category and where
--each of these roads start and end location. This is also showing the road name

select p.project_name, r.road_name,s.start_id,e.end_id, s.start_name as"Start location Name",e.end_name as"End location Name"

from project p, project_road pr,roads r, startlocation s,endlocation e

where p.project_code=pr.project_code
and r.road_id=pr.road_id
and r.start_id=s.start_id
and r.end_id=e.end_id
and r.road_categ='Main Road';
```

	PROJECT_NAME	ROAD_NAME	START_ID	END_ID	Start location Name	End location Name
1	Road build	Adelaid Road	S-5	E-1	North Cote	Bay view
2	Long Road build	Mission Place	S-1	E-1	Glenfield	Bay view