

F16_95-703 DATABASE MANAGEMENT Project

Team #1

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Question A:

Script #1:

```
DROP TABLE employee      CASCADE CONSTRAINTS;
DROP TABLE department    CASCADE CONSTRAINTS;
DROP TABLE training      CASCADE CONSTRAINTS;
DROP TABLE course        CASCADE CONSTRAINTS;
DROP TABLE class         CASCADE CONSTRAINTS;
DROP TABLE instructor    CASCADE CONSTRAINTS;
DROP TABLE grade_score  CASCADE CONSTRAINTS;
```

```
CREATE TABLE department
(dept_ID      NUMBER(5),
 dept_Name   VARCHAR2(30) NOT NULL,
 dept_Mngr   NUMBER(5),
 CONSTRAINT department_ID_PK PRIMARY KEY (dept_ID)
);
```

```
CREATE TABLE employee
(emp_ID       NUMBER(5),
 emp_Lname   VARCHAR2(30),
 emp_Fname   VARCHAR2(30),
 email       VARCHAR2(30),
 DOB         DATE NOT NULL,
 hire_Date   DATE DEFAULT SYSDATE,
 street      VARCHAR2(30),
 city        VARCHAR2(30),
 state       VARCHAR2(2),
 zip_code    NUMBER(5),
 dept_ID     NUMBER(5),
 sup_ID      NUMBER(5),
 CONSTRAINT employee_ID_PK PRIMARY KEY (emp_ID),
 CONSTRAINT employee_deptID_FK FOREIGN KEY (dept_ID) REFERENCES department (dept_ID),
 CONSTRAINT employee_supID_FK FOREIGN KEY (sup_ID) REFERENCES employee (emp_ID),
 CONSTRAINT employee_dates_CK CHECK (DOB <= hire_Date),
 CONSTRAINT employee_email_CK CHECK (email LIKE '%@%.%'),
 CONSTRAINT employee_supID_CK CHECK (sup_ID <> emp_ID)
);
```

```
CREATE TABLE course
(crs_ID       NUMBER(5),
 crs_Title    VARCHAR2(50),
 crs_Type     VARCHAR2(30),
 college_Name VARCHAR2(30),
 tuition      NUMBER(5),
 CONSTRAINT course_ID_PK PRIMARY KEY (crs_ID)
);
```

```
CREATE TABLE instructor
(instr_ID      NUMBER(5),
instr_Lname   VARCHAR2(30) NOT NULL,
instr_Fname   VARCHAR2(30) NOT NULL,
instr_Phone   NUMBER(10),
specialty     VARCHAR2(30),
CONSTRAINT instructor_ID_PK PRIMARY KEY (instr_ID)
);
```

```
CREATE TABLE grade_score
(grade  VARCHAR2(2) NOT NULL,
score  NUMBER(3,2) NOT NULL,
CONSTRAINT gradeScore_grade_PK PRIMARY KEY (grade),
CONSTRAINT gradeScore_grade_CK CHECK (grade IN ('A+', 'A', 'A-', 'B+', 'B', 'B-', 'C+', 'C', 'C-', 'R')),
CONSTRAINT gradeScore_score_CK CHECK ((score <= 4.33) AND (score >= 0.00))
);
```

```
CREATE TABLE class
(crs_ID      NUMBER(5),
section     VARCHAR2(2),
sem_Cmpleted VARCHAR2(30),
instr_ID     NUMBER(5),
CONSTRAINT class_ID_PK PRIMARY KEY (crs_ID,section,sem_Cmpleted),
CONSTRAINT class_crsID_FK FOREIGN KEY (crs_ID) REFERENCES course (crs_ID),
CONSTRAINT class_instrID_FK FOREIGN KEY (instr_ID) REFERENCES instructor (instr_ID)
);
```

```
CREATE TABLE training
(TID      NUMBER(5),
emp_ID    NUMBER(5),
appr_Date DATE,
crs_ID    NUMBER(5),
section   VARCHAR2(2),
sem_Cmpleted VARCHAR2(30) NOT NULL,
grade     VARCHAR2(2) NOT NULL,
CONSTRAINT training_TID_PK PRIMARY KEY (TID),
CONSTRAINT training_empID_FK FOREIGN KEY (emp_ID) REFERENCES employee (emp_ID),
CONSTRAINT training_crsID_FK FOREIGN KEY (crs_ID,section,sem_Cmpleted) REFERENCES class (crs_ID,section,sem_Cmpleted),
CONSTRAINT training_grade_FK FOREIGN KEY (grade) REFERENCES grade_score (grade)
);
```

```
ALTER TABLE department
ADD CONSTRAINT department_deptMngr_FK FOREIGN KEY (dept_Mngr) REFERENCES employee (emp_ID);
```

```
COMMIT;
```

Question A:

Script #2:

```
-- department
INSERT INTO department VALUES (1001,'Marketing',null);
INSERT INTO department VALUES (1002,'Human Resources',null);
INSERT INTO department VALUES (1003,'Sales',null);
INSERT INTO department VALUES (1004,'Customer Service',null);
INSERT INTO department VALUES (1005,'Finance',null);
INSERT INTO department VALUES (1006,'Production',null);
INSERT INTO department VALUES (1007,'Research and Development',null);
INSERT INTO department VALUES (1008,'Manufacturing',null);
INSERT INTO department VALUES (1009,'Accounting',null);
INSERT INTO department VALUES (1010,'Consulting',null);
INSERT INTO department VALUES (1011,'Analytics',null);

-- employee
INSERT INTO employee VALUES (10001,'Liu','Jingxiao','jingxial@andrew.cmu.edu','19-FEB-1994','01-AUG-2011',
    '230 N Craig','Pittsburgh','PA',15213,1001,null);
INSERT INTO employee VALUES (10002,'Agarwal','Ajay','aragarwa@andrew.cmu.edu','10-JAN-1994','02-AUG-2011',
    '5710 Bartlett Street','Pittsburgh','PA',15217,1001,10001);
INSERT INTO employee VALUES (10003,'Ahn','Jungho','junghoa@andrew.cmu.edu','24-JUN-1994','01-AUG-2011',
    '4750 Centre Avenue','Pittsburgh','PA',15213,1001,10001);
INSERT INTO employee VALUES (10004,'Aravind','Pritham','pvaravin@andrew.cmu.edu','09-APR-1994','02-AUG-2011',
    '5738 Darlington','Pittsburgh','PA',15217,1002,null);
INSERT INTO employee VALUES (10005,'Bakert','Andrew','abakert@andrew.cmu.edu','21-DEC-1994','01-AUG-2012',
    '240 Melwood Ave','Pittsburgh','PA',15213,1002,10004);
INSERT INTO employee VALUES (10006,'Arora','Rajat','rarora1@cmu.edu','06-APR-1993','02-AUG-2012',
    '5738 Darlington','Pittsburgh','PA',15217,1003,null);
INSERT INTO employee VALUES (10007,'Chao','Shucheng','shuchenc@andrew.cmu.edu','21-NOV-1994','01-AUG-2012',
    '230 N Craig','Pittsburgh','PA',15213,1003,10006);
INSERT INTO employee VALUES (10008,'Chen','Dihong','dihonc@andrew.cmu.edu','09-APR-1994','02-AUG-2012',
    '5738 Darlington','Pittsburgh','PA',15217,1004,null);
INSERT INTO employee VALUES (10009,'Chen','Yiming','yimingc1@andrew.cmu.edu','21-SEP-1993','02-AUG-2012',
    '5710 Bartlett Street','Pittsburgh','PA',15217,1004,10008);
INSERT INTO employee VALUES (10010,'Dennin','Luke','ldennin@andrew.cmu.edu','03-APR-1995','02-AUG-2012',
    '5738 Darlington','Pittsburgh','PA',15217,1005,null);
INSERT INTO employee VALUES (10011,'Feng','Christopher','cf1@andrew.cmu.edu','27-FEB-1994','01-AUG-2012',
    '4750 Centre Avenue','Pittsburgh','PA',15213,1005,10010);
INSERT INTO employee VALUES (10012,'Zhu','Di','zhudi@andrew.cmu.edu','19-MAR-1994','01-AUG-2012',
    '230 N Craig','Pittsburgh','PA',15213,1006,null);
INSERT INTO employee VALUES (10013,'Zhou','Jiali','jializ@andrew.cmu.edu','10-JAN-1994','02-AUG-2012',
    '5710 Bartlett Street','Pittsburgh','PA',15217,1006,10012);
INSERT INTO employee VALUES (10014,'Zhao','Yusheng','zhaoyu@andrew.cmu.edu','24-JUN-1994','01-AUG-2012',
    '4750 Centre Avenue','Pittsburgh','PA',15213,1007,null);
INSERT INTO employee VALUES (10015,'Zhao','Yiren','Yiren@andrew.cmu.edu','09-APR-1994','02-AUG-2012',
    '5738 Darlington','Pittsburgh','PA',15217,1007,10014);
INSERT INTO employee VALUES (10016,'Zhao','Xin','xinzh@andrew.cmu.edu','21-DEC-1994','01-AUG-2012',
    '240 Melwood Ave','Pittsburgh','PA',15213,1008,null);
INSERT INTO employee VALUES (10017,'Alla','Sharan','sharan@cmu.edu','06-APR-1993','02-AUG-2012',
    '5738 Darlington','Pittsburgh','PA',15217,1008,10016);
INSERT INTO employee VALUES (10018,'Bamforth','Gabriel','gabriel@andrew.cmu.edu','21-NOV-1994','01-AUG-2012',
    '230 N Craig','Pittsburgh','PA',15213,1009,null);
```

```

INSERT INTO employee VALUES (10019,'Cheng','Perry','perry@andrew.cmu.edu','09-APR-1994','02-AUG-2012',
    '5738 Darlington','Pittsburgh','PA',15217,1009,10018);
INSERT INTO employee VALUES (10020,'Chirinos','Renato','renato@andrew.cmu.edu','21-SEP-1993','02-AUG-2011',
    '5710 Bartlett Street','Pittsburgh','PA',15217,1010,null);
INSERT INTO employee VALUES (10021,'Chukwuma','Obiano','obiano@andrew.cmu.edu','03-APR-1995','02-AUG-2015',
    '5738 Darlington','Pittsburgh','PA',15217,1010,10020);
INSERT INTO employee VALUES (10022,'Clarke','Dylan','dylan@andrew.cmu.edu','27-FEB-1994','01-AUG-2015',
    '4750 Centre Avenue','Pittsburgh','PA',15213,1011,null);
INSERT INTO employee VALUES (10023,'Cruz','Julissa','juliss@andrew.cmu.edu','27-FEB-1994','01-AUG-2015',
    '4750 Centre Avenue','Pittsburgh','PA',15213,1011,10022);

```

-- instructor

```

INSERT INTO instructor VALUES (9501,'Szczygula','Janusz',4122686096,'Database');
INSERT INTO instructor VALUES (9502,'Esmall','Zadeh',1881109911,'Management');
INSERT INTO instructor VALUES (9503,'Dwivedi','Neelam',4122687246,'Java');
INSERT INTO instructor VALUES (9504,'Pastor','Lynne',4122686725,'Finance');
INSERT INTO instructor VALUES (9505,'Alessandro','Acquisti',4122686101,'Economics');
INSERT INTO instructor VALUES (9506,'Crane','John',4122686065,'Management');
INSERT INTO instructor VALUES (9507,'Pastor','Lynn',1881109943,'Finance');
INSERT INTO instructor VALUES (9508,'Labash','Chris',4122687256,'Management');
INSERT INTO instructor VALUES (9509,'Rosenberg','Haley',4122686723,'Management');
INSERT INTO instructor VALUES (9510,'Baron','Raymond',4122686176,'Management');
INSERT INTO instructor VALUES (9511,'Szczygula','Janusz',4122686096,'Database');

```

-- grade_score

```

INSERT INTO grade_score VALUES ('A+',4.33);
INSERT INTO grade_score VALUES ('A',4.00);
INSERT INTO grade_score VALUES ('A-',3.67);
INSERT INTO grade_score VALUES ('B+',3.33);
INSERT INTO grade_score VALUES ('B',3.00);
INSERT INTO grade_score VALUES ('B-',2.67);
INSERT INTO grade_score VALUES ('C+',2.33);
INSERT INTO grade_score VALUES ('C',2.00);
INSERT INTO grade_score VALUES ('C-',1.67);
INSERT INTO grade_score VALUES ('R',0.00);

```

--course

```

INSERT INTO course VALUES (95703,'Database Mngt','DBM','Heinz',1800);
INSERT INTO course VALUES (95705,'Telecommunications Management','EXTC','Heinz',0);
INSERT INTO course VALUES (95706,'Object Oriented Analysis and Design','CS','Heinz',0);
INSERT INTO course VALUES (95716,'Principles of Finance','Finance','Heinz',900);
INSERT INTO course VALUES (95710,'Economic Analysis','Finance','Heinz',null);
INSERT INTO course VALUES (95701,'Marketing Digital Media','Finance','Heinz',1800);
INSERT INTO course VALUES (95702,'Financial Accounting','Finance','Heinz',2700);
INSERT INTO course VALUES (95704,'Professional Speaking','English','Heinz',1800);
INSERT INTO course VALUES (95707,'Professional Writing','English','Heinz',2700);
INSERT INTO course VALUES (95708,'Managing Disruptive Technologies','CS','Heinz',null);
INSERT INTO course VALUES (95722,'Data Structures','CS','School of Computer Science',2700);
INSERT INTO course VALUES (95723,'Machine Learning','CS','School of Computer Science',900);

```

```
-- class
INSERT INTO class VALUES (95706,'A1','Spring 2013',9503);
INSERT INTO class VALUES (95716,'A2','Spring 2013',9504);
INSERT INTO class VALUES (95710,'A2','Spring 2013',9505);
INSERT INTO class VALUES (95701,'A1','Fall 2013',9506);
INSERT INTO class VALUES (95702,'A1','Fall 2013',9507);
INSERT INTO class VALUES (95708,'A2','Fall 2013',9510);
INSERT INTO class VALUES (95722,'A2','Fall 2013',9501);
INSERT INTO class VALUES (95723,'A2','Fall 2013',9502);
INSERT INTO class VALUES (95703,'A1','Spring 2014',9501);
INSERT INTO class VALUES (95716,'A2','Spring 2014',9504);
INSERT INTO class VALUES (95710,'A2','Spring 2014',9505);
INSERT INTO class VALUES (95701,'A1','Fall 2014',9506);
INSERT INTO class VALUES (95702,'A1','Fall 2014',9507);
INSERT INTO class VALUES (95704,'A1','Fall 2014',9508);
INSERT INTO class VALUES (95722,'A2','Fall 2014',9501);
INSERT INTO class VALUES (95723,'A2','Fall 2014',9502);
INSERT INTO class VALUES (95705,'A1','Spring 2014',9502);
INSERT INTO class VALUES (95703,'A1','Spring 2015',9501);
INSERT INTO class VALUES (95705,'A1','Spring 2015',9502);
INSERT INTO class VALUES (95710,'A2','Spring 2015',9505);
INSERT INTO class VALUES (95701,'A1','Fall 2015',9506);
INSERT INTO class VALUES (95702,'A1','Fall 2015',9507);
INSERT INTO class VALUES (95704,'A1','Fall 2015',9508);
INSERT INTO class VALUES (95707,'A2','Fall 2015',9509);
INSERT INTO class VALUES (95723,'A2','Fall 2015',9502);
INSERT INTO class VALUES (95716,'A2','Spring 2015',9504);
INSERT INTO class VALUES (95703,'A1','Spring 2016',9501);
INSERT INTO class VALUES (95705,'A1','Spring 2016',9502);
INSERT INTO class VALUES (95706,'A1','Spring 2016',9503);
INSERT INTO class VALUES (95701,'A1','Fall 2016',9506);
INSERT INTO class VALUES (95702,'A1','Fall 2016',9507);
INSERT INTO class VALUES (95704,'A1','Fall 2016',9508);
INSERT INTO class VALUES (95707,'A2','Fall 2016',9509);
INSERT INTO class VALUES (95708,'A2','Fall 2016',9510);
```

```
--training
INSERT INTO training VALUES (001,10018,'29-NOV-2012',95710,'A2','Spring 2013','A');
INSERT INTO training VALUES (002,10019,'29-NOV-2012',95710,'A2','Spring 2013','B');
INSERT INTO training VALUES (003,10014,'29-MAR-2013',95701,'A1','Fall 2013','B-');
INSERT INTO training VALUES (004,10014,'29-MAR-2013',95702,'A1','Fall 2013','B');
INSERT INTO training VALUES (005,10001,'29-MAR-2013',95701,'A1','Fall 2013','A');
INSERT INTO training VALUES (006,10001,'29-MAR-2013',95702,'A1','Fall 2013','B');
INSERT INTO training VALUES (007,10012,'29-MAR-2013',95723,'A2','Fall 2013','R');
INSERT INTO training VALUES (008,10013,'29-MAR-2013',95723,'A2','Fall 2013','B');
INSERT INTO training VALUES (009,10012,'29-MAR-2014',95723,'A2','Fall 2014','A');
INSERT INTO training VALUES (010,10001,'29-NOV-2013',95703,'A1','Spring 2014','C-');
INSERT INTO training VALUES (011,10003,'29-NOV-2013',95716,'A2','Spring 2014','B+');
INSERT INTO training VALUES (012,10004,'29-NOV-2013',95710,'A2','Spring 2014','A');
INSERT INTO training VALUES (013,10005,'29-NOV-2013',95710,'A2','Spring 2014','B');
INSERT INTO training VALUES (014,10006,'29-NOV-2013',95716,'A2','Spring 2014','R');
INSERT INTO training VALUES (015,10001,'29-MAR-2014',95701,'A1','Fall 2014','A');
INSERT INTO training VALUES (016,10002,'29-MAR-2014',95702,'A1','Fall 2014','B');
```

```

INSERT INTO training VALUES (017,10003,'29-MAR-2014',95704,'A1','Fall 2014','R');
INSERT INTO training VALUES (018,10004,'29-MAR-2014',95701,'A1','Fall 2014','A');
INSERT INTO training VALUES (019,10005,'29-MAR-2014',95702,'A1','Fall 2014','B');
INSERT INTO training VALUES (020,10009,'29-MAR-2014',95723,'A2','Fall 2014','C');
INSERT INTO training VALUES (021,10010,'29-MAR-2014',95723,'A2','Fall 2014','B');
INSERT INTO training VALUES (022,10006,'29-NOV-2014',95716,'A2','Spring 2015','C');
INSERT INTO training VALUES (023,10003,'29-MAR-2015',95704,'A1','Fall 2015','B+');
INSERT INTO training VALUES (024,10011,'29-NOV-2014',95703,'A1','Spring 2015','R');
INSERT INTO training VALUES (025,10012,'29-NOV-2014',95705,'A1','Spring 2015','A-');
INSERT INTO training VALUES (026,10015,'29-NOV-2014',95710,'A2','Spring 2015','B');
INSERT INTO training VALUES (027,10019,'29-NOV-2014',95710,'A2','Spring 2015','C-');
INSERT INTO training VALUES (028,10011,'29-MAR-2015',95701,'A1','Fall 2015','C-');
INSERT INTO training VALUES (029,10012,'29-MAR-2015',95702,'A1','Fall 2015','B');
INSERT INTO training VALUES (030,10014,'29-MAR-2015',95701,'A1','Fall 2015','A');
INSERT INTO training VALUES (031,10015,'29-MAR-2015',95702,'A1','Fall 2015','R');
INSERT INTO training VALUES (032,10017,'29-MAR-2015',95707,'A2','Fall 2015','R');
INSERT INTO training VALUES (033,10015,'29-MAR-2016',95702,'A1','Fall 2016','B');
INSERT INTO training VALUES (034,10017,'29-MAR-2016',95707,'A2','Fall 2016','B');
INSERT INTO training VALUES (035,10011,'29-NOV-2015',95703,'A1','Spring 2016','B');
INSERT INTO training VALUES (036,10001,'29-NOV-2015',95703,'A1','Spring 2016','A');
INSERT INTO training VALUES (037,10006,'29-NOV-2015',95703,'A1','Spring 2016','A');
INSERT INTO training VALUES (038,10002,'29-NOV-2015',95705,'A1','Spring 2016','A-');
INSERT INTO training VALUES (039,10006,'29-MAR-2016',95701,'A1','Fall 2016','R');
INSERT INTO training VALUES (040,10022,'29-MAR-2016',95702,'A1','Fall 2016','B');
INSERT INTO training VALUES (041,10023,'29-MAR-2016',95704,'A1','Fall 2016','B+');
INSERT INTO training VALUES (042,10009,'29-MAR-2016',95701,'A1','Fall 2016','A');
INSERT INTO training VALUES (043,10009,'29-MAR-2016',95702,'A1','Fall 2016','R');

```

```
--ADD DEPT_MNGR
```

```
-- department_deptMngr
```

```

UPDATE department SET dept_Mngr = 10001 WHERE dept_ID = 1001;
UPDATE department SET dept_Mngr = 10004 WHERE dept_ID = 1002;
UPDATE department SET dept_Mngr = 10006 WHERE dept_ID = 1003;
UPDATE department SET dept_Mngr = 10008 WHERE dept_ID = 1004;
UPDATE department SET dept_Mngr = 10010 WHERE dept_ID = 1005;
UPDATE department SET dept_Mngr = 10012 WHERE dept_ID = 1006;
UPDATE department SET dept_Mngr = 10014 WHERE dept_ID = 1007;
UPDATE department SET dept_Mngr = 10016 WHERE dept_ID = 1008;
UPDATE department SET dept_Mngr = 10018 WHERE dept_ID = 1009;
UPDATE department SET dept_Mngr = 10020 WHERE dept_ID = 1010;
UPDATE department SET dept_Mngr = 10022 WHERE dept_ID = 1011;

```

```
COMMIT;
```

Question A:

Content of the tables:

SQL> SELECT * FROM employee;

EMP_ID	EMP_LNAME	EMP_FNAME	EMAIL	DOB	HIRE_DATE	STREET	CITY	ST	ZIP_CODE	DEPT_ID	SUP_ID
10001	Liu	Jingxiao	jingxial@andrew.cmu.edu	19-FEB-94	01-AUG-11	230 N Craig	Pittsburgh	PA	15213	1001	
10002	Agarwal	Ajay	aragarwa@andrew.cmu.edu	10-JAN-94	02-AUG-11	5710 Bartlett Street	Pittsburgh	PA	15217	1001	10001
10003	Ahn	Jungho	junghoa@andrew.cmu.edu	24-JUN-94	01-AUG-11	4750 Centre Avenue	Pittsburgh	PA	15213	1001	10001
10004	Aravind	Pritham	pvaravin@andrew.cmu.edu	09-APR-94	02-AUG-11	5738 Darlington	Pittsburgh	PA	15217	1002	
10005	Bakert	Andrew	abakert@andrew.cmu.edu	21-DEC-94	01-AUG-12	240 Melwood Ave	Pittsburgh	PA	15213	1002	10004
10006	Arora	Rajat	rarora1@cmu.edu	06-APR-93	02-AUG-12	5738 Darlington	Pittsburgh	PA	15217	1003	
10007	Chao	Shucheng	shuchenc@andrew.cmu.edu	21-NOV-94	01-AUG-12	230 N Craig	Pittsburgh	PA	15213	1003	10006
10008	Chen	Dihong	dihonc@andrew.cmu.edu	09-APR-94	02-AUG-12	5738 Darlington	Pittsburgh	PA	15217	1004	
10009	Chen	Yiming	yimingc1@andrew.cmu.edu	21-SEP-93	02-AUG-12	5710 Bartlett Street	Pittsburgh	PA	15217	1004	10008
10010	Dennin	Luke	ldennin@andrew.cmu.edu	03-APR-95	02-AUG-12	5738 Darlington	Pittsburgh	PA	15217	1005	
10011	Feng	Christopher	cf1@andrew.cmu.edu	27-FEB-94	01-AUG-12	4750 Centre Avenue	Pittsburgh	PA	15213	1005	10010
10012	Zhu	Di	zhudi@andrew.cmu.edu	19-MAR-94	01-AUG-12	230 N Craig	Pittsburgh	PA	15213	1006	
10013	Zhou	Jiali	jializ@andrew.cmu.edu	10-JAN-94	02-AUG-12	5710 Bartlett Street	Pittsburgh	PA	15217	1006	10012
10014	Zhao	Yusheng	zhaoyu@andrew.cmu.edu	24-JUN-94	01-AUG-12	4750 Centre Avenue	Pittsburgh	PA	15213	1007	
10015	Zhao	Yiren	Yiren@andrew.cmu.edu	09-APR-94	02-AUG-12	5738 Darlington	Pittsburgh	PA	15217	1007	10014
10016	Zhao	Xin	xinzh@andrew.cmu.edu	21-DEC-94	01-AUG-12	240 Melwood Ave	Pittsburgh	PA	15213	1008	
10017	Alla	Sharan	sharan@cmu.edu	06-APR-93	02-AUG-12	5738 Darlington	Pittsburgh	PA	15217	1008	10016
10018	Bamforth	Gabriel	gabriel@andrew.cmu.edu	21-NOV-94	01-AUG-12	230 N Craig	Pittsburgh	PA	15213	1009	
10019	Cheng	Perry	perryrc@andrew.cmu.edu	09-APR-94	02-AUG-12	5738 Darlington	Pittsburgh	PA	15217	1009	10018
10020	Chirinos	Renato	renato@andrew.cmu.edu	21-SEP-93	02-AUG-11	5710 Bartlett Street	Pittsburgh	PA	15217	1010	
10021	Chukwuma	Obianozo	obiano@andrew.cmu.edu	03-APR-95	02-AUG-15	5738 Darlington	Pittsburgh	PA	15217	1010	10020
10022	Clarke	Dylan	dylan@andrew.cmu.edu	27-FEB-94	01-AUG-15	4750 Centre Avenue	Pittsburgh	PA	15213	1011	
10023	Cruz	Julissa	julis@andrew.cmu.edu	27-FEB-94	01-AUG-15	4750 Centre Avenue	Pittsburgh	PA	15213	1011	10022

23 rows selected.

SQL> SELECT * FROM department;

DEPT_ID	DEPT_NAME	DEPT_MNGR
1001	Marketing	10001
1002	Human Resources	10004
1003	Sales	10006
1004	Customer Service	10008
1005	Finance	10010
1006	Production	10012
1007	Research and Development	10014
1008	Manufacturing	10016
1009	Accounting	10018
1010	Consulting	10020
1011	Analytics	10022

11 rows selected.


```
SQL> SELECT * FROM training;
```

TID	EMP_ID	APPR_DATE	CRS_ID	SECTION	SEM_CMPLTED	GR
1	10018	29-NOV-12	95710	A2	Spring 2013	A
2	10019	29-NOV-12	95710	A2	Spring 2013	B
3	10014	29-MAR-13	95701	A1	Fall 2013	B-
4	10014	29-MAR-13	95702	A1	Fall 2013	B
5	10001	29-MAR-13	95701	A1	Fall 2013	A
6	10001	29-MAR-13	95702	A1	Fall 2013	B
7	10012	29-MAR-13	95723	A2	Fall 2013	R
8	10013	29-MAR-13	95723	A2	Fall 2013	B
9	10012	29-MAR-14	95723	A2	Fall 2014	A
10	10001	29-NOV-13	95703	A1	Spring 2014	C-
11	10003	29-NOV-13	95716	A2	Spring 2014	B+
12	10004	29-NOV-13	95710	A2	Spring 2014	A
13	10005	29-NOV-13	95710	A2	Spring 2014	B
14	10006	29-NOV-13	95716	A2	Spring 2014	R
15	10001	29-MAR-14	95701	A1	Fall 2014	A
16	10002	29-MAR-14	95702	A1	Fall 2014	B
17	10003	29-MAR-14	95704	A1	Fall 2014	R
18	10004	29-MAR-14	95701	A1	Fall 2014	A
19	10005	29-MAR-14	95702	A1	Fall 2014	B
20	10009	29-MAR-14	95723	A2	Fall 2014	C
21	10010	29-MAR-14	95723	A2	Fall 2014	B
22	10006	29-NOV-14	95716	A2	Spring 2015	C
23	10003	29-MAR-15	95704	A1	Fall 2015	B+
24	10011	29-NOV-14	95703	A1	Spring 2015	R
25	10012	29-NOV-14	95705	A1	Spring 2015	A-
26	10015	29-NOV-14	95710	A2	Spring 2015	B
27	10019	29-NOV-14	95710	A2	Spring 2015	C-
28	10011	29-MAR-15	95701	A1	Fall 2015	C-
29	10012	29-MAR-15	95702	A1	Fall 2015	B
30	10014	29-MAR-15	95701	A1	Fall 2015	A
31	10015	29-MAR-15	95702	A1	Fall 2015	R
32	10017	29-MAR-15	95707	A2	Fall 2015	R
33	10015	29-MAR-16	95702	A1	Fall 2016	B
34	10017	29-MAR-16	95707	A2	Fall 2016	B
35	10011	29-NOV-15	95703	A1	Spring 2016	B
36	10001	29-NOV-15	95703	A1	Spring 2016	A
37	10006	29-NOV-15	95703	A1	Spring 2016	A
38	10002	29-NOV-15	95705	A1	Spring 2016	A-
39	10006	29-MAR-16	95701	A1	Fall 2016	R
40	10022	29-MAR-16	95702	A1	Fall 2016	B
41	10023	29-MAR-16	95704	A1	Fall 2016	B+
42	10009	29-MAR-16	95701	A1	Fall 2016	A
43	10009	29-MAR-16	95702	A1	Fall 2016	R

43 rows selected.

```
SQL> SELECT * FROM course;
```

CRS_ID	CRS_TITLE	CRS_TYPE	COLLEGE_NAME	TUITION
95703	Database Mngt	DBM	Heinz	1800
95705	Telecommunications Management	EXTC	Heinz	0
95706	Object Oriented Analysis and Design	CS	Heinz	0
95716	Principles of Finance	Finance	Heinz	900
95710	Economic Analysis	Finance	Heinz	
95701	Marketing Digital Media	Finance	Heinz	1800
95702	Financial Accounting	Finance	Heinz	2700
95704	Professional Speaking	English	Heinz	1800
95707	Professional Writing	English	Heinz	2700
95708	Managing Disruptive Technologies	CS	Heinz	
95722	Data Structures	CS	School of Computer Science	2700
95723	Machine Learning	CS	School of Computer Science	900

12 rows selected.

```
SQL> SELECT * FROM instructor;
```

INSTR_ID	INSTR_LNAME	INSTR_FNAME	INSTR_PHONE	SPECIALTY
9501	Szczypula	Janusz	4122686096	Database
9502	Esmall	Zadeh	1881109911	Management
9503	Dwivedi	Neelam	4122687246	Java
9504	Pastor	Lynne	4122686725	Finance
9505	Alessandro	Acquisti	4122686101	Economics
9506	Crane	John	4122686065	Management
9507	Pastor	Lynn	1881109943	Finance
9508	Labash	Chris	4122687256	Management
9509	Rosenberg	Haley	4122686723	Management
9510	Baron	Raymond	4122686176	Management
9511	Szczypula	Janusz	4122686096	Database

11 rows selected.

```
SQL> SELECT * FROM class;
```

CRS_ID	SECTION	SEM_CMPLTED	INSTR_ID
95706	A1	Spring 2013	9503
95716	A2	Spring 2013	9504
95710	A2	Spring 2013	9505
95701	A1	Fall 2013	9506
95702	A1	Fall 2013	9507
95708	A2	Fall 2013	9510
95722	A2	Fall 2013	9501
95723	A2	Fall 2013	9502
95703	A1	Spring 2014	9501
95716	A2	Spring 2014	9504
95710	A2	Spring 2014	9505
95701	A1	Fall 2014	9506
95702	A1	Fall 2014	9507
95704	A1	Fall 2014	9508
95722	A2	Fall 2014	9501
95723	A2	Fall 2014	9502
95705	A1	Spring 2014	9502
95703	A1	Spring 2015	9501
95705	A1	Spring 2015	9502
95710	A2	Spring 2015	9505
95701	A1	Fall 2015	9506
95702	A1	Fall 2015	9507
95704	A1	Fall 2015	9508
95707	A2	Fall 2015	9509
95723	A2	Fall 2015	9502
95716	A2	Spring 2015	9504
95703	A1	Spring 2016	9501
95705	A1	Spring 2016	9502
95706	A1	Spring 2016	9503
95701	A1	Fall 2016	9506
95702	A1	Fall 2016	9507
95704	A1	Fall 2016	9508
95707	A2	Fall 2016	9509
95708	A2	Fall 2016	9510

34 rows selected.

```
SQL> SELECT * FROM grade_score;
```

GR	SCORE
A+	4.33
A	4
A-	3.67
B+	3.33
B	3
B-	2.67
C+	2.33
C	2
C-	1.67
R	0

10 rows selected.

Question B:

Create SQL queries:

```
SQL> --Q1
SQL> CLEAR COLUMNS
columns cleared
SQL> COLUMN employee FORMAT A30
SQL> COLUMN GPA FORMAT 0.99
SQL> SELECT DISTINCT emp_ID || '-' || emp_Lname || ', ' || emp_Fname AS employee,
 2      COUNT(emp_ID) AS "# of times", AVG(score) AS GPA, crs_ID
 3 FROM   grade_score JOIN training USING(grade)
 4        JOIN employee USING(emp_ID)
 5 GROUP BY emp_ID,emp_Lname,emp_Fname,crs_ID
 6 HAVING COUNT(emp_ID) > 1;
```

EMPLOYEE	# of times	GPA	CRS_ID
10019-Cheng, Perry	2	2.34	95710
10012-Zhu, Di	2	2.00	95723
10003-Ahn, Jungho	2	1.67	95704
10011-Feng, Christopher	2	1.50	95703
10001-Liu, Jingxiao	2	4.00	95701
10017-Alla, Sharan	2	1.50	95707
10014-Zhao, Yusheng	2	3.34	95701
10001-Liu, Jingxiao	2	2.84	95703
10015-Zhao, Yiren	2	1.50	95702
10006-Arora, Rajat	2	1.00	95716

10 rows selected.

```

SQL> --Q2
SQL> --Assumption: The fiscal year in the USA is from OCT 1st to next year's Sept 30th. In order to make sure that
SQL> --every semester is finished in one fiscal year. We assume that the fall semester is from AUG 1st to SEPT 30th,
SQL> --and the spring semester is from FEB 1st to MAR 31st. Thus, we should use different semesters' records in
SQL> --different month.
SQL> CLEAR COLUMNS
columns cleared
SQL> COLUMN employee FORMAT A30
SQL> SELECT employee, email, "# of classes"
  2 FROM(SELECT DISTINCT emp_ID || '-' || emp_Lname || ', ' || emp_Fname AS employee, email,
  3          COUNT(emp_ID) AS "# of classes", AVG(score) AS "GPA"
  4 FROM      employee JOIN training USING(emp_ID)
  5          JOIN class USING(crs_ID, section, sem_Cmpleted)
  6          JOIN course USING(crs_ID)
  7          JOIN grade_score USING(grade)
  8 WHERE (LOWER(crs_Title) = 'database mngt' OR LOWER(crs_Type) = 'dbm')
  9 AND (TO_NUMBER(SUBSTR(sem_Cmpleted,INSTR(sem_Cmpleted,'')+1,INSTR(sem_Cmpleted,'')+4)) > EXTRACT(YEAR FROM SYSDATE)-3
10      OR sem_Cmpleted = (CASE
11                          WHEN EXTRACT(MONTH FROM SYSDATE) BETWEEN 1 AND 9 THEN 'Fall '
12                          ELSE NULL END) || TO_CHAR(EXTRACT(YEAR FROM SYSDATE)-3)
13      OR sem_Cmpleted = (CASE
14                          WHEN EXTRACT(MONTH FROM SYSDATE) BETWEEN 1 AND 3 THEN 'Spring '
15                          ELSE NULL END) || TO_CHAR(EXTRACT(YEAR FROM SYSDATE)-3))
16 GROUP BY emp_ID,emp_Lname,emp_Fname,email)
17 WHERE "GPA" > 0.00;

```

EMPLOYEE	EMAIL	# of classes
10001-Liu, Jingxiao	jingxial@andrew.cmu.edu	2
10006-Arora, Rajat	rarora1@cmu.edu	1
10011-Feng, Christopher	cf1@andrew.cmu.edu	2

```

SQL> --Q3
SQL> CLEAR COLUMNS
columns cleared
SQL> COLUMN department FORMAT A35
SQL> COLUMN "Total budget" FORMAT $99990
SQL> COLUMN Classes FORMAT 99
SQL> SELECT dept_ID || ' - ' || dept_Name AS department, COUNT(TID) AS "# of trainings",
2         COUNT(DISTINCT crs_ID || sem_Cmpleted || section) AS "# of classes",
3         SUM(NVL(tuition,0)) AS "Total budget",
4         RANK() OVER (ORDER BY SUM(NVL(tuition,0)) DESC) AS Rank
5 FROM     department JOIN employee USING(dept_ID)
6         LEFT OUTER JOIN training USING(emp_ID)
7         LEFT OUTER JOIN class USING(crs_ID, section, sem_Cmpleted)
8         LEFT OUTER JOIN course USING(crs_ID)
9 GROUP BY dept_ID, dept_Name;

```

DEPARTMENT	# of trainings	# of classes	Total budget	RANK
1001 - Marketing	10	10	\$17100	1
1007 - Research and Development	6	6	\$11700	2
1005 - Finance	4	4	\$6300	3
1003 - Sales	4	4	\$5400	4
1004 - Customer Service	3	3	\$5400	4
1008 - Manufacturing	2	2	\$5400	4
1006 - Production	5	4	\$5400	4
1002 - Human Resources	4	3	\$4500	8
1011 - Analytics	2	2	\$4500	8
1010 - Consulting	0	0	\$0	10
1009 - Accounting	3	2	\$0	10

11 rows selected.

```

SQL> --Q4
SQL> CLEAR COLUMNS
columns cleared
SQL> COLUMN instructor FORMAT A35
SQL> COLUMN class FORMAT A55
SQL> SELECT DISTINCT instr_ID || '-' || instr_Lname || ', ' || instr_Fname AS Instructor, instr_Phone AS PhoneNum,
2      crs_ID || '-' || crs_Title || ', ' || section || ', ' || sem_Cmpleted AS Class
3 FROM   instructor JOIN class USING(instr_ID)
4        JOIN course USING(crs_ID)
5        JOIN training USING(crs_ID, section, sem_Cmpleted)
6 WHERE  grade <> 'R';

```

INSTRUCTOR	PHONENUM CLASS
9502-Esmall, Zadeh	1881109911 95723-Machine Learning, A2, Fall 2014
9502-Esmall, Zadeh	1881109911 95723-Machine Learning, A2, Fall 2013
9506-Crane, John	4122686065 95701-Marketing Digital Media, A1, Fall 2016
9507-Pastor, Lynn	1881109943 95702-Financial Accounting, A1, Fall 2016
9509-Rosenberg, Haley	4122686723 95707-Professional Writing, A2, Fall 2016
9504-Pastor, Lynne	4122686725 95716-Principles of Finance, A2, Spring 2015
9505-Alessandro, Acquisti	4122686101 95710-Economic Analysis, A2, Spring 2015
9505-Alessandro, Acquisti	4122686101 95710-Economic Analysis, A2, Spring 2014
9506-Crane, John	4122686065 95701-Marketing Digital Media, A1, Fall 2014
9508-Labash, Chris	4122687256 95704-Professional Speaking, A1, Fall 2016
9501-Szczypula, Janusz	4122686096 95703-Database Mngt, A1, Spring 2014
9506-Crane, John	4122686065 95701-Marketing Digital Media, A1, Fall 2013
9501-Szczypula, Janusz	4122686096 95703-Database Mngt, A1, Spring 2016
9505-Alessandro, Acquisti	4122686101 95710-Economic Analysis, A2, Spring 2013
9507-Pastor, Lynn	1881109943 95702-Financial Accounting, A1, Fall 2014
9502-Esmall, Zadeh	1881109911 95705-Telecommunications Management, A1, Spring 2015
9507-Pastor, Lynn	1881109943 95702-Financial Accounting, A1, Fall 2015
9507-Pastor, Lynn	1881109943 95702-Financial Accounting, A1, Fall 2013
9508-Labash, Chris	4122687256 95704-Professional Speaking, A1, Fall 2015
9502-Esmall, Zadeh	1881109911 95705-Telecommunications Management, A1, Spring 2016
9504-Pastor, Lynne	4122686725 95716-Principles of Finance, A2, Spring 2014
9506-Crane, John	4122686065 95701-Marketing Digital Media, A1, Fall 2015

22 rows selected.


```

SQL> --Q5
SQL> CLEAR COLUMNS
columns cleared
SQL> COLUMN "Previous Semester" FORMAT 0.99
SQL> COLUMN "Current Semester" FORMAT 0.99
SQL> COLUMN "Following Semester" FORMAT 0.99
SQL> COLUMN semester FORMAT A15
SQL> SELECT L || R AS semester,
2      LAG(grade, 1) OVER (ORDER BY R, L DESC) AS "Previous Semester",
3      grade AS "Current Semester",
4      LEAD(grade, 1) OVER (ORDER BY R, L DESC) AS "Following Semester"
5 FROM(
6   SELECT SUBSTR(semester,1,INSTR(semester,' ')) AS L, SUBSTR(semester,INSTR(semester,' ')+1,INSTR(semester,' ')+4) AS R, grade
7   FROM(
8     SELECT DISTINCT sem_Cmpleted AS semester, ROUND(AVG(score),2) AS grade
9     FROM   training JOIN grade_score USING(grade)
10    GROUP BY sem_Cmpleted))
11 ORDER BY R, L DESC;

```

SEMESTER	Previous Semester	Current Semester	Following Semester
Spring 2013		3.50	2.61
Fall 2013	3.50	2.61	2.40
Spring 2014	2.61	2.40	2.88
Fall 2014	2.40	2.88	2.07
Spring 2015	2.88	2.07	2.00
Fall 2015	2.07	2.00	3.67
Spring 2016	2.00	3.67	2.33
Fall 2016	3.67	2.33	

8 rows selected.

```

SQL> --Q6
SQL> CLEAR COLUMNS
columns cleared
SQL> SELECT tuition, COUNT(tuition) AS "# of Classes"
  2 FROM(SELECT (CASE
  3         WHEN tuition > 0 AND tuition <= 1000 THEN 'Inexpensive'
  4         WHEN tuition > 1000 AND tuition <= 2000 THEN 'Moderate'
  5         WHEN tuition > 2000 THEN 'Expensive'
  6         WHEN tuition IS NULL OR tuition = 0 THEN 'Unknown' END) AS tuition
  7 FROM   class JOIN course USING(crs_ID))
  8 RIGHT OUTER JOIN
  9 (SELECT 'Inexpensive' AS tuition FROM class
 10 UNION
 11 SELECT 'Moderate' AS tuition FROM class
 12 UNION
 13 SELECT 'Expensive' AS tuition FROM class
 14 UNION
 15 SELECT 'Unknown' AS tuition FROM class) USING(tuition)
 16 GROUP BY tuition
 17 ORDER BY 2 DESC;

```

TUITION	# of Classes
Unknown	10
Moderate	10
Expensive	8
Inexpensive	6

```

SQL> --Q7
SQL> --Assumption: Number of classes attended is defined as the classes registered by employees. Thus, we counted
SQL> --classes, not trainings here.
SQL> COLUMN "Total tuition" FORMAT $999990
SQL> SELECT college_Name, COUNT(DISTINCT Offered) AS "# of Classes Offered",
  2     COUNT(DISTINCT CASE
  3             WHEN TID IS NOT NULL
  4             THEN offered
  5             END) AS "# of Classes Attended",
  6     SUM(DECODE(TID,NULL,0,tuition)) AS "Total tuition"
  7 FROM(SELECT college_Name, crs_ID || sem_Cmpleted || section AS Offered, tuition, TID
  8 FROM class LEFT OUTER JOIN training USING(crs_ID, section, sem_Cmpleted)
  9 JOIN course USING(crs_ID))
 10 GROUP BY college_Name;

```

COLLEGE_NAME	# of Classes Offered	# of Classes Attended	Total tuition
Heinz	29	23	\$61200
School of Computer Science	5	2	\$4500

2 rows selected.

```

SQL> --Q8
SQL> CLEAR COLUMNS
columns cleared
SQL> COLUMN employee FORMAT A30
SQL> SELECT DISTINCT emp_ID || '-' || emp_Lname || ', ' || emp_Fname AS employee,
2      COUNT(crs_ID) AS "# of Classes",
3      DENSE_RANK() OVER (ORDER BY COUNT(crs_ID) DESC) AS Rank
4 FROM   employee LEFT OUTER JOIN training USING(emp_ID)
5        LEFT OUTER JOIN class USING(crs_ID, section, sem_Cmpleted)
6 GROUP BY emp_ID,emp_Lname,emp_Fname
7 ORDER BY rank;

```

EMPLOYEE	# of Classes	RANK
10001-Liu, Jingxiao	5	1
10006-Arora, Rajat	4	2
10012-Zhu, Di	4	2
10003-Ahn, Jungho	3	3
10009-Chen, Yiming	3	3
10011-Feng, Christopher	3	3
10014-Zhao, Yusheng	3	3
10015-Zhao, Yiren	3	3
10002-Agarwal, Ajay	2	4
10004-Aravind, Pritham	2	4
10005-Bakert, Andrew	2	4
10017-Alla, Sharan	2	4
10019-Cheng, Perry	2	4
10010-Dennin, Luke	1	5
10013-Zhou, Jiali	1	5
10018-Bamforth, Gabriel	1	5
10022-Clarke, Dylan	1	5
10023-Cruz, Julissa	1	5
10007-Chao, Shucheng	0	6
10008-Chen, Dihong	0	6
10016-Zhao, Xin	0	6
10020-Chirinos, Renato	0	6
10021-Chukwuma, Obiano	0	6

23 rows selected.

```

SQL> --Q9
SQL> CLEAR COLUMNS
columns cleared
SQL> COLUMN employee FORMAT A30
SQL> COLUMN crs_Title FORMAT A35
SQL> COLUMN "Semester and Grade (a)" FORMAT A22
SQL> COLUMN "Semester and Grade (b)" FORMAT A22
SQL> SELECT employee, crs_Title, A.Sem_Grade AS "Semester and Grade (a)", B.Sem_Grade AS "Semester and Grade (b)"
  2 FROM(
  3 (SELECT DISTINCT emp_ID || ' - ' || emp_Lname || ', ' || emp_Fname AS employee, crs_Title,
  4   sem_Completed || ', ' || grade AS Sem_Grade
  5 FROM
  6 ((SELECT emp_Lname, emp_Fname, emp_ID,
  7   crs_Title, crs_ID, COUNT(crs_ID) AS courseNum
  8   FROM   employee JOIN training USING(emp_ID)
  9         JOIN course USING(crs_ID)
 10   GROUP BY emp_Lname,emp_Fname, emp_ID,crs_Title, crs_ID
 11   HAVING COUNT(crs_ID)>1)
 12 JOIN
 13 training USING(emp_ID,crs_ID))) A
 14 JOIN
 15 (SELECT DISTINCT emp_ID || ' - ' || emp_Lname || ', ' || emp_Fname AS employee, crs_Title,
 16   sem_Completed || ', ' || grade AS Sem_Grade
 17 FROM
 18 ((SELECT emp_Lname, emp_Fname, emp_ID,
 19   crs_Title, crs_ID, COUNT(crs_ID) AS courseNum
 20   FROM   employee JOIN training USING(emp_ID)
 21         JOIN course USING(crs_ID)
 22   GROUP BY emp_Lname,emp_Fname, emp_ID,crs_Title, crs_ID
 23   HAVING COUNT(crs_ID)>1)
 24 JOIN
 25 training USING(emp_ID,crs_ID))) B
 26 USING(employee, crs_Title))
 27 WHERE A.Sem_Grade < B.Sem_Grade;

```

EMPLOYEE	CRS_TITLE	Semester and Grade (a)	Semester and Grade (b)
10015 - Zhao, Yiren	Financial Accounting	Fall 2015, R	Fall 2016, B
10019 - Cheng, Perry	Economic Analysis	Spring 2013, B	Spring 2015, C-
10017 - Alla, Sharan	Professional Writing	Fall 2015, R	Fall 2016, B
10001 - Liu, Jingxiao	Database Mngt	Spring 2014, C-	Spring 2016, A
10001 - Liu, Jingxiao	Marketing Digital Media	Fall 2013, A	Fall 2014, A
10003 - Ahn, Jungho	Professional Speaking	Fall 2014, R	Fall 2015, B+
10014 - Zhao, Yusheng	Marketing Digital Media	Fall 2013, B-	Fall 2015, A
10006 - Arora, Rajat	Principles of Finance	Spring 2014, R	Spring 2015, C
10011 - Feng, Christopher	Database Mngt	Spring 2015, R	Spring 2016, B
10012 - Zhu, Di	Machine Learning	Fall 2013, R	Fall 2014, A

10 rows selected.

```

SQL> --Q10
SQL> CLEAR COLUMNS
columns cleared
SQL> BREAK ON course
SQL> COLUMN sem_Completed FORMAT A15
SQL> COLUMN section FORMAT A10
SQL> COLUMN employee_ONE FORMAT A30
SQL> COLUMN employee_TWO FORMAT A30
SQL> COLUMN course FORMAT A35
SQL> SELECT DISTINCT crs_ID || ' - ' || crs_Title AS course, sem_Completed, section, A.employee AS employee_ONE, B.employee AS employee_TWO
  2 FROM ((SELECT crs_ID, crs_Title, sem_Completed, section, emp_ID || '-' || emp_Lname || ', ' || emp_Fname AS employee
  3 FROM employee JOIN training USING(emp_ID)
  4 JOIN class USING(crs_ID, sem_Completed, section)
  5 JOIN course USING(crs_ID)) A
  6 JOIN
  7 (SELECT crs_ID, crs_Title, sem_Completed, section, emp_ID || '-' || emp_Lname || ', ' || emp_Fname AS employee
  8 FROM employee JOIN training USING(emp_ID)
  9 JOIN class USING(crs_ID, sem_Completed, section)
 10 JOIN course USING(crs_ID)) B
 11 USING(crs_ID, crs_Title, sem_Completed, section))
 12 WHERE A.employee > B.employee
 13 ORDER BY 1;

```

COURSE	SEM_COMPLETED	SECTION	EMPLOYEE_ONE	EMPLOYEE_TWO
95701 - Marketing Digital Media	Fall 2013	A1	10014-Zhao, Yusheng	10001-Liu, Jingxiao
	Fall 2014	A1	10004-Aravind, Pritham	10001-Liu, Jingxiao
	Fall 2015	A1	10014-Zhao, Yusheng	10011-Feng, Christopher
	Fall 2016	A1	10009-Chen, Yiming	10006-Arora, Rajat
95702 - Financial Accounting	Fall 2013	A1	10014-Zhao, Yusheng	10001-Liu, Jingxiao
	Fall 2014	A1	10005-Bakert, Andrew	10002-Agarwal, Ajay
	Fall 2015	A1	10015-Zhao, Yiren	10012-Zhu, Di
	Fall 2016	A1	10015-Zhao, Yiren	10009-Chen, Yiming
	Fall 2016	A1	10022-Clarke, Dylan	10009-Chen, Yiming
	Fall 2016	A1	10022-Clarke, Dylan	10015-Zhao, Yiren
95703 - Database Mngt	Spring 2016	A1	10006-Arora, Rajat	10001-Liu, Jingxiao
	Spring 2016	A1	10011-Feng, Christopher	10001-Liu, Jingxiao
	Spring 2016	A1	10011-Feng, Christopher	10006-Arora, Rajat
95710 - Economic Analysis	Spring 2013	A2	10019-Cheng, Perry	10018-Bamforth, Gabriel
	Spring 2014	A2	10005-Bakert, Andrew	10004-Aravind, Pritham
	Spring 2015	A2	10019-Cheng, Perry	10015-Zhao, Yiren
95716 - Principles of Finance	Spring 2014	A2	10006-Arora, Rajat	10003-Ahn, Jungho
95723 - Machine Learning	Fall 2013	A2	10013-Zhou, Jiali	10012-Zhu, Di
	Fall 2014	A2	10010-Dennin, Luke	10009-Chen, Yiming
	Fall 2014	A2	10012-Zhu, Di	10009-Chen, Yiming
	Fall 2014	A2	10012-Zhu, Di	10010-Dennin, Luke

21 rows selected.

```

SQL>
SQL> SPOOL OUT

```

Question C:
Report Script:

```
DROP VIEW employeeTrainingSummary;
CREATE VIEW employeeTrainingSummary
AS
SELECT dept_Name AS department,
       employee.emp_ID || ' - ' || employee.emp_Lname || ', ' || employee.emp_Fname AS employee,
       (CASE
        WHEN employee.sup_ID IS NULL
        THEN NULL
        ELSE employee.sup_ID || ' - ' || sup.emp_Lname || ', ' || sup.emp_Fname
        END) AS supervisor,
       (CASE
        WHEN crs_Title IS NULL
        THEN NULL
        ELSE crs_Title || ', ' || sem_Cmpleted || ', ' || grade
        END) AS Training, score
FROM   department JOIN employee ON employee.dept_ID = department.dept_ID
       LEFT OUTER JOIN employee sup ON employee.sup_ID = sup.emp_ID
       LEFT OUTER JOIN training ON employee.emp_ID = training.emp_ID
       LEFT OUTER JOIN class USING(crs_ID,section,sem_Cmpleted)
       LEFT OUTER JOIN course USING(crs_ID)
       LEFT OUTER JOIN grade_Score USING(grade)

ORDER BY 1,2,3,4;
```

```
REM "Employee Training Information Report" created on November 29 2016
REM by user CASTEEL
SET FEEDBACK OFF LINESIZE 150 PAGESIZE 45
REM set up the appropriate parameters to increase readability
CLEAR COLUMNS
COLUMN employee      HEADING 'Employee|Number/Name'          FORMAT A30
COLUMN supervisor    HEADING 'Supervisor|Number/Name'        FORMAT A30 NULL 'Supervisor'
COLUMN department    HEADING 'Department|Number/Name'        FORMAT A25
COLUMN training       HEADING 'Training|Title/Semester/Grade' FORMAT A50 NULL 'No training'
COLUMN Score          HEADING 'GPA'                          FORMAT 0.99
TTITLE 'Employee Trainings'
BTITLE CENTER 'END of Employee Training Information Report' RIGHT 'Run By: Team#1'
BREAK ON department SKIP 1 ON employee SKIP 1 ON supervisor
COMPUTE COUNT LABEL 'Number of Classes (Emp)' OF training ON employee
COMPUTE AVG   LABEL 'Employee GPA' OF score ON employee
COMPUTE COUNT LABEL 'Number of Classes (Dept)' OF training ON department
COMPUTE AVG   LABEL 'Department GPA' OF score ON department
```

```
SPOOL C:\DBM\Project\Report_OUTPUT.TXT
SELECT department, employee, supervisor, training, score
FROM employeeTrainingSummary;
SPOOL OFF
```

```
CLEAR BREAK COLUMN COMPUTE
TTITLE OFF
BTITLE OFF
SET FEEDBACK ON LINESIZE 100 PAGESIZE 80
```

Question C:
Report Output:

```
SQL> SELECT department, employee, supervisor, training, score
2 FROM employeeTrainingSummary;
```

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Employee Trainings				
Department Number/Name	Employee Number/Name	Supervisor Number/Name	Training Title/Semester/Grade	GPA
Accounting	10018 - Bamforth, Gabriel	Supervisor	Economic Analysis, Spring 2013, A	4.00
	*****	*****	-----	-----
	Employee GPA			4.00
	Number of Classes (Emp)			1
	10019 - Cheng, Perry	10018 - Bamforth, Gabriel	Economic Analysis, Spring 2013, B	3.00
			Economic Analysis, Spring 2015, C-	1.67
	*****	*****	-----	-----
	Employee GPA			2.34
	Number of Classes (Emp)			2
	*****		-----	-----
	Department GPA			2.89
	Number of Classes (Dept)			3
Analytics	10022 - Clarke, Dylan	Supervisor	Financial Accounting, Fall 2016, B	3.00
	*****	*****	-----	-----
	Employee GPA			3.00
	Number of Classes (Emp)			1
	10023 - Cruz, Julissa	10022 - Clarke, Dylan	Professional Speaking, Fall 2016, B+	3.33
	*****	*****	-----	-----
	Employee GPA			3.33
	Number of Classes (Emp)			1
	*****		-----	-----
	Department GPA			3.17
	Number of Classes (Dept)			2
Consulting	10020 - Chirinos, Renato	Supervisor	No training	
	*****	*****	-----	-----
	Employee GPA			
	Number of Classes (Emp)			0
	10021 - Chukwuma, Obiano	10020 - Chirinos, Renato	No training	
	*****	*****	-----	-----
	Employee GPA			

END of Employee Training Information Report

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Employee Trainings

Department Number/Name	Employee Number/Name	Supervisor Number/Name	Training Title/Semester/Grade	GPA
Number of Classes (Emp)				0

Department GPA				
Number of Classes (Dept)				0
Customer Service	10008 - Chen, Dihong	Supervisor	No training	

Employee GPA				
Number of Classes (Emp)				0
	10009 - Chen, Yiming	10008 - Chen, Dihong	Financial Accounting, Fall 2016, R	0.00
			Machine Learning, Fall 2014, C	2.00
			Marketing Digital Media, Fall 2016, A	4.00

Employee GPA				2.00
Number of Classes (Emp)				3

Department GPA				2.00
Number of Classes (Dept)				3
Finance	10010 - Dennin, Luke	Supervisor	Machine Learning, Fall 2014, B	3.00

Employee GPA				3.00
Number of Classes (Emp)				1
	10011 - Feng, Christopher	10010 - Dennin, Luke	Database Mngt, Spring 2015, R	0.00
			Database Mngt, Spring 2016, B	3.00
			Marketing Digital Media, Fall 2015, C-	1.67

Employee GPA				1.56
Number of Classes (Emp)				3

Department GPA				1.92
Number of Classes (Dept)				4

END of Employee Training Information Report

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Employee Trainings

Department Number/Name	Employee Number/Name	Supervisor Number/Name	Training Title/Semester/Grade	GPA
Human Resources	10004 - Aravind, Pritham	Supervisor	Economic Analysis, Spring 2014, A	4.00
			Marketing Digital Media, Fall 2014, A	4.00

	Employee GPA			4.00
	Number of Classes (Emp)			2
	10005 - Bakert, Andrew	10004 - Aravind, Pritham	Economic Analysis, Spring 2014, B	3.00
			Financial Accounting, Fall 2014, B	3.00

	Employee GPA			3.00
	Number of Classes (Emp)			2

Department GPA				3.50
Number of Classes (Dept)				4
Manufacturing	10016 - Zhao, Xin	Supervisor	No training	

	Employee GPA			
	Number of Classes (Emp)			0
	10017 - Alla, Sharan	10016 - Zhao, Xin	Professional Writing, Fall 2015, R	0.00
			Professional Writing, Fall 2016, B	3.00

	Employee GPA			1.50
	Number of Classes (Emp)			2

Department GPA				1.50
Number of Classes (Dept)				2
Marketing	10001 - Liu, Jingxiao	Supervisor	Database Mngt, Spring 2014, C-	1.67
			Database Mngt, Spring 2016, A	4.00
			Financial Accounting, Fall 2013, B	3.00
			Marketing Digital Media, Fall 2013, A	4.00
			Marketing Digital Media, Fall 2014, A	4.00
	END of Employee Training Information Report			

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Employee Trainings

Department Number/Name	Employee Number/Name	Supervisor Number/Name	Training Title/Semester/Grade	GPA

	Employee GPA			3.33
	Number of Classes (Emp)			5
Marketing	10002 - Agarwal, Ajay	10001 - Liu, Jingxiao	Financial Accounting, Fall 2014, B	3.00
			Telecommunications Management, Spring 2016, A-	3.67

	Employee GPA			3.34
	Number of Classes (Emp)			2
	10003 - Ahn, Jungho	10001 - Liu, Jingxiao	Principles of Finance, Spring 2014, B+	3.33
			Professional Speaking, Fall 2014, R	0.00
			Professional Speaking, Fall 2015, B+	3.33

	Employee GPA			2.22
	Number of Classes (Emp)			3

Department GPA				3.00
Number of Classes (Dept)				10
Production	10012 - Zhu, Di	Supervisor	Financial Accounting, Fall 2015, B	3.00
			Machine Learning, Fall 2013, R	0.00
			Machine Learning, Fall 2014, A	4.00
			Telecommunications Management, Spring 2015, A-	3.67

	Employee GPA			2.67
	Number of Classes (Emp)			4
	10013 - Zhou, Jiali	10012 - Zhu, Di	Machine Learning, Fall 2013, B	3.00

	Employee GPA			3.00
	Number of Classes (Emp)			1

Department GPA				2.73
Number of Classes (Dept)				5
END of Employee Training Information Report				Run By: Team#1

Employee Trainings

Department Number/Name	Employee Number/Name	Supervisor Number/Name	Training Title/Semester/Grade	GPA			
Research and Development	10014 - Zhao, Yusheng	Supervisor	Financial Accounting, Fall 2013, B	3.00			
			Marketing Digital Media, Fall 2013, B-	2.67			
			Marketing Digital Media, Fall 2015, A	4.00			
	*****			-----	-----		
	Employee GPA				3.22		
	Number of Classes (Emp)				3		
	10015 - Zhao, Yiren	10014 - Zhao, Yusheng	Economic Analysis, Spring 2015, B	3.00			
			Financial Accounting, Fall 2015, R	0.00			
			Financial Accounting, Fall 2016, B	3.00			
	*****			-----	-----		
	Employee GPA				2.00		
	Number of Classes (Emp)				3		
*****			-----	-----			
Department GPA				2.61			
Number of Classes (Dept)				6			
Sales	10006 - Arora, Rajat	Supervisor	Database Mngt, Spring 2016, A	4.00			
			Marketing Digital Media, Fall 2016, R	0.00			
			Principles of Finance, Spring 2014, R	0.00			
	*****			-----	-----		
	Principles of Finance, Spring 2015, C			2.00			
	-----			-----	-----		
	Employee GPA				1.50		
	Number of Classes (Emp)				4		
	10007 - Chao, Shucheng	10006 - Arora, Rajat	No training	-----	-----		
						-----	-----
						-----	-----
	Employee GPA						
Number of Classes (Emp)				0			
*****			-----	-----			
Department GPA				1.50			
Number of Classes (Dept)				4			

END of Employee Training Information Report

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