

# BDD200NAA - Project 01

## 1. Application Description

Coursera is one of the famous companies to provide many people with learning opportunities to pursue their own major regardless of where they live in. Especially, the pandemic period boosted the demand for online learning or e-learning. Now that Coursera partners with more than 200 universities, more and more students, workers, and companies will also pay attention to their services in the future.

Various organizations such as universities and companies participate in the Coursera platform, and they provide learners with a variety of courses. A course stores various information, like course id, its name, its level, its description, a specific organization that offers its course, and a specific category that a course relates to. The course id is a primary key because each course id should not be duplicate. The organization and the category related to a specific course by defining an organization id and a category id as a foreign key, respectively.

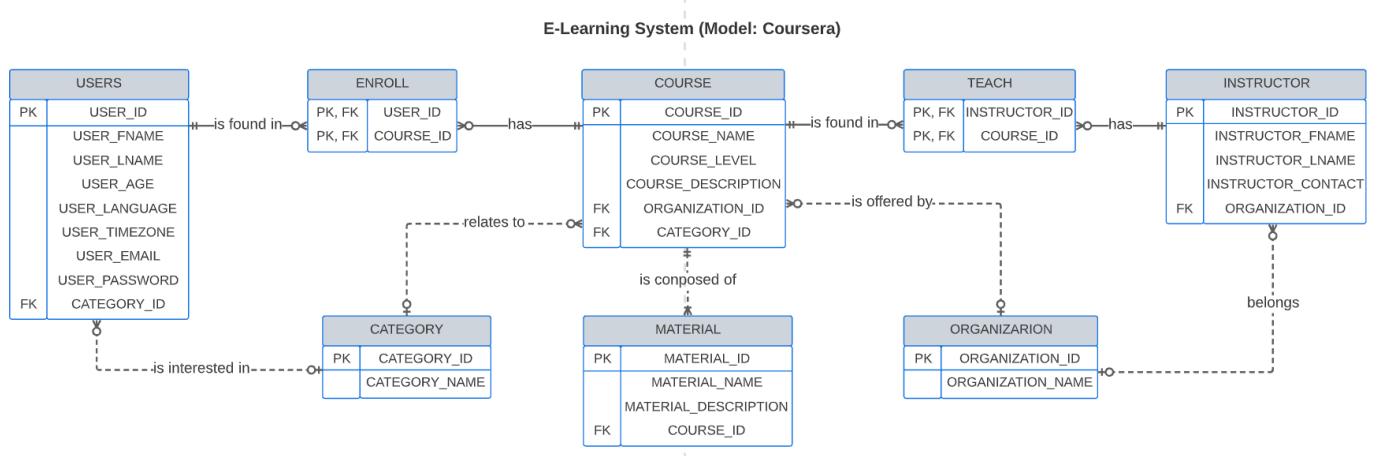
As for the category and organization entity, both have two information respectively: its id and its name. A category may relate to many courses and each course may be related to a specific category. An organization may offer many courses. Although each course can be offered by a specific organization, there is a case where a specific course is provided by only the personal instructor(s). Thus, it is likely that an organization id doesn't exist in the course entity.

Also, each course may be taught by multiple instructors and each instructor may teach various courses. The instructor entity has its id as a primary key, its first name, its last name, and an organization id that he/she belongs to.

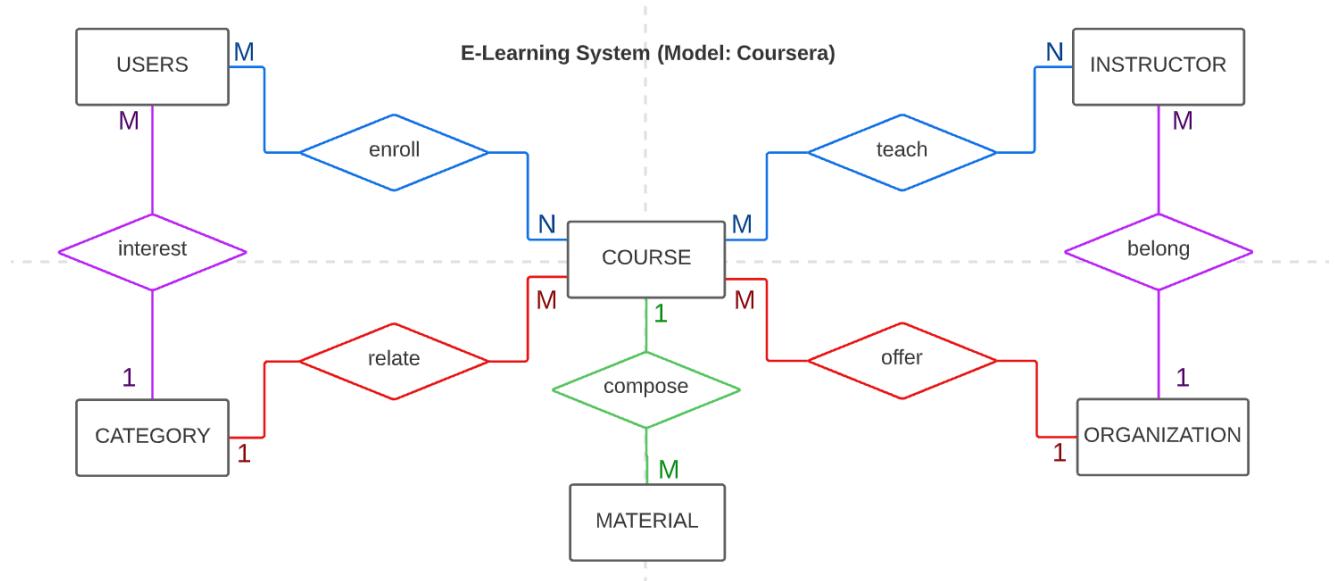
Each course must be composed of more than one unique material; it means that each material is not shared with other courses and must belong to a specific course. Thus, each material has the course id as a foreign key, as well as material id, its name, its description.

Lastly, each user may enroll in many courses and each course may be enrolled by many users. Each user has a lot of attributes, such as user id (primary key), first name, last name, age, language, time zone, email address, password, and a specific category. When a user signed in the Coursera, he/she was likely to choose one category as individual interest field. In other words, user entity may have category id as a foreign key.

## 2. ER Model



### 3. Schema Design



### 4. Database Construction

**Table:**  
**ORGANIZATION**

The screenshot shows the Oracle SQL Developer interface with two panes. The left pane displays the 'Connections' tree for 'BDD200' and the 'Script Output' pane showing the execution of a SQL script to create the 'ORGANIZATION' table and insert seven rows of data. The right pane shows the 'Welcome Page' for the 'ORGANIZATION' table, displaying its columns and data.

```

create table organization(
    organization_id number(6, 0) not null,
    organization_name varchar2(50) not null,
    constraint organization_pk primary key (organization_id)
);

INSERT ALL
INTO ORGANIZATION VALUES('1', 'Google')
INTO ORGANIZATION VALUES('2', 'IBM')
INTO ORGANIZATION VALUES('3', 'Microsoft')
INTO ORGANIZATION VALUES('4', 'University of Toronto')
INTO ORGANIZATION VALUES('5', 'University of Michigan')
INTO ORGANIZATION VALUES('6', 'Stanford University')
INTO ORGANIZATION VALUES('7', 'Johns Hopkins University')
SELECT * FROM dual;
  
```

Table ORGANIZATION created.  
7 rows inserted.

COLUMN_NAME	DATA_TYPE	NULLABLE	DATA_DEFAULT	COLUMN_ID	COMMENTS
ORGANIZATION_ID	NUMBER(6,0)	No	(null)	1	(null)
ORGANIZATION_NAME	VARCHAR2(50 BYTE)	No	(null)	2	(null)

**Table:**  
**CATEGORY**

The screenshot shows the Oracle SQL Developer interface with two panes. The left pane displays the 'Connections' tree for 'BDD200' and the 'Script Output' pane showing the execution of a SQL script to create the 'CATEGORY' table and insert five rows of data. The right pane shows the 'Welcome Page' for the 'CATEGORY' table, displaying its columns and data.

```

create table category(
    category_id number(6, 0) not null,
    category_name varchar2(50) not null,
    constraint category_pk primary key (category_id)
);

INSERT ALL
INTO CATEGORY VALUES('1', 'Data Science')
INTO CATEGORY VALUES('2', 'Business')
INTO CATEGORY VALUES('3', 'Computer Science')
INTO CATEGORY VALUES('4', 'Math')
INTO CATEGORY VALUES('5', 'Health')
SELECT * FROM dual;
  
```

Table CATEGORY created.  
5 rows inserted.

COLUMN_NAME	DATA_TYPE	NULLABLE	DATA_DEFAULT	COLUMN_ID	COMMENTS
CATEGORY_ID	NUMBER(6,0)	No	(null)	1	(null)
CATEGORY_NAME	VARCHAR2(50 BYTE)	No	(null)	2	(null)

Table:  
COURSE Part 1

```

CREATE TABLE COURSE (
    course_id NUMBER(4, 0) NOT NULL,
    course_name VARCHAR2(50) NOT NULL,
    course_level VARCHAR(20),
    course_description VARCHAR(500),
    organization_id NUMBER(4, 0),
    category_id NUMBER(4, 0),
    constraint course_pk primary key(course_id),
    constraint course_org_fk foreign key(organization_id) references organization(organization_id),
    constraint course_cat_fk foreign key(category_id) references category(category_id)
);

Table COURSE created.

1 INSERT ALL
INTO COURSE VALUES('1', 'Google Data Science', 'Beginner', 'The course, Google Data Science, is offered by Google, and its level is Beginner. You can learn about the field of Google Data Science.', '1', '1')
INTO COURSE VALUES('2', 'Data Science on Google Cloud', 'Advanced', 'The course, Data Science on Google Cloud, is offered by Google, and its level is Advanced. You can learn about the field of Data Science.', '2', '1')
INTO COURSE VALUES('3', 'How to Use Google Cloud on Business', 'Intermediate', 'The course, How to Use Google Cloud on Business, is offered by Google, and its level is Intermediate. You can learn about the field of Google Cloud on Business.', '3', '2')
INTO COURSE VALUES('4', 'Business Strategies', 'Advanced', 'The course, Business Strategies, is offered by Google, and its level is Advanced. You can learn about the field of Business.', '4', '2')
INTO COURSE VALUES('5', 'Introduction to Programming Languages', 'Beginner', 'The course, Introduction to Programming Languages, is offered by Google, and its level is Beginner. You can learn about the field of Computer Science.', '5', '1')
INTO COURSE VALUES('6', 'IBM Data Science', 'Beginner', 'The course, IBM Data Science, is offered by IBM, and its level is Beginner. You can learn about the field of Data Science.', '6', '1')
INTO COURSE VALUES('7', 'Applied Data Science with Python', 'Intermediate', 'The course, Applied Data Science with Python, is offered by IBM, and its level is Intermediate. You can learn about the field of Data Science.', '7', '2')
INTO COURSE VALUES('8', 'How to Use Excel for Data Analysis', 'Beginner', 'The course, How to Use Excel for Data Analysis, is offered by Microsoft, and its level is Beginner. You can learn about the field of Microsoft Excel.', '8', '1')
INTO COURSE VALUES('9', 'Business Analytics', 'Advanced', 'The course, Business Analytics, is offered by IBM, and its level is Advanced. You can learn about the field of Business.', '9', '2')
INTO COURSE VALUES('10', 'Computer Science', 'Intermediate', 'The course, Computer Science, is offered by IBM, and its level is Intermediate. You can learn about the field of Computer Science.', '10', '3')
INTO COURSE VALUES('11', 'Microsoft Data Science', 'Beginner', 'The course, Microsoft Data Science, is offered by Microsoft, and its level is Beginner. You can learn about the field of Data Science.', '11', '1')
INTO COURSE VALUES('12', 'How to Use Excel for Data Analysis', 'Beginner', 'The course, How to Use Excel for Data Analysis, is offered by Microsoft, and its level is Beginner. You can learn about the field of Data Science.', '12', '1')
INTO COURSE VALUES('13', 'Business Management Principles', 'Beginner', 'The course, Business Management Principles, is offered by Microsoft, and its level is Intermediate. You can learn about the field of Business.', '13', '2')
INTO COURSE VALUES('14', 'Business Analytics', 'Advanced', 'The course, Business Analytics, is offered by Microsoft, and its level is Advanced. You can learn about the field of Business.', '14', '2')
INTO COURSE VALUES('15', 'Introduction to Computer Science and Programming', 'Beginner', 'The course, Introduction to Computer Science and Programming, is offered by Microsoft, and its level is Beginner. You can learn about the field of Computer Science.', '15', '1')
INTO COURSE VALUES('16', 'Machine Learning Methods', 'Intermediate', 'The course, Machine Learning Methods, is offered by University of Toronto, and its level is Intermediate. You can learn about the field of Data Science.', '16', '2')
INTO COURSE VALUES('17', 'How to Learn New Business', 'Beginner', 'The course, How to Learn New Business, is offered by University of Toronto, and its level is Beginner. You can learn about the field of Business.', '17', '1')
INTO COURSE VALUES('18', 'Coding: C and C++', 'Intermediate', 'The course, Coding: C and C++, is offered by University of Toronto, and its level is Intermediate. You can learn about the field of Coding.', '18', '2')
INTO COURSE VALUES('19', 'Introduction to Linear Algebra', 'Beginner', 'The course, Introduction to Linear Algebra, is offered by University of Toronto, and its level is Beginner. You can learn about the field of Mathematics.', '19', '1')
INTO COURSE VALUES('20', 'Mathematics for Machine Learning', 'Intermediate', 'The course, Mathematics for Machine Learning, is offered by University of Toronto, and its level is Intermediate. You can learn about the field of Mathematics.', '20', '2')
INTO COURSE VALUES('21', 'Introduction to Data Science', 'Beginner', 'The course, Introduction to Data Science, is offered by University of Michigan, and its level is Beginner. You can learn about the field of Data Science.', '21', '1')
INTO COURSE VALUES('22', 'Project Management Principles', '(null)', 'The course, Project Management Principles, is offered by University of Michigan, and its level is Intermediate. You can learn about the field of Business.', '22', '2')
INTO COURSE VALUES('23', 'How to Create Algorithms in Python', 'Intermediate', 'The course, How to Create Algorithms in Python, is offered by University of Michigan, and its level is Intermediate. You can learn about the field of Python.', '23', '1')
INTO COURSE VALUES('24', 'History of Mathematics', 'Beginner', 'The course, History of Mathematics, is offered by University of Michigan, and its level is Beginner. You can learn about the field of Mathematics.', '24', '1')
INTO COURSE VALUES('25', 'Linear Regression', 'Beginner', 'The course, Linear Regression, is offered by University of Michigan, and its level is Beginner. You can learn about the field of Mathematics.', '25', '1')
INTO COURSE VALUES('26', 'Statistical Inference', 'Intermediate', 'The course, Statistical Inference, is offered by Stanford University, and its level is Intermediate. You can learn about the field of Mathematics.', '26', '2')
INTO COURSE VALUES('27', 'Mathematical Biostatistics', 'Advanced', 'The course, Mathematical Biostatistics, is offered by Stanford University, and its level is Advanced. You can learn about the field of Mathematics.', '27', '3')
INTO COURSE VALUES('28', 'Discrete Mathematics', 'Beginner', 'The course, Discrete Mathematics, is offered by Stanford University, and its level is Beginner. You can learn about the field of Mathematics.', '28', '1')
INTO COURSE VALUES('29', 'Importance of Healthcare', '(null)', 'The course, Importance of Healthcare, is offered by Stanford University, and its level is Intermediate. You can learn about the field of Healthcare.', '29', '2')
INTO COURSE VALUES('30', 'Biostatistics in Public Health', 'Intermediate', 'The course, Biostatistics in Public Health, is offered by Johns Hopkins University, and its level is Intermediate. You can learn about the field of Biostatistics.', '30', '3')
INTO COURSE VALUES('31', 'Covid19 Data Analysis', 'Advanced', 'The course, Covid19 Data Analysis, is offered by Johns Hopkins University, and its level is Advanced. You can learn about the field of Covid19 Data Analysis.', '31', '4')
INTO COURSE VALUES('32', 'Statistical Methods for Epidemiology', 'Intermediate', 'The course, Statistical Methods for Epidemiology, is offered by Johns Hopkins University, and its level is Intermediate. You can learn about the field of Epidemiology.', '32', '3')
INTO COURSE VALUES('33', 'Mental Health Risks of SNS', 'Beginner', 'The course, Mental Health Risks of SNS, is offered by Johns Hopkins University, and its level is Beginner. You can learn about the field of Health.', '33', '1')
INTO COURSE VALUES('34', 'Statistical Methods for Epidemiology', 'Intermediate', 'The course, Statistical Methods for Epidemiology, is offered by Johns Hopkins University, and its level is Intermediate. You can learn about the field of Epidemiology.', '34', '3')
INTO COURSE VALUES('35', 'Statistical Methods for Epidemiology', 'Beginner', 'The course, Statistical Methods for Epidemiology, is offered by Johns Hopkins University, and its level is Beginner. You can learn about the field of Epidemiology.', '35', '1')

SELECT * FROM dual;

```

35 rows inserted.

Table:  
COURSE Part 2

COLUMN_NAME	DATA_TYPE	NULLABLE	DATA_DEFAULT	COLUMN_ID	COMMENTS
1 COURSE_ID	NUMBER(6,0)	No	(null)	1 (null)	
2 COURSE_NAME	VARCHAR2(50 BYTE)	No	(null)	2 (null)	
3 COURSE_LEVEL	VARCHAR2(20 BYTE)	Yes	(null)	3 (null)	
4 COURSE_DESCRIPTION	VARCHAR2(500 BYTE)	Yes	(null)	4 (null)	
5 ORGANIZATION_ID	NUMBER(6,0)	Yes	(null)	5 (null)	
6 CATEGORY_ID	NUMBER(6,0)	Yes	(null)	6 (null)	

COURSE_ID	COURSE_NAME	COURSE_LEVEL	COURSE_DESCRIPTION	ORGANIZATION_ID	CATEGORY_ID
1	Google Data Science	Beginner	The course, Google Data Science, is offered by Google, and its level is Beginner. You can learn about the field of Google Data Science.	1	1
2	Data Science on Google Cloud	Advanced	The course, Data Science on Google Cloud, is offered by Google, and its level is Advanced. You can learn about the field of Data Science.	1	1
3	How to Use Google Cloud on Business	Intermediate	The course, How to Use Google Cloud on Business, is offered by Google, and its level is Intermediate. You can learn about the field of Google Cloud on Business.	2	2
4	Business Strategies	Advanced	The course, Business Strategies, is offered by Google, and its level is Advanced. You can learn about the field of Business.	3	2
5	Introduction to Programming Languages	Beginner	The course, Introduction to Programming Languages, is offered by Google, and its level is Beginner. You can learn about the field of Computer Science.	5	1
6	IBM Data Science	Beginner	The course, IBM Data Science, is offered by IBM, and its level is Beginner. You can learn about the field of Data Science.	6	1
7	Applied Data Science with Python	Intermediate	The course, Applied Data Science with Python, is offered by IBM, and its level is Intermediate. You can learn about the field of Data Science.	7	2
8	How to Use Excel for Data Analysis	Beginner	The course, How to Use Excel for Data Analysis, is offered by Microsoft, and its level is Beginner. You can learn about the field of Microsoft Excel.	8	1
9	Business Analytics	Advanced	The course, Business Analytics, is offered by IBM, and its level is Advanced. You can learn about the field of Business.	9	2
10	Computer Science	Intermediate	The course, Computer Science, is offered by IBM, and its level is Intermediate. You can learn about the field of Computer Science.	10	3
11	Microsoft Data Science	Beginner	The course, Microsoft Data Science, is offered by Microsoft, and its level is Beginner. You can learn about the field of Data Science.	11	1
12	How to Use Excel for Data Analysis	Beginner	The course, How to Use Excel for Data Analysis, is offered by Microsoft, and its level is Beginner. You can learn about the field of Microsoft Excel.	12	1
13	Business Management Principles	Intermediate	The course, Business Management Principles, is offered by Microsoft, and its level is Intermediate. You can learn about the field of Business.	13	2
14	Business Analytics	Advanced	The course, Business Analytics, is offered by Microsoft, and its level is Advanced. You can learn about the field of Business.	14	2
15	Introduction to Computer Science and Programming	Beginner	The course, Introduction to Computer Science and Programming, is offered by Microsoft, and its level is Beginner. You can learn about the field of Computer Science.	15	1
16	Machine Learning Methods	Intermediate	The course, Machine Learning Methods, is offered by University of Toronto, and its level is Intermediate. You can learn about the field of Data Science.	16	2
17	How to Launch New Business	Advanced	The course, How to Launch New Business, is offered by University of Toronto, and its level is Advanced. You can learn about the field of Business.	17	2
18	Coding: C and C++	Intermediate	The course, Coding: C and C++, is offered by University of Toronto, and its level is Intermediate. You can learn about the field of Coding.	18	3
19	Introduction to Linear Algebra	Beginner	The course, Introduction to Linear Algebra, is offered by University of Toronto, and its level is Beginner. You can learn about the field of Mathematics.	19	4
20	Mathematics for Machine Learning	Intermediate	The course, Mathematics for Machine Learning, is offered by University of Toronto, and its level is Intermediate. You can learn about the field of Mathematics.	20	4
21	Introduction to Data Science	Beginner	The course, Introduction to Data Science, is offered by University of Michigan, and its level is Beginner. You can learn about the field of Data Science.	21	1
22	Project Management Principles	(null)	The course, Project Management Principles, is offered by University of Michigan, and its level is Intermediate. You can learn about the field of Business.	22	2
23	How to Create Algorithms in Python	Intermediate	The course, How to Create Algorithms in Python, is offered by University of Michigan, and its level is Intermediate. You can learn about the field of Python.	23	1
24	History of Mathematics	Beginner	The course, History of Mathematics, is offered by University of Michigan, and its level is Beginner. You can learn about the field of Mathematics.	24	4
25	Linear Regression	Beginner	The course, Linear Regression, is offered by University of Michigan, and its level is Beginner. You can learn about the field of Mathematics.	25	4
26	Statistical Inference	Intermediate	The course, Statistical Inference, is offered by Stanford University, and its level is Intermediate. You can learn about the field of Mathematics.	26	4
27	Mathematical Biostatistics	Advanced	The course, Mathematical Biostatistics, is offered by Stanford University, and its level is Advanced. You can learn about the field of Mathematics.	27	4
28	Discrete Mathematics	Beginner	The course, Discrete Mathematics, is offered by Stanford University, and its level is Beginner. You can learn about the field of Mathematics.	28	4
29	Importance of Healthcare	(null)	The course, Importance of Healthcare, is offered by Stanford University, and its level is Intermediate. You can learn about the field of Healthcare.	29	5
30	Biostatistics in Public Health	Intermediate	The course, Biostatistics in Public Health, is offered by Johns Hopkins University, and its level is Intermediate. You can learn about the field of Biostatistics.	30	5
31	Covid19 Data Analysis	Advanced	The course, Covid19 Data Analysis, is offered by Johns Hopkins University, and its level is Advanced. You can learn about the field of Covid19 Data Analysis.	31	5
32	Statistical Methods for Epidemiology	Intermediate	The course, Statistical Methods for Epidemiology, is offered by Johns Hopkins University, and its level is Intermediate. You can learn about the field of Epidemiology.	32	5
33	Mental Health Risks of SNS	Beginner	The course, Mental Health Risks of SNS, is offered by Johns Hopkins University, and its level is Beginner. You can learn about the field of Health.	33	5

Table: MATERIAL Part 1

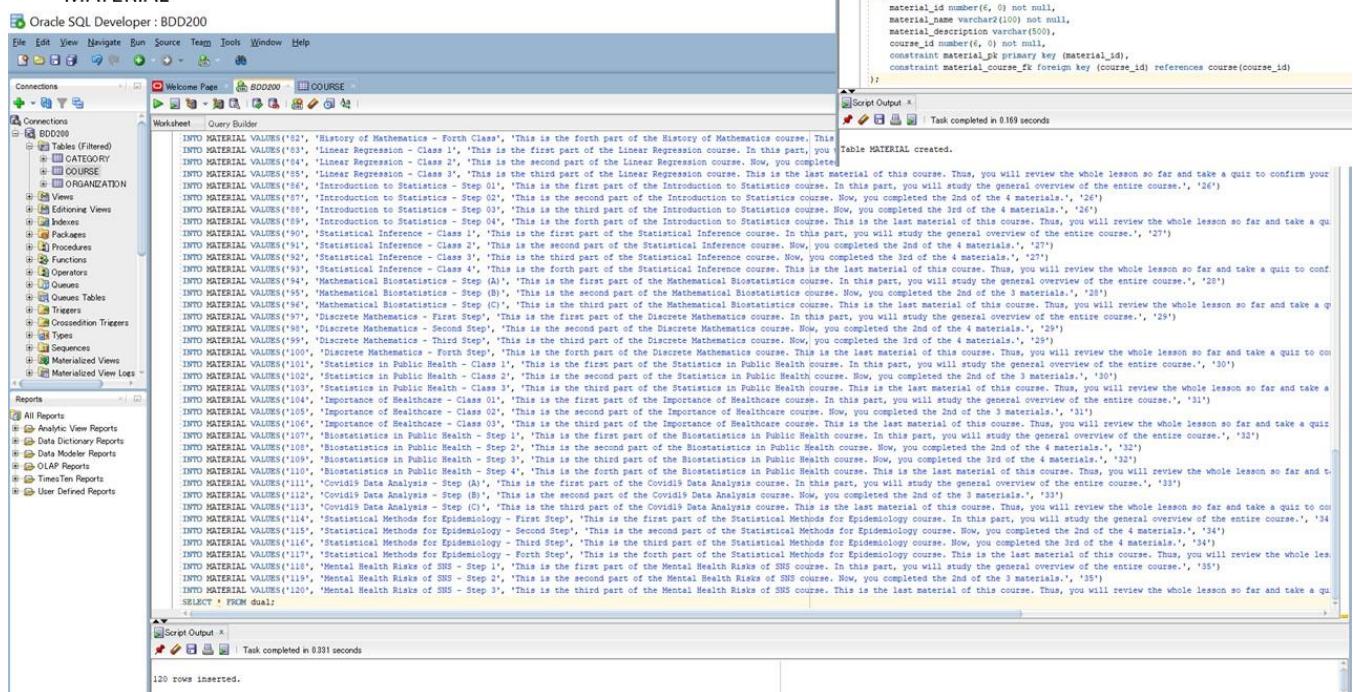


Table:  
MATERIAL Part 2

Table: MATERIAL	
Part 2	
Column	Data
1	Google Data Scie... This is the first part of the Goog...
2	Google Data Scie... This is the second part of the Goog...
3	Google Data Scie... This is the third part of the Goog...
4	4Data Science ... This is the first part of the Data...
5	5Data Science ... This is the second part of the Data...
6	6Data Science ... This is the third part of the Data...
7	7How to Use Googl... This is the first part of the How...
8	8How to Use Googl... This is the second part of the How...
9	9How to Use Googl... This is the third part of the How...
10	10Business Strateg... This is the first part of the Busi...
11	11Business Strateg... This is the second part of the Busi...
12	12Business Strateg... This is the third part of the Busi...
13	13Introduction to ... This is the first part of the Intr...
14	14Introduction to ... This is the second part of the Intr...
15	15Introduction to ... This is the third part of the Intr...
16	16Introduction to ... This is the forth part of the Intr...
17	17IBM Data Science... This is the first part of the IBM...
18	18IBM Data Science... This is the second part of the IBM...
19	19IBM Data Science... This is the third part of the IBM...
20	20Applied Data Sci... This is the first part of the Appl...
21	21Applied Data Sci... This is the second part of the Appl...
22	22Applied Data Sci... This is the third part of the Appl...
23	23Introduction to ... This is the first part of the Intr...
24	24Introduction to ... This is the second part of the Intr...
25	25Introduction to ... This is the third part of the Intr...
26	26Introduction to ... This is the forth part of the Intr...
27	27Business Analyti... This is the first part of the Busin...
28	28Business Analyti... This is the second part of the Busin...
29	29Business Analyti... This is the third part of the Busin...
30	30Computer Science... This is the first part of the Comp...
31	31Computer Science... This is the second part of the Comp...
32	32Computer Science... This is the third part of the Comp...
33	33Computer Science... This is the forth part of the Comp...
34	34Microsoft Data S... This is the first part of the Micr...
35	35Microsoft Data S... This is the second part of the Micr...
36	36Microsoft Data S... This is the third part of the Micr...
37	37How to use Excel... This is the first part of the How...
38	38How to use Excel... This is the second part of the How...
39	39How to use Excel... This is the third part of the How...
40	40How to use Excel... This is the forth part of the How...
41	41How to use Excel... This is the fifth part of the How...
42	42Business Managem... This is the second part of the Busi...
43	43Business Managem... This is the third part of the Busi...
44	44Business Analytics... This is the first part of the Busi...
45	45Business Analytics... This is the second part of the Busi...
46	46Business Analytics... This is the third part of the Busi...
47	47Business Analytics... This is the forth part of the Busi...
48	48Introduction to Co... This is the first part of the Intr...
49	49Introduction to Co... This is the second part of the Intr...
50	50Introduction to Co... This is the third part of the Intr...
51	51Introduction to Co... This is the forth part of the Intr...
52	52Machine Learning M... This is the first part of the Mach...
53	53Machine Learning M... This is the second part of the Mach...
54	54Machine Learning M... This is the third part of the Mach...
55	55How to launch New ... This is the first part of the How...
56	56How to launch New ... This is the second part of the How...
57	57How to launch New ... This is the third part of the How...
58	58Coding C and C++ ... This is the first part of the Cod...
59	59Coding C and C++ ... This is the second part of the Cod...
60	60Coding C and C++ ... This is the third part of the Cod...
61	61Introduction to Li... This is the first part of the Intr...
62	62Introduction to Li... This is the second part of the Intr...
63	63Introduction to Li... This is the third part of the Intr...
64	64Introduction to Li... This is the forth part of the Intr...
65	65Mathematics for Ma... This is the first part of the Math...
66	66Mathematics for Ma... This is the second part of the Math...
67	67Mathematics for Ma... This is the third part of the Math...
68	68Introduction to De... This is the first part of the Intr...
69	69Introduction to De... This is the second part of the Intr...
70	70Introduction to De... This is the third part of the Intr...
71	71Introduction to De... This is the forth part of the Intr...
72	72Project Management... This is the first part of the Proj...
73	73Project Management... This is the second part of the Proj...
74	74Project Management... This is the third part of the Proj...
75	75Project Management... This is the forth part of the Proj...
76	76How to create Algo... This is the first part of the How...
77	77How to create Algo... This is the second part of the How...
78	78How to create Algo... This is the third part of the How...
79	79History of Mathema... This is the first part of the Hist...
80	80History of Mathema... This is the second part of the Hist...
81	81History of Mathema... This is the third part of the Hist...
82	82History of Mathema... This is the forth part of the Hist...
83	83Linear Regression ... This is the first part of...
84	84Linear Regression ... This is the second part of...
85	85Linear Regression ... This is the third part of...
86	86Introduction to Sta... This is the first part of...
87	87Introduction to Sta... This is the second part of...
88	88Introduction to Sta... This is the third part of...
89	89Introduction to Sta... This is the forth part of...
90	90Statistical Inferen... This is the first part of...
91	91Statistical Inferen... This is the second part of...
92	92Statistical Inferen... This is the third part of...
93	93Statistical Inferen... This is the forth part of...
94	94Mathematical Biostat... This is the first part of...
95	95Mathematical Biostat... This is the second part of...
96	96Mathematical Biostat... This is the third part of...
97	97Discrete Mathematic... This is the first part of...
98	98Discrete Mathematic... This is the second part of...
99	99Discrete Mathematic... This is the third part of...
100	100Discrete Mathematic... This is the forth part of...
101	101Statistics in Publis... This is the first part of...
102	102Statistics in Publis... This is the second part of...
103	103Statistics in Publis... This is the third part of...
104	104Importance of Healt... This is the first part of...
105	105Importance of Healt... This is the second part of...
106	106Importance of Healt... This is the third part of...
107	107Biostatistics in Pu... This is the first part of...
108	108Biostatistics in Pu... This is the second part of...
109	109Biostatistics in Pu... This is the third part of...
110	110Biostatistics in Pu... This is the forth part of...
111	111COVID19 Data Analys... This is the first part of...
112	112COVID19 Data Analys... This is the second part of...
113	113COVID19 Data Analys... This is the third part of...
114	114Statistical Methods... This is the first part of...
115	115Statistical Methods... This is the second part of...
116	116Statistical Methods... This is the third part of...
117	117Statistical Methods... This is the forth part of...
118	118Mental Health Risks... This is the first part of...
119	119Mental Health Risks... This is the second part of...
120	120Mental Health Risks... This is the third part of...

**Table:**  
**USERS**

```

CREATE TABLE users (
    user_id NUMBER(6,0) NOT NULL,
    user_name VARCHAR2(20) NOT NULL,
    user_iname VARCHAR2(20) NOT NULL,
    user_age NUMBER(3,0),
    user_language VARCHAR2(20) NOT NULL,
    user_timezone VARCHAR2(30),
    user_email VARCHAR2(30) NOT NULL,
    user_password VARCHAR2(20) NOT NULL,
    category_id NUMBER(6,0),
    CONSTRAINT user_pk PRIMARY KEY (user_id),
    CONSTRAINT user_cat_fk FOREIGN KEY (category_id) REFERENCES category (category_id)
);

```

**Table:**  
**USERS**

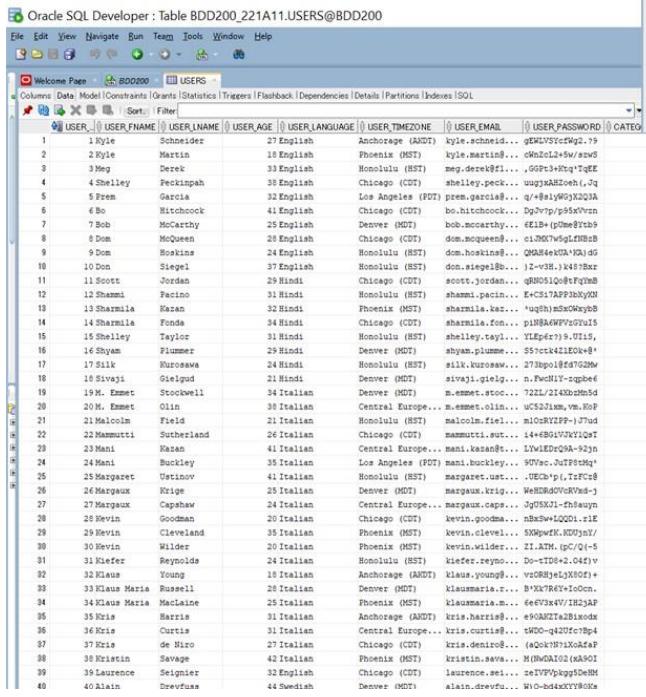
```

INSERT INTO users VALUES('2301', 'Matthew', '26', 'English', 'Matthew@matrix.com', '9345B23F4aXd', '5')
INSERT INTO users VALUES('2301', 'Clinton', '23', 'English', 'Clinton@matrix.com', '4560c0Dm-009', '1')
INSERT INTO users VALUES('2321', 'Clinton', '23', 'English', 'Clinton.Chapman@matrix.com', '4560c0Dm-009', '1')
INSERT INTO users VALUES('2321', 'Clinton', '23', 'English', 'Clinton.Chapman@matrix.com', '4560c0Dm-009', '1')
INSERT INTO users VALUES('2331', 'Eric', '37', 'English', 'Eric.Prasanth@attile.com', '1Q1U1fWgYjXN8', '3')
INSERT INTO users VALUES('2331', 'Ingrid', '26', 'English', 'Phoenix@HSTI', 'Ingrid.Welles@steel.com', 'T8097pS7TpqP0V', '3')
INSERT INTO users VALUES('2351', 'Ingrid', '26', 'English', 'Phoenix@HSTI', 'Ingrid.Welles@steel.com', 'T8097pS7TpqP0V', '3')
INSERT INTO users VALUES('2361', 'Cliff', '32', 'English', 'Honolulu@HSTI', 'Cliff.puri@coramran.com', 'W0pgyQub,I9w', '2')
INSERT INTO users VALUES('2371', 'Emily', '24', 'English', 'Emily@matrix.com', '1Q1U1fWgYjXN8', '4')
INSERT INTO users VALUES('2371', 'Hannah', '43', 'English', 'Hannah@matrix.com', '1Q1U1fWgYjXN8', '4')
INSERT INTO users VALUES('2381', 'Liam', '20', 'English', 'Liam@matrix.com', '1Q1U1fWgYjXN8', '4')
INSERT INTO users VALUES('2381', 'Cyrill', '37', 'English', 'Chicago@CDT', 'cyrill.laughlin@der.com', '4560c0Dm-009', '1')
INSERT INTO users VALUES('2391', 'Cyrill', '37', 'English', 'Chicago@CDT', 'cyrill.laughlin@der.com', '4560c0Dm-009', '1')
INSERT INTO users VALUES('2411', 'Cynthia', '37', 'English', 'Honolulu@HSTI', 'cynthia.collins@pdwt.com', '4560c0Dm-009', '4')
INSERT INTO users VALUES('2421', 'Cynthia', '40', 'English', 'Phoenix@HSTI', 'cynthia.collins@pdwt.com', '1B3gj45k34kEV', '4')
INSERT INTO users VALUES('2431', 'Luchino', '27', 'English', 'Denver@MDT', 'luchino.bradford@pdwt.com', 'rd3gelypp97V3Y', '4')
INSERT INTO users VALUES('2441', 'Luchino', '27', 'English', 'Denver@MDT', 'luchino.bradford@pdwt.com', 'rd3gelypp97V3Y', '4')
INSERT INTO users VALUES('2451', 'Luchino', '27', 'English', 'Los Angeles@EST', 'luchino.bradford@pdwt.com', 'rd3gelypp97V3Y', '4')
INSERT INTO users VALUES('2461', 'Robin', '35', 'English', 'Chicago@CDT', 'robin.danen@phainopepla.com', '(5e5d92m6,BD)', '1')
INSERT INTO users VALUES('2471', 'Orson', '40', 'English', 'Chicago@CDT', 'orson.perkins@pdwt.com', '4560c0Dm-009', '1')
INSERT INTO users VALUES('2481', 'Orson', '40', 'English', 'Chicago@CDT', 'orson.perkins@pdwt.com', '4560c0Dm-009', '1')
INSERT INTO users VALUES('2491', 'Bryan', '38', 'English', 'Honolulu@HSTI', 'bryan.hanson@pyrholoxia.com', 'fQgRfK8zJ7Q0M', '4')
INSERT INTO users VALUES('2511', 'Blake', '35', 'English', 'Phoenix@HSTI', 'blake.masterson@pdwt.com', '4560c0Dm-009', '1')
INSERT INTO users VALUES('2521', 'Bob', '33', 'Hindi', 'Bangalore@INDT', 'bob.singh@pdwt.com', '906edc94d0f', '1')
INSERT INTO users VALUES('2531', 'Bob', '33', 'Hindi', 'Honolulu@HSTI', 'bob.singh@pdwt.com', '906edc94d0f', '1')
INSERT INTO users VALUES('2541', 'Brian', '36', 'Hindi', 'India Standard Time (IST)', 'brian.douglas@voce.com', 'e8c83OpJaPf1z', '1')
INSERT INTO users VALUES('2551', 'Brian', '34', 'Hindi', 'India Standard Time (IST)', 'brian.baldwin@card.com', 'e8c83OpJaPf1z', '1')
INSERT INTO users VALUES('2561', 'Brooke', '37', 'Hindi', 'India Standard Time (IST)', 'brooke.michalow@pdwt.com', 'fWf6,ghAE7wLEz', '1')
INSERT INTO users VALUES('2571', 'Brooke', '37', 'Hindi', 'India Standard Time (IST)', 'brooke.michalow@pdwt.com', 'fWf6,ghAE7wLEz', '1')
INSERT INTO users VALUES('2581', 'Bruce', '20', 'Hindi', 'Denver@MDT', 'bruce.dunaway@jumco.com', 'gHw7ZQwvW,b', '2')
INSERT INTO users VALUES('2591', 'Bruce', '20', 'Hindi', 'Denver@MDT', 'bruce.dunaway@jumco.com', 'gHw7ZQwvW,b', '2')
INSERT INTO users VALUES('2601', 'Bruno', '18', 'Hindi', 'Denver@MDT', 'bruno.montana@pdwt.com', 'W7114z92B0Q3Vn', '1')
INSERT INTO users VALUES('2611', 'Burt', '26', 'Hindi', 'Phoenix@HSTI', 'burt.spielberg@trogen.com', 'V9Vfizul,VtJ,zB', '3')
INSERT INTO users VALUES('2621', 'Burt', '22', 'Hindi', 'Chicago@CDT', 'burt.spielberg@trogen.com', 'V9Vfizul,VtJ,zB', '3')
INSERT INTO users VALUES('2631', 'C', '23', 'Hindi', 'Chicago@CDT', 'c.burke@pdwt.com', 'd1h1hQQuze', '1')
INSERT INTO users VALUES('2641', 'C', '23', 'Hindi', 'Chicago@CDT', 'c.burke@pdwt.com', 'd1h1hQQuze', '1')
INSERT INTO users VALUES('2651', 'Buster', '44', 'Hindi', 'Los Angeles@EST', 'buster.jackson@lakshmi.com', '1Q1U1fWgYjXN8', '5')
INSERT INTO users VALUES('2661', 'Buster', '44', 'Hindi', 'Honolulu@HSTI', 'buster.hogart@lakshmi.com', 'b+vgpyCvQw97', '1')
INSERT INTO users VALUES('2671', 'C', 'Thomas', '29', 'Hindi', 'Phoenix@HSTI', 'c.thomas.nolte@phoebe.com', 'X7aueqGnQ705', '2')
INSERT INTO users VALUES('2681', 'Daniel', '23', 'Hindi', 'Los Angeles@EST', 'daniel.loren@redstart.com', 'z72E02xmb,C2', '2')
INSERT INTO users VALUES('2691', 'Daniel', '23', 'Chinese', 'China Standard Time (CST)', 'daniel.guiney@redpoll.com', 'R3y0117W3jcg3l', '3')
SELECT * FROM dual;

```

269 rows inserted.

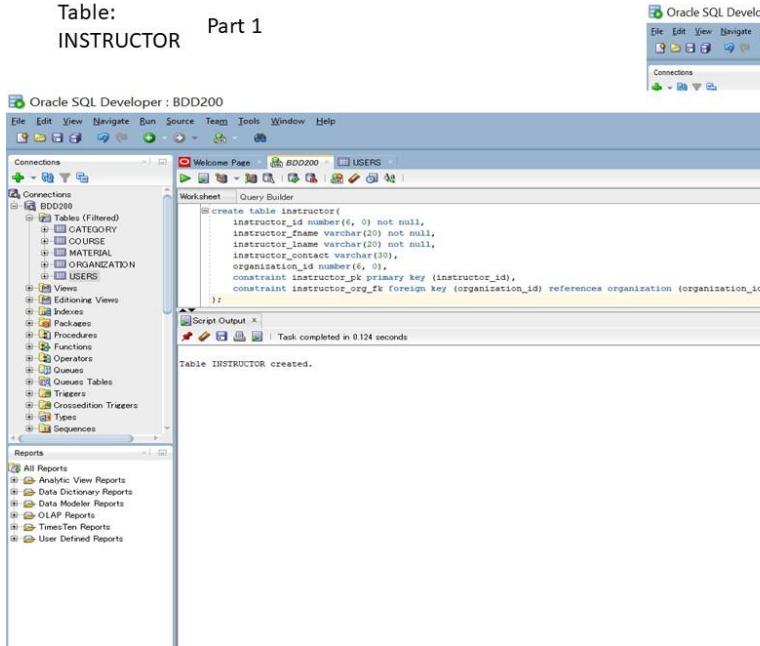
**Table:**  
**Part 3**



The screenshot shows the Oracle SQL Developer interface with the 'Welcome Page' selected. The connection is set to 'BDD200'. The 'USERS' table is currently selected. The table has 9 columns: USER\_ID, FIRST\_NAME, LAST\_NAME, AGE, LANGUAGE, TIMEZONE, EMAIL, and CATEGORY\_ID. The data consists of 40 rows of user information, including names like Kyle Schneider, Martin Hitchcock, and Maureen Chapman.

USER_ID	FIRST_NAME	LAST_NAME	AGE	LANGUAGE	TIMEZONE	EMAIL	CATEGORY_ID
1	Kyle	Schneider	27	English	Anchorage (ADT)	kyle.schneid...@globe360.com	1
2	Kyle	Martin	18	English	Phoenix (MST)	kyle.martin...@cn2k12.com	2
3	Meg	Derek	33	English	Honolulu (HST)	meg.derek@f...@globe360.com	3
4	Shelley	Peckinpah	38	English	Chicago (CDT)	shelley.peck...@wugj3mzoh.com	4
5	Freddie	Garcia	32	English	Los Angeles (PDT)	freddie.garcia...@qslly95x203.com	5
6	Bob	Hitchcock	41	English	Chicago (CDT)	bob.hitchcock...@dg7v9px9tvn.com	6
7	Bob	McCarthy	25	English	Denver (MDT)	bob.mcCarthy...@f181.p@met97ab.com	7
8	Dom	McQueen	28	English	Chicago (CDT)	dom.mcqueen...@ci1907wsgf9fb8.com	8
9	Dom	Hoskins	24	English	Honolulu (HST)	dom.hoskins...@QMSA8eXVA1d9.com	9
10	Don	Siegel	37	English	Honolulu (HST)	don.siegel@...@globe360.com	10
11	Scott	Jordan	29	English	Chicago (CDT)	scott.jordan...@globe360.com	11
12	D. Sharmi	Pacino	31	English	Honolulu (HST)	d.sharmi.pacino...@E-CS17APF9XhXN.com	12
13	Sharmila	Kazan	32	English	Phoenix (MST)	sharmila.kaz...@uqlhj3mzKwY8B.com	13
14	A. Sharmila	Fonda	34	English	Chicago (CDT)	a.sharmila.fonda...@piN8AW9V9H915.com	14
15	Shelley	Taylor	31	English	Honolulu (HST)	shelley.tay...@YL8pfrt9.9.U15.com	15
16	I. Shyam	Plumer	29	English	Denver (MDT)	i.shyam.plumer...@59cc42120k8.com	16
17	T. Silk	Eurosawa	24	English	Honolulu (HST)	t.silk.eurosaw...@27Bp0lf8GZGMW.com	17
18	S. Sivaji	Gielgud	21	English	Denver (MDT)	s.sivaji.gielg...@pHv1V-gpbed.com	18
19	J. Emmet	Stockwell	34	Italian	Denver (MDT)	j.emmet.stock...@m.emmett.olin...@globe360.com	19
20	M. Emmet	Olin	38	Italian	Central Europe...	m.emmett.olin...@72L21k20hM5d.com	20
21	Malcolm	Field	21	Italian	Honolulu (HST)	malcolm.field...@m0d2121pp77h.com	21
22	D. Mammuti	Sutherland	26	Italian	Chicago (CDT)	d.mammuti.ust...@14+8qUvXV7Q1297.com	22
23	M. Kazan	Reynolds	41	Italian	Central Europe...	m.kazan.reyno...@LW1EdzQ9-52jn.com	23
24	M. Buckley	Buckley	35	Italian	Los Angeles (PDT)	m.buckley...@907e..@J7T9tm.com	24
25	M. Margaret	Ustinov	41	Italian	Honolulu (HST)	m.margaret.ust...@JED9p1,TzCt8.com	25
26	M. Margaux	Krige	25	Italian	Denver (MDT)	m.margaux.krige...@HOMEdR9vJd-j.com	26
27	M. Margaux	Cashew	24	Italian	Central Europe...	m.margaux.cashew...@jG5X1l-fhauyn.com	27
28	R. Kevin	Goodman	20	Italian	Chicago (CDT)	r.kevin.goodma...@9+M4W+Q2Qn.r1Z.com	28
29	R. Kevin	Cleveland	35	Italian	Phoenix (MST)	r.kevin.cleveland...@5DqWfK.MDfJn7.com	29
30	R. Kevin	Wilder	20	Italian	Phoenix (MST)	r.kevin.wilder...@21.ATN.pc/Q-5.com	30
31	K. Kiefer	Reynolds	24	Italian	Honolulu (HST)	k.kiefer.reym...@Do-1TD9+2.041v.com	31
32	K. Young	Young	18	Italian	Anchorage (ADT)	k.young.you...@V2GR8jxjy8C01.com	32
33	K. Klaus Maria	Russell	28	Italian	Denver (MDT)	klaus.maria...@BxV9R7Rv1Jocn.com	33
34	K. Klaus Maria	MacLaine	25	Italian	Phoenix (MST)	klaus.maria...@e+eV7v3v7/X2fAP.com	34
35	Kris	Harris	31	Italian	Anchorage (ADT)	kris.harris...@+HQMzTA2Bixnd.com	35
36	Kris	Curtis	31	Italian	Central Europe...	kris.curts...@tHO-Q1207v7hp4.com	36
37	Kris	de Niro	27	Italian	Chicago (CDT)	kris.de.niro...@4Qk197Ix0afap.com	37
38	Kristin	Savage	42	Italian	Phoenix (MST)	kristin.sava...@M!W9GA102@AHOI.com	38
39	Laurence	Seigner	32	English	Chicago (CDT)	laurence.sei...@zeIV7pVkgp0emHn.com	39
40	Alain	Dreyfuss	44	Swedish	Denver (MDT)	alain.dreyfu...@W-o2d4xXY79Ks.com	40

**Table:**  
**Part 1**



The screenshot shows the Oracle SQL Developer interface with the 'Welcome Page' selected. The connection is set to 'BDD200'. The 'INSTRUCTOR' table is currently selected. The table has 17 columns: INSTRUCTOR\_ID, FIRST\_NAME, LAST\_NAME, AGE, LANGUAGE, TIMEZONE, EMAIL, ORGANIZATION\_ID, and INSTRUCTOR\_PK. The data consists of 50 rows of instructor information, including names like Kathy Preashavani and Donald Hunter.

INSTRUCTOR_ID	FIRST_NAME	LAST_NAME	AGE	LANGUAGE	TIMEZONE	EMAIL	ORGANIZATION_ID	INSTRUCTOR_PK
1	Kathy	Preashavani	35	English	Anchorage (ADT)	kathy.preashavani.com	'2'	
2	Heisen	Neeson	50	English	Phoenix (MST)	heisen.nees...@graham.neeson@bullet.com	'2'	
3	Jean	Chapman	22	English	Chicago (CDT)	jean.chapm...@clint.chap...@q485+q2d5-M60.com	'3'	
4	Eric	Stoltz	27	English	Denver (MDT)	eric.stoltz...@clint.pie...@q485+q2d5-M60.com	'4'	
5	Eric	Stoltz	33	English	Chicago (CDT)	eric.stoltz...@12U13Pwv9yKHEB.com	'5'	
6	Ingrid	Whaleys	35	English	Phoenix (MST)	ingrid.wha...@ingrid.w...@q485+q2d5-M60.com	'6'	
7	Cliff	Puris	27	English	Los Angeles (PDT)	cliff.puri...@hRpSpL8C7C0Pz.com	'7'	
8	Emily	Pollack	32	English	Denver (MDT)	emily.polla...@WpqyQub.J.196.com	'8'	
9	Fritz	Hackman	35	English	Honolulu (HST)	fritz.hack...@M6DyWkVqyHkEMB.com	'9'	
10	Eric	Collins	34	English	Chicago (CDT)	eric.collins...@q8bll.la...@q485+q2d5-M60.com	'10'	
11	Corinne	Collins	37	English	Chicago (CDT)	corinne.col...@q8bll.la...@q485+q2d5-M60.com	'11'	
12	Maureen	Chapman	35	English	Phoenix (MST)	maureen.chap...@maureen.chap...@q485+q2d5-M60.com	'12'	
13	John	Dickinson	32	English	Los Angeles (PDT)	john.dicki...@s8d45Pwv97P93.com	'13'	
14	Lorraine	Jordan	27	English	Denver (MDT)	lorraine.jor...@lucino.jor...@q485+q2d5-M60.com	'14'	
15	John	Lucino	24	English	Chicago (CDT)	john.lucino...@lucino.jor...@q485+q2d5-M60.com	'15'	
16	John	Lucino	31	English	Los Angeles (PDT)	john.lucino...@Dy8Pwv97yKtHc.com	'16'	
17	Bob	Sharif	35	English	Los Angeles (PDT)	bob.shari...@DyPC7yH8Dydb.com	'17'	
18	Donald	Hunter	34	English	India Standard...	donald.hun...@brian.dou...@q8HCQDyJwF0lir.com	'18'	
19	Donald	Hunter	35	English	Chicago (CDT)	donald.hun...@brian.hun...@q8HCQDyJwF0lir.com	'19'	
20	Donald	Hunter	37	English	India Standard...	donald.hun...@brooke.mi...@q484+q2d5-M60.com	'20'	
21	Donald	Hunter	40	English	Honolulu (HST)	donald.hun...@bruce.hun...@q484+q2d5-M60.com	'21'	
22	Donald	Hunter	33	English	Anchorage (ADT)	donald.hun...@black.nas...@q484+q2d5-M60.com	'22'	
23	Donald	Hunter	31	English	Anchorage (ADT)	donald.hun...@bruno.elet...@q484+q2d5-M60.com	'23'	
24	Bob	Sharif	32	English	Honolulu (HST)	bob.shari...@h8aIzyvveuAC.com	'24'	
25	Bob	Sharif	34	English	Los Angeles (PDT)	bob.shari...@DyPC7yH8Dydb.com	'25'	
26	Bob	Burt	26	English	Chicago (CDT)	bob.burt...@burt.spie...@q484+q2d5-M60.com	'26'	
27	Burt	Spielberg	26	English	Chicago (CDT)	burt.spie...@C7WUv+vn+mt7Pm.com	'27'	
28	Brian	Neeson	32	English	Anchorage (ADT)	brian.neeso...@d181B0DUtQ0nE.com	'28'	
29	Brian	Neeson	37	English	Anchorage (ADT)	brian.neeso...@buster.jac...@q484+q2d5-M60.com	'29'	
30	Brian	Neeson	44	English	Los Angeles (PDT)	brian.neeso...@Lw4Kq4m1+re4d.com	'30'	
31	Brian	Neeson	20	English	Bruce (MDT)	brian.neeso...@bruce.duna...@q484+q2d5-M60.com	'31'	
32	Brian	Neeson	20	English	India Standard...	brian.neeso...@bruno.elet...@q484+q2d5-M60.com	'32'	
33	Brian	Neeson	18	English	Denver (MDT)	brian.neeso...@BBB9fPwv97D17y	'33'	
34	Brian	Neeson	28	English	Phoenix (MST)	brian.neeso...@bry...@q484+q2d5-M60.com	'34'	
35	Brian	Neeson	26	English	Chicago (CDT)	brian.neeso...@C7WUv+vn+mt7Pm.com	'35'	
36	Brian	Neeson	37	English	India Standard...	brian.neeso...@brooke.mi...@q484+q2d5-M60.com	'36'	
37	Brian	Neeson	44	English	Honolulu (HST)	brian.neeso...@bruce.hun...@q484+q2d5-M60.com	'37'	
38	Brian	Neeson	20	English	India Standard...	brian.neeso...@bruno.elet...@q484+q2d5-M60.com	'38'	
39	Brian	Neeson	29	English	Phoenix (MST)	brian.neeso...@C7WUv+vn+mt7Pm.com	'39'	
40	Brian	Neeson	32	English	Chicago (CDT)	brian.neeso...@bry...@q484+q2d5-M60.com	'40'	
41	Julian	Lang	24	English	Phoenix (MST)	julian.lang@halcyone.com	'41'	
42	Hal	Stone	24	English	Chicago (CDT)	hal.stone...@hal.stone...@q484+q2d5-M60.com	'42'	
43	Malcolm	Broderick	24	English	Chicago (CDT)	malcolm.broderick@pioneer.com	'43'	
44	Malcolm	Broderick	25	English	Phoenix (MST)	malcolm.broderick@pioneer.com	'44'	
45	Mary	Lemon	49	English	Phoenix (MST)	m...@mary.lemonpuffin.com	'45'	
46	Mary	Collins	48	English	Chicago (CDT)	m...@mary.collins@pyrmaloxia.com	'46'	
47	Mary	Collins	33	English	Chicago (CDT)	m...@mary.collins@pyrmaloxia.com	'47'	
48	Mary	Collins	38	English	Chicago (CDT)	m...@mary.collins@pyrmaloxia.com	'48'	
49	Mary	Collins	39	English	Chicago (CDT)	m...@mary.collins@pyrmaloxia.com	'49'	
50	Freida	Whitcraft	44	English	Chicago (CDT)	freida.whitcraf...@andiper.com	'50'	
51	Freida	Whitcraft	31	English	Chicago (CDT)	freida.whitcraf...@andiper.com	'51'	
52	Freida	Whitcraft	40	English	Chicago (CDT)	freida.whitcraf...@andiper.com	'52'	
53	Freida	Whitcraft	45	English	Chicago (CDT)	freida.whitcraf...@andiper.com	'53'	
54	Freida	Whitcraft	46	English	Chicago (CDT)	freida.whitcraf...@andiper.com	'54'	
55	Freida	Whitcraft	47	English	Chicago (CDT)	freida.whitcraf...@andiper.com	'55'	
56	Freida	Whitcraft	48	English	Chicago (CDT)	freida.whitcraf...@andiper.com	'56'	
57	Freida	Whitcraft	49	English	Chicago (CDT)	freida.whitcraf...@andiper.com	'57'	
58	Freida	Whitcraft	50	English	Chicago (CDT)	freida.whitcraf...@andiper.com	'58'	
59	Freida	Whitcraft	51	English	Chicago (CDT)	freida.whitcraf...@andiper.com	'59'	
60	Freida	Whitcraft	52	English	Chicago (CDT)	freida.whitcraf...@andiper.com	'60'	
61	Freida	Whitcraft	53	English	Chicago (CDT)	freida.whitcraf...@andiper.com	'61'	
62	Freida	Whitcraft	54	English	Chicago (CDT)	freida.whitcraf...@andiper.com	'62'	
63	Freida	Whitcraft	55	English	Chicago (CDT)	freida.whitcraf...@andiper.com	'63'	
64	Freida	Whitcraft	56	English	Chicago (CDT)	freida.whitcraf...@andiper.com	'64'	
65	Freida	Whitcraft	57	English	Chicago (CDT)	freida.whitcraf...@andiper.com	'65'	
66	Freida	Whitcraft	58	English	Chicago (CDT)	freida.whitcraf...@andiper.com	'66'	
67	Freida	Whitcraft	59	English	Chicago (CDT)	freida.whitcraf...@andiper.com	'67'	
68	Freida	Whitcraft	60	English	Chicago (CDT)	freida.whitcraf...@andiper.com	'68'	
69	Freida	Whitcraft	61	English	Chicago (CDT)	freida.whitcraf...@andiper.com	'69'	
70	Freida	Whitcraft	62	English	Chicago (CDT)	freida.whitcraf...@andiper.com	'70'	
71	Freida	Whitcraft	63	English	Chicago (CDT)	freida.whitcraf...@andiper.com	'71'	
72	Freida	Whitcraft	64	English	Chicago (CDT)	freida.whitcraf...@andiper.com	'72'	
73	Freida	Whitcraft	65	English	Chicago (CDT)	freida.whitcraf...@andiper.com	'73'	
74	Freida	Whitcraft	66	English	Chicago (CDT)	freida.whitcraf...@andiper.com	'74'	
75	Freida	Whitcraft	67	English	Chicago (CDT)	freida.whitcraf...@andiper.com	'75'	
76	Freida	Whitcraft	68	English	Chicago (CDT)	freida.whitcraf...@andiper.com	'76'	
77	Freida	Whitcraft	69	English	Chicago (CDT)	freida.whitcraf...@andiper.com	'77'	
78	Freida	Whitcraft	70	English	Chicago (CDT)	freida.whitcraf...@andiper.com	'78'	
79	Freida	Whitcraft	71	English	Chicago (CDT)	freida.whitcraf...@andiper.com	'79'	
80	Freida	Whitcraft	72	English	Chicago (CDT)	freida.whitcraf...@andiper.com	'80'	
81	Freida	Whitcraft	73	English	Chicago (CDT)	freida.whitcraf...@andiper.com	'81'	
82	Freida	Whitcraft	74	English	Chicago (CDT)	freida.whitcraf...@andiper.com	'82'	
83	Freida	Whitcraft	75	English	Chicago (CDT)	freida.whitcraf...@andiper.com	'83'	
84	Freida	Whitcraft	76	English	Chicago (CDT)	freida.whitcraf...@andiper.com	'84'	
85	Freida	Whitcraft	77	English	Chicago (CDT)	freida.whitcraf...@andiper.com	'85'	
86	Freida	Whitcraft	78	English	Chicago (CDT)	freida.whitcraf...@andiper.com	'86'	
87	Freida	Whitcraft	79	English	Chicago (CDT)	freida.whitcraf...@andiper.com	'87'	
88	Freida	Whitcraft	80	English	Chicago (CDT)	freida.whitcraf...@andiper.com	'88'	
89	Freida	Whitcraft	81	English	Chicago (CDT)	freida.whitcraf...@andiper.com	'89'	
90	Freida	Whitcraft	82	English	Chicago (CDT)	freida.whitcraf...@andiper.com	'90'	
91	Freida	Whitcraft	83	English	Chicago (CDT)	freida.whitcraf...@andiper.com	'91'	
92	Freida	Whitcraft	84	English	Chicago (CDT)	freida.whitcraf...@andiper.com	'92'	
93	Freida	Whitcraft	85	English	Chicago (CDT)</			

**Table:**  
**INSTRUCTOR**

The screenshot shows the Oracle SQL Developer interface with the 'INSTRUCTOR' table selected. The left pane displays the table structure with columns: INSTRUCTOR\_ID (NUMBER), INSTRUCTOR\_NAME (VARCHAR2), INSTRUCTOR\_CONTACT (VARCHAR2), and ORGANIZATION\_ID (NUMBER). The right pane shows the data for 40 rows, including columns: INSTRUCTOR\_ID, INSTRUCTOR\_NAME, INSTRUCTOR\_CONTACT, and ORGANIZATION\_ID.

INSTRUCTOR_ID	INSTRUCTOR_NAME	INSTRUCTOR_CONTACT	ORGANIZATION_ID
1	Bryan Dvrie	bryan.dvrie@redpoll.com	1
2	Ajay Sen	ajay.sen@zgcon.com	1
3	Carol Jordan	carol.jordan@unisone.com	1
4	Carol Bradford	carol.bradford@versin.com	1
5	Carly Stockwell	carly.stockwell@virico.com	1
6	Cary Olin	cary.olin@terribash.com	1
7	Tanya Ganesan	tanya.ganesan@pecon.com	1
8	Clara Andrews	clara.andrews@yellowcat.com	1
9	Kathy Phan	kathy.phan@ani.com	2
10	Heeson Chapman	heeson.chapman@skillet.com	2
11	Ian Wright	ian.wright@vocto.com	2
12	Jean Chapman	jean.chapman@vocto.com	2
13	Danny Rourke	danny.rourke@zcast.com	2
14	Danny Rourke	danny.rourke@zcast.com	2
15	Donald Hunter	donald.hunter@chahalca.com	2
16	Edgar Spielberg	edgar.spielberg@shakar.com	2
17	Dan Roberts	dan.roberts@nuthatch.com	3
18	Edward Gates	edward.gates@ebird.com	3
19	Edward Julius	edward.julius@ebird.com	3
20	Farah Quinn	farah.quinn@blueapple.com	3
21	Farrag Lango	farrag.lango@blueapple.com	3
22	Hal Stockwell	hal.stockwell@phones.com	3
23	Malcolm Kenneth	malcolm.kenn@spirit.com	3
24	Malcolm Broderick	malcolm.broderick@lover.com	3
25	Mary Lemon	mary.lemon@puffin.com	4
26	Mary Collins	mary.collins@pyrrholoxia.com	4
27	Matt Gusey	matt.gusey@redpoll.com	4
28	Max von Sydow	max.vonsydow@redstart.com	4
29	Schell	max.schell@sandeling.com	4
30	Cynthia Whittlestorf	cynthia.whittlestorf@sandiper.com	4
31	Donald Minelli	donald.minelli@sup.com	4
32	Hannah Broderick	hannah.broderick@erite.com	5
33	Julia Wilder	julia.wilder@erite.com	5
34	Paul Wilder	paul.wilder@erit.com	5
35	Shah Rukh Field	shahrukh.field@shahruh.com	5
36	Sally Bogart	sally.bogart@willer.com	5
37	Bruce Bates	bruce.bates@comind.com	5
38	E Brooke Shepherd	e Brooke.shepherd@willer.com	5
39	Ben de Niro	ben.de.niro@kinglet.com	6
40	Emmett	emmett.walken@limkin.com	6

**Table:**  
**ENROLL**

The screenshot shows the Oracle SQL Developer interface with the 'ENROLL' table created. The left pane shows the table structure and a creation script. The right pane shows the data being inserted into the table.

```

create table ENROLL (
    user_id number(4, 0) not null,
    course_id number(4, 0) not null,
    constraint ENROLL_pk primary key (user_id, course_id),
    constraint ENROLL_user_fk foreign key (user_id) references users (user_id),
    constraint ENROLL_course_fk foreign key (course_id) references course (course_id)
);

```

Table ENROLL created.

Script Output: Task completed in 0.123 seconds

Script Output: 815 rows inserted.

**Table:  
ENROLL**

The screenshot shows the Oracle SQL Developer interface with the ENROLL table selected. The left pane displays the table structure with columns: USER\_ID, COURSE\_ID, and COURSE\_ID. The right pane shows the data for the ENROLL table, which contains 40 rows of data.

	USER_ID	COURSE_ID
1	1	13
2	1	17
3	1	8
4	1	22
5	2	25
6	2	26
7	3	28
8	3	20
9	3	27
10	4	2
11	4	21
12	5	3
13	5	17
14	6	23
15	6	18
16	6	15
17	7	31
18	7	35
19	8	18
20	8	5
21	8	10
22	8	15
23	9	11
24	9	1
25	9	2
26	10	12
27	10	6
28	11	6
29	11	11
30	11	21
31	11	12
32	12	13
33	12	17
34	12	14
35	12	8
36	13	6
37	13	21
38	13	16
39	13	11
40	14	24

**Table:  
TEACH**

The screenshot shows the Oracle SQL Developer interface with the TEACH table created. The left pane shows the table structure and a script output window showing the creation command. The right pane shows the data being inserted into the TEACH table, with a script output window showing the insert statements and a message indicating 63 rows inserted.

```

create table teach (
    instructor_id number(6, 0) not null,
    course_id number(6, 0) not null,
    constraint teach_pk primary key (instructor_id, course_id),
    constraint teach_instr_fk foreign key (instructor_id) references instructor (instructor_id),
    constraint teach_course_fk foreign key (course_id) references course (course_id)
);

```

Table TEACH created.

```

INTO TEACH VALUES('17', '13')
INTO TEACH VALUES('18', '14')
INTO TEACH VALUES('23', '14')
INTO TEACH VALUES('17', '13')
INTO TEACH VALUES('24', '14')
INTO TEACH VALUES('25', '17')
INTO TEACH VALUES('30', '17')
INTO TEACH VALUES('27', '18')
INTO TEACH VALUES('31', '19')
INTO TEACH VALUES('25', '19')
INTO TEACH VALUES('25', '19')
INTO TEACH VALUES('30', '19')
INTO TEACH VALUES('26', '20')
INTO TEACH VALUES('25', '21')
INTO TEACH VALUES('35', '22')
INTO TEACH VALUES('32', '22')
INTO TEACH VALUES('34', '23')
INTO TEACH VALUES('32', '23')
INTO TEACH VALUES('32', '23')
INTO TEACH VALUES('34', '24')
INTO TEACH VALUES('32', '24')
INTO TEACH VALUES('34', '25')
INTO TEACH VALUES('42', '26')
INTO TEACH VALUES('45', '27')
INTO TEACH VALUES('39', '28')
INTO TEACH VALUES('45', '28')
INTO TEACH VALUES('43', '29')
INTO TEACH VALUES('43', '29')
INTO TEACH VALUES('44', '29')
INTO TEACH VALUES('39', '30')
INTO TEACH VALUES('50', '31')
INTO TEACH VALUES('42', '32')
INTO TEACH VALUES('49', '32')
INTO TEACH VALUES('49', '33')
INTO TEACH VALUES('44', '33')
INTO TEACH VALUES('50', '33')
INTO TEACH VALUES('34', '34')
INTO TEACH VALUES('48', '34')
INTO TEACH VALUES('49', '35')
SELECT * FROM dual;

```

63 rows inserted.

**Table:**  
**TEACH**

The screenshot shows the Oracle SQL Developer interface with the 'TEACH' table selected. The left pane displays the table structure with columns: INSTRUCTOR\_ID, COURSE\_ID, and INSTRUTOR\_COURSE. The right pane shows the data for the INSTRUTOR\_COURSE table, which maps INSTRUCTOR\_ID to COURSE\_ID.

INSTRUCTOR_ID	COURSE_ID
1	5
2	4
3	3
4	7
5	3
6	5
7	9
8	2
9	5
10	14
11	12
12	14
13	9
14	11
15	13
16	14
17	9
18	13
19	24
20	20
21	24
22	21
23	24
24	17
25	18
26	23
27	17
28	30
29	28
30	30
31	27
32	31
33	28
34	25
35	30
36	26
37	36
38	38
39	30
40	36
41	34
42	32
43	34
44	32
45	31
46	42
47	42
48	45
49	39
50	45
51	41
52	43
53	44
54	39
55	50
56	50
57	49
58	49
59	46
60	50
61	50
62	48
63	49

## 5. Designing Simple Quarries

(1) Getting the whole data from CATEGORY table.

The screenshot shows the Oracle SQL Developer interface with a query being run against the 'BDD200' connection. The query is 'select \* from category'. The results are displayed in the 'Query Result' window, showing five rows of data from the CATEGORY table.

CATEGORY_ID	CATEGORY_NAME
1	Data Science
2	Business
3	Computer Science
4	Math
5	Health

(2) Getting the whole organization data whose name includes “University”.

Oracle SQL Developer : BDD200

File Edit View Navigate Run Source Team Tools Window Help

Connections      Worksheet      Query Builder

```
select *
from organization
where organization_name like '%University%';
```

Query Result x | All Rows Fetched: 4 in 0.038 seconds

ORGANIZATION_ID	ORGANIZATION_NAME
1	University of Toronto
2	University of Michigan
3	Stanford University
4	Johns Hopkins University

### (3) Getting the whole course data whose level is suitable for beginners.

Oracle SQL Developer : BDD200

File Edit View Navigate Run Source Team Tools Window Help

Connections      Worksheet      Query Builder

```
select *
from course
where course_level = 'Beginner';
```

Query Result x | All Rows Fetched: 15 in 0.031 seconds

COURSE_ID	COURSE_NAME	COURSE_LEVEL	COURSE_DESCRIPTION	ORGANIZATION_ID	CATEGORY_ID
1	Google Data Science	Beginner	The course, Google Data Science, is offered by...	1	1
2	Introduction to Programming Languages	Beginner	The course, Introduction to Programming Languages, is offered by...	1	3
3	IBM Data Science	Beginner	The course, IBM Data Science, is offered by...	2	1
4	Introduction to Business	Beginner	The course, Introduction to Business, is offered by...	2	2
5	Microsoft Data Science	Beginner	The course, Microsoft Data Science, is offered by...	3	1
6	How to use Excel for Data Analysis	Beginner	The course, How to use Excel for Data Analysis, is offered by...	3	1
7	Introduction to Computer Science and Programming	Beginner	The course, Introduction to Computer Science and Programming, is offered by...	3	3
8	Introduction to Linear Algebra	Beginner	The course, Introduction to Linear Algebra, is offered by...	4	4
9	Introduction to Data Science	Beginner	The course, Introduction to Data Science, is offered by...	5	1
10	History of Mathematics	Beginner	The course, History of Mathematics, is offered by...	5	4
11	Linear Regression	Beginner	The course, Linear Regression, is offered by...	5	4
12	Introduction to Statistics	Beginner	The course, Introduction to Statistics, is offered by...	6	4
13	Discrete Mathematics	Beginner	The course, Discrete Mathematics, is offered by...	6	4
14	Importance of Healthcare	Beginner	The course, Importance of Healthcare, is offered by...	7	5
15	Mental Health Risks of SNS	Beginner	The course, Mental Health Risks of SNS, is offered by...	7	5

### (4) Getting the course name whose name includes “Data” and the course’s level is intermediate or advanced.

The screenshot shows the Oracle SQL Developer interface. The top menu bar includes File, Edit, View, Navigate, Run, Source, Team, Tools, Window, and Help. The toolbar has various icons for connection management, navigation, and code editing. The Connections panel on the left lists a connection named 'BDD200' which contains tables like CATEG, COURSE, ENROLL, INSTRUC, MATERIA, ORGANIZ, TEACH, and USERS. The central workspace shows a Worksheet tab with the following SQL query:

```
select *  
from course  
where course_name like '%Data%' and (course_level = 'Intermediate' or course_level = 'Advanced');
```

Below the worksheet is a Script Output window showing the results of the query:

COURSE_ID	COURSE_NAME	COURSE_LEVEL	COURSE_DESCRIPTION	ORGANIZATION_ID	CATEGORY_ID
1	Data Science on Google Cloud	Advanced	The course, Data Science on Google Cloud, is offered by...	1	1
2	Applied Data Science with Python	Intermediate	The course, Applied Data Science with Python, is offere...	2	1
3	Covid19 Data Analysis	Advanced	The course, Covid19 Data Analysis, is offered by Johns ...	7	5

(5) Getting the whole material data whose description includes “first part”. It’s equivalent to getting every first material info of each course.

Oracle SQL Developer : BDD200

File Edit View Navigate Run Source Team Tools Window Help

Connections      Welcome Page      BDD200      BDD200sql

Worksheet      Query Builder

```
select *
from material
where material_description like '%first part%';
```

Script Output      Query Result

SQL | All Rows Fetched: 35 in 0.036 seconds

MATERIAL_ID	MATERIAL_NAME	MATERIAL_DESCRIPTION	COURSE_ID
1	1 Google Data Science - Step 1	This is the first part of the Google Data Science course. In...	1
2	4 Data Science on Google Cloud - Part 1	This is the first part of the Data Science on Google Cloud c...	2
3	7 How to Use Google Cloud on Business - Step 1	This is the first part of the How to Use Google Cloud on Bus...	3
4	10 Business Strategies - First Part	This is the first part of the Business Strategies course. In...	4
5	13 Introduction to Programming Languages - Class 1	This is the first part of the Introduction to Programming La...	5
6	17 IBM Data Science - Class 01	This is the first part of the IBM Data Science course. In th...	6
7	20 Applied Data Science with Python - Step 1	This is the first part of the Applied Data Science with Pyth...	7
8	23 Introduction to Business - Part (A)	This is the first part of the Introduction to Business cours...	8
9	27 Business Analytics - First Part	This is the first part of the Business Analytics course. In ...	9
10	30 Computer Science - Step 1	This is the first part of the Computer Science course. In th...	10
11	34 Microsoft Data Science - Step 01	This is the first part of the Microsoft Data Science course...	11
12	37 How to use Excel for Data Analysis - Part 1	This is the first part of the How to use Excel for Data Anal...	12
13	41 Business Management - Class (A)	This is the first part of the Business Management course. In...	13
14	44 Business Analytics - First Part	This is the first part of the Business Analytics course. In ...	14
15	48 Introduction to Computer Science and Programming - Step 1	This is the first part of the Introduction to Computer Scien...	15
16	52 Machine Learning Methods - Step 01	This is the first part of the Machine Learning Methods cours...	16
17	55 How to launch New Business - Part 1	This is the first part of the How to launch New Business cou...	17
18	56 Coding: C and C++ - Part (A)	This is the first part of the Coding: C and C++ course. In ...	18
19	61 Introduction to Linear Algebra - First Class	This is the first part of the Introduction to Linear Algebra...	19
20	65 Mathematics for Machine Learning - Step 1	This is the first part of the Mathematics for Machine Learn...	20
21	68 Introduction to Data Science - Class 01	This is the first part of the Introduction to Data Science c...	21
22	72 Project Management Principles - Step 1	This is the first part of the Project Management Principles ...	22
23	76 How to create Algorithm in Python - Step (A)	This is the first part of the How to create Algorithm in Pyt...	23
24	79 History of Mathematics - First Class	This is the first part of the History of Mathematics course...	24
25	83 Linear Regression - Class 1	This is the first part of the Linear Regression course. In t...	25
26	86 Introduction to Statistics - Step 01	This is the first part of the Introduction to Statistics cou...	26
27	90 Statistical Inference - Class 1	This is the first part of the Statistical Inference course. ...	27
28	94 Mathematical Biostatistics - Step (A)	This is the first part of the Mathematical Biostatistics cou...	28
29	97 Discrete Mathematics - First Step	This is the first part of the Discrete Mathematics course. I...	29
30	101 Statistics in Public Health - Class 1	This is the first part of the Statistics in Public Health co...	30
31	104 Importance of Healthcare - Class 01	This is the first part of the Importance of Healthcare cours...	31
32	107 Biostatistics in Public Health - Step 1	This is the first part of the Biostatistics in Public Health...	32
33	111 Covid19 Data Analysis - Step (A)	This is the first part of the Covid19 Data Analysis course. ...	33
34	114 Statistical Methods for Epidemiology - First Step	This is the first part of the Statistical Methods for Epidem...	34
35	118 Mental Health Risks of SNS - Step 1	This is the first part of the Mental Health Risks of SNS cou...	35

I Line 3 Column 40      Insert      Modified! Windows: CR

(6) Getting the whole user information whose language is Hindi and lives around Chicago.

Oracle SQL Developer : BDD200

File Edit View Navigate Run Source Team Tools Window Help

Connections      Worksheet      Query Builder

```
select *
from users
where user_language = 'Hindi' and user_timezone = 'Chicago (CDT);
```

Script Output x    Query Result x

SQL | All Rows Fetched: 7 in 0.03 seconds

USER_ID	USER_FNAME	USER_LNAME	USER_AGE	USER_LANGUAGE	USER_TIMEZONE	USER_EMAIL	USER_PASSWORD	CATEGORY_ID
1	11 Scott	Jordan	29	Hindi	Chicago (CDT)	scott.jordan@will.com	qRNO51Qo@tFqmB	1
2	14 Sharmila	Fonda	34	Hindi	Chicago (CDT)	sharmila.fonda@bufflehead.com	p1h@AeWVzGv1S	4
3	112 Rob	Russell	32	Hindi	Chicago (CDT)	rob.russell@verdin.com	W@UVnOjT+@fjALO	2
4	114 Robin	Adjani	20	Hindi	Chicago (CDT)	robin.adjani@moorhen.com	@s(AYM4W?y4EsE*	4
5	125 Roxanne	Shepherd	24	Hindi	Chicago (CDT)	roxanne.shepherd@dunlin.com	O1ofHjEE87N-CZl	4
6	129 Roy	Bates	44	Hindi	Chicago (CDT)	roy.bates@wigeon.com	z1Wz+sQ1iQNvy.G	2
7	262 Burt	Spielberg	26	Hindi	Chicago (CDT)	burt.spielberg@trogon.com	Op7NUkv+vunV7Fm	5

(7) Getting the user id, their name, and their time zone whose ages are less than 20.

Oracle SQL Developer : BDD200

File Edit View Navigate Run Source Team Tools Window Help

Connections      Worksheet      Query Builder

```
select user_id, user_fname, user_lname, user_timezone
from users
where user_age < 20;
```

Script Output x    Query Result x

SQL | All Rows Fetched: 19 in 0.046 seconds

USER_ID	USER_FNAME	USER_LNAME	USER_TIMEZONE
1	182 Goldie	Slater	Anchorage (AKDT)
2	198 Dheeraj	Alexander	Denver (MDT)
3	216 Mary Beth	Roberts	Denver (MDT)
4	218 Meena	Alexander	Phoenix (MST)
5	260 Bruno	Montana	Denver (MDT)
6	2 Kyle	Martin	Phoenix (MST)
7	32 Klaus	Young	Anchorage (AKDT)
8	44 Alan	Hunter	Honolulu (HST)
9	46 Albert	Bel Geddes	Honolulu (HST)
10	49 Alec	Idle	Honolulu (HST)
11	50 Alexander	Eastwood	Phoenix (MST)
12	54 Alfred	Johnson	Honolulu (HST)
13	57 Ali	Stern	Los Angeles (PDT)
14	63 Alonso	Olmos	Phoenix (MST)
15	64 Alonso	Kaurusmdki	Denver (MDT)
16	66 Amanda	Brown	Chicago (CDT)
17	121 Romy	McCarthy	Anchorage (AKDT)
18	135 Manisha	Taylor	Honolulu (HST)

(8) Getting the whole user information whose ages are the oldest one of all after searching the minimum value of user\_age.

Oracle SQL Developer : BDD200

File Edit View Navigate Run Source Team Tools Window Help

Connections BDD200

Worksheet Query Builder

```
select min(user_age)
from users

select *
from users
where user_age = 18;
```

Script Output Query Result

All Rows Fetched: 11 in 0.086 seconds

USER_ID	USER_FNAME	USER_LNAME	USER_AGE	USER_LANGUAGE	USER_TIMEZONE	USER_EMAIL	USER_PASSWORD	CATEGORY_ID
1	182 Goldie	Slater	18	English	Anchorage (AKDT)	goldie.slater@pyrrhuloxia.com	mLr)tg2hs1Cs(I	3
2	198 Dheeraj	Alexander	18	English	Denver (MDT)	dheeraj.alexander@nuthatch.com	-s2v3vi6u*,b,Jy	2
3	216 Mary Beth	Roberts	18	English	Denver (MDT)	marybeth.roberts@nuthatch.com	RpuFwg9eAP59z7	1
4	260 Bruno	Montand	18	Hindi	Denver (MDT)	bruno.montand@towhee.com	H@8hPS702NT1*y	2
5	2 Kyle	Martin	18	English	Phoenix (MST)	kyle.martin@eider.com	cWnZCLz+5w/swS	4
6	32 Klaus	Young	18	Italian	Anchorage (AKDT)	klaus.young@venbird.com	vzORHjelJX80f)+	3
7	49 Alec	Idle	18	Swedish	Honolulu (HST)	alec.idle@eider.com	l+z=8/Z/Xm,,6,qt	2
8	54 Alfred	Johnson	18	Swedish	Honolulu (HST)	alfred.johnson@flicker.com	.N07o(B0uR+>sub	5
9	63 Alonso	Olmos	18	Swedish	Phoenix (MST)	alonso.olmos@phalarope.com	rWR6x7pO+hE37Mp	2
10	66 Amanda	Brown	18	Swedish	Chicago (CDT)	amanda.brown@thrasher.com	@yh?ms-ktwD+Tlb	4
11	153 Dianne	Sen	18	English	Honolulu (HST)	dianne.sen@tattler.com	+Yr5v//sDo693w5	4

(9) Getting the whole instructor information whose first name starts “C”.

Oracle SQL Developer : BDD200

File Edit View Navigate Run Source Team Tools Window Help

Connections BDD200

Worksheet Query Builder

```
select *
from instructor
where instructor_fname like ('C%');
```

Script Output Query Result

All Rows Fetched: 7 in 0.029 seconds

INSTRUCTOR_ID	INSTRUCTOR_FNAME	INSTRUCTOR_LNAME	INSTRUCTOR_CONTACT	ORGANIZATION_ID
1	3 Carol	Jordan	carol.jordan@turnstone.com	1
2	4 Carol	Bradford	carol.bradford@verdin.com	1
3	5 Cary	Stockwell	cary.stockwell@vireo.com	1
4	6 Cary	Olin	cary.olin@waterthrush.com	1
5	7 Clara	Krige	clara.krige@whimbrel.com	1
6	8 Clara	Ganesan	clara.ganesan@wigeon.com	1
7	30 Cynda	Whitcraft	cynda.whitcraft@sandpiper.com	4

## 6. Designing Advanced Quarries

(1) Getting each category’s name and the average age among users who are interested in its category. Some analysts will search for it in order to evaluate the following question: Is there a relationship between user’s age and their interesting field?

The screenshot shows the Oracle SQL Developer interface. The top menu bar includes File, Edit, View, Navigate, Run, Source, Team, Tools, Window, and Help. The left sidebar has sections for Connections (showing a connection to BDD200), Tables (listing Tables (Filtered) like CATEGORY, COURSE, ENROLL, etc.), and Reports (listing All Reports, Analytic View Reports, Data Dictionary Reports, Data Modeler Reports, OLAP Reports, TimesTen Reports, and User Defined Reports). The main workspace shows a Worksheet tab with the following SQL query:

```
select category_name, avg(user_age)
from users join category using (category_id)
group by category_name;
```

The Script Output tab shows the results of the query:

CATEGORY_NAME	AVG(USER_AGE)
1 Health	28.38095238095238095238095238095238
2 Business	31.23214285714285714285714285714286
3 Computer Science	30.693548387096771935483870967719354839
4 Data Science	31.49315068493150684931506849315068493151
5 Math	30.57894736842105263157894736842105263158

(2) Getting course\_id, course\_name, course\_level, and the number of users who are enrolling in its course. This result indicates how popular each course is. (The following picture shows the first 17 popular courses out of 35 ones.)

The screenshot shows the Oracle SQL Developer interface with the following details:

- Title Bar:** Oracle SQL Developer : BDD200
- Menu Bar:** File, Edit, View, Navigate, Run, Source, Team, Tools, Window, Help
- Toolbar:** Includes icons for New Connection, Open Connection, Save, Undo, Redo, Copy, Paste, Find, Replace, and others.
- Connections Sidebar:** Shows a tree view of connections. The current connection is "BDD200". Under "Tables (Filtered)", the "ENROLL" table is selected. Other tables listed include CATEGORY, COURSE, USER\_ID, COURSE\_ID, INSTRUCTOR, MATERIAL, ORGANIZATION, and TEACH.
- Worksheet Area:** Contains a query editor window with the following SQL code:

```
select course_id, course_name, course_level, count(*) as num_enroll
from enroll join course using(course_id)
group by(course_id, course_name, course_level)
order by num_enroll desc;
```
- Script Output Area:** Shows the results of the query execution: "All Rows Fetched: 35 in 0.032 seconds".
- Query Result Area:** Displays the query results in a table format:

COURSE_ID	COURSE_NAME	COURSE_LEVEL	NUM_ENROLL
1	15 Introduction to Computer Science and Programming	Beginner	43
2	18 Coding: C and C++	Intermediate	40
3	5 Introduction to Programming Languages	Beginner	37
4	10 Computer Science	Intermediate	35
5	16 Machine Learning Methods	Intermediate	35
6	6 IBM Data Science	Beginner	34
7	23 How to create Algorithm in Python	Intermediate	33
8	1 Google Data Science	Beginner	30
9	11 Microsoft Data Science	Beginner	30
10	12 How to use Excel for Data Analysis	Beginner	29
11	20 Mathematics for Machine Learning	Intermediate	27
12	21 Introduction to Data Science	Beginner	26
13	13 Business Management	Intermediate	26
14	2 Data Science on Google Cloud	Advanced	26
15	3 How to Use Google Cloud on Business	Intermediate	25
16	28 Mathematical Biostatistics	Advanced	24
17	14 Business Analytics	Advanced	23

(3) Getting the course info (its id, its name, its level) and the number of instructors who are in charge of each course. Being listed in the top 15 courses when sorted in descending order.

Oracle SQL Developer : BDD200

File Edit View Navigate Run Source Team Tools Window Help

Connections      Worksheet      Query Builder

BDD200      Welcome Page      BDD200.sql      BDD200      INSTRUCTOR

Script Output      Query Result

```
select *
from (select course_id, course_name, course_level, count(instructor_id) as num_instructors
      from course join teach using (course_id)
      group by course_id, course_name, course_level
      order by num_instructors desc)
where ROWNUM <= 15;
```

COURSE_ID	COURSE_NAME	COURSE_LEVEL	NUM_INSTRUCTORS
1	18 Coding: C and C++	Intermediate	3
2	13 Business Management	Intermediate	3
3	8 Introduction to Business	Beginner	3
4	3 How to Use Google Cloud on Business	Intermediate	3
5	33 Covid19 Data Analysis	Advanced	3
6	23 How to create Algorithm in Python	Intermediate	3
7	28 Mathematical Biostatistics	Advanced	3
8	9 Business Analytics	Advanced	2
9	17 How to launch New Business	Advanced	2
10	14 Business Analytics	Advanced	2
11	4 Business Strategies	Advanced	2
12	24 History of Mathematics	Beginner	2
13	12 How to use Excel for Data Analysis	Beginner	2
14	2 Data Science on Google Cloud	Advanced	2
15	19 Introduction to Linear Algebra	Beginner	2

I Line 6 Column 19    I Insert    I Modified    I Windows

(4) Getting the lists of user info (its id and name) who are enrolling in more than 3 advanced courses. It is likely that those users are industrious users.

Oracle SQL Developer : BDD200

File Edit View Navigate Run Source Team Tools Window Help

Connections      Worksheet      Query Builder

BDD200      Welcome Page      BDD200.sql      BDD200      INSTRUCTOR

Script Output      Query Result

```
select user_id, user_fname, user_lname, count(user_id) as num_advanced_course
  from enroll join users using (user_id)
 where enroll.course_id in (
  select course_id
    from enroll join course using (course_id)
   where course_level = 'Advanced'
  group by user_id, user_fname, user_lname
 having count(user_id) >= 3;
```

USER_ID	USER_FNAME	USER_LNAME	NUM_ADVANCED_COURSE
1	258 Bruce	Dunaway	3
2	111 Ridley	Young	3
3	166 Sissy	Puri	3
4	65 Amanda	Finney	3
5	140 Meenakshi	Mason	3
6	103 Meg	Sen	3

(5) In terms of the course whose level is intermediate and enrolled in more than 25 users, getting course id, its name, organization name that offers its course, and category name.

Oracle SQL Developer : BDD200

The screenshot shows the Oracle SQL Developer interface. The left sidebar displays connections and tables. The main area shows a query builder with the following SQL code:

```

select course_id, course_name, organization_name, category_name
from (select * from course join organization using (organization_id)) join category using (category_id)
where course_id in (
    select course_id
    from course join enroll using (course_id)
    where course_level = 'Intermediate'
    group by course_id
    having count(course_id) >= 25
);

```

The query results table contains the following data:

COURSE_ID	COURSE_NAME	ORGANIZATION_NAME	CATEGORY_NAME
1	3 How to Use Google Cloud on Business	Google	Business
2	10 Computer Science	IBM	Computer Science
3	13 Business Management	Microsoft	Business
4	20 Mathematics for Machine Learning	University of Toronto	Math
5	18 Coding: C and C++	University of Toronto	Computer Science
6	16 Machine Learning Methods	University of Toronto	Data Science
7	23 How to create Algorithm in Python	University of Michigan	Computer Science

(6) In terms of specific courses that are enrolled by more than 15 English users (those who are using English regardless of where they live), get course id, its name, its level, the organization name offering its course, and category name related to its course.

Oracle SQL Developer : BDD200

The screenshot shows the Oracle SQL Developer interface. The left sidebar displays connections and tables. The main area shows a query builder with the following SQL code:

```

select *
from (select course_id, course_name, course_level, organization_name, category_name
      from (select * from (
              select * from course join organization using (organization_id))
              join category using (category_id))
      join (select course_id, count(course_id) as num_user_enroll
            from course join enroll using (course_id)
            where enroll.user_id in (
                select user_id
                from users where user_language = 'English')
            group by course_id)
            course using (course_id)
            where num_user_enroll >= 15
            order by num_user_enroll desc;

```

The query results table contains the following data:

COURSE_ID	COURSE_NAME	COURSE_LEVEL	ORGANIZATION_NAME	CATEGORY_NAME	NUM_USER_ENROLL
1	5 Introduction to Programming Languages	Beginner	Google	Computer Science	19
2	15 Introduction to Computer Science and Programming	Beginner	Microsoft	Computer Science	19
3	18 Coding: C and C++	Intermediate	University of Toronto	Computer Science	19
4	23 How to create Algorithm in Python	Intermediate	University of Michigan	Computer Science	17
5	10 Computer Science	Intermediate	IBM	Computer Science	17
6	16 Machine Learning Methods	Intermediate	University of Toronto	Data Science	15
7	1 Google Data Science	Beginner	Google	Data Science	15

## 7. Updating and deleting database content

### Update-(1):

Some surveys for many users show that the course “Coding: C and C++” is more difficult than users’ expectations. Therefore, the corporation decides to be higher the course level from “Intermediate” to “Advanced”.

The image shows two side-by-side screenshots of the Oracle SQL Developer interface. Both windows have the title 'developer : BDD200' and show the same database connection. The left window displays a 'Worksheet' tab with the following SQL code:

```
/*Before changing*/
select course_id, course_name, course_level
from course
where course_name like ('%C%');
```

The right window also has a 'Worksheet' tab with the following SQL code:

```
update course
set course_level = 'Advanced'
where course_id = 18;
```

Below the code tabs, both windows show a 'Script Output' tab with the message 'All Rows Fetched: 6 in 0.025 seconds' and a 'Query Result' tab showing a table with six rows of course data. In the first window, the 'course\_level' column for the row where course\_id=18 and course\_name='Coding: C and C++' is highlighted in red. In the second window, the 'course\_level' column for the same row is explicitly set to 'Advanced' in the update query.

COURSE_ID	COURSE_NAME	COURSE_LEVEL
1	2 Data Science on Google Cloud	Advanced
2	3 How to Use Google Cloud on Business	Intermediate
3	10 Computer Science	Intermediate
4	15 Introduction to Computer Science and Programming	Beginner
5	18 Coding: C and C++	Intermediate
6	33 Covid19 Data Analysis	Advanced

COURSE_ID	COURSE_NAME	COURSE_LEVEL
1	2 Data Science on Google Cloud	Advanced
2	3 How to Use Google Cloud on Business	Intermediate
3	10 Computer Science	Intermediate
4	15 Introduction to Computer Science and Programming	Beginner
5	18 Coding: C and C++	Advanced
6	33 Covid19 Data Analysis	Advanced

### Update-(2):

Two instructors whose ids are 11 and 30 respectively changed their company to Google.

**INSTRUCTOR**

```

Connections
+ CATEGORY
  + COURSE
    + COURSE_ID
      + COURSE_NAME
      + COURSE_LEVEL
      + COURSE_DESCRIPTION
    + ORGANIZATION_ID
    + CATEGORY_ID
  + ENROLL
    + USER_ID
      + COURSE_ID
    + INSTRUCTOR
  + INSTRUCTOR

```

Worksheet | Query Builder

```

/*Before changing*/
select *
from instructor join organization using (organization_id)
where instructor_id in (11, 30);

```

Script Output | SQL | All Rows Fetched 2 in 0.08 seconds

ORGANIZATION_ID	INSTRUCTOR_ID	INSTRUCTOR_FNAME	INSTRUCTOR_LNAME	INSTRUCTOR_CONTACT	ORGANIZATION_NAME
1	2	11	Graham Neeson	graham.neeson@auklet.com	IBM
2	4	30	Cynda Whitcraft	cynda.whitcraft@sandpiper.com	University of Toronto

**ORGANIZATION**

```

Connections
+ USER_ID
  + COURSE_ID
  + INSTRUCTOR
  + MATERIAL
  + ORGANIZATION
  + TEACH
    + INSTRUCTOR_ID
      + COURSE_ID
  + USERS
    + USER_ID
      + USER_FNAME
      + USER_LNAME

```

Reports

- All Reports
- Analytic View Reports

Worksheet | Query Builder

```

update instructor
set instructor.organization_id = 1
where instructor_id in (11, 30);

/*After changing*/
select *
from instructor join organization using (organization_id)
where instructor_id in (11, 30);

```

Script Output | SQL | All Rows Fetched 2 in 0.088 seconds

ORGANIZATION_ID	INSTRUCTOR_ID	INSTRUCTOR_FNAME	INSTRUCTOR_LNAME	INSTRUCTOR_CONTACT	ORGANIZATION_NAME
1	1	11	Graham Neeson	graham.neeson@auklet.com	Google
2	1	30	Cynda Whitcraft	cynda.whitcraft@sandpiper.com	Google

### Update-(3):

The following three users seemed to move to Chicago recently.

**ORGANIZATION**

```

Connections
+ USER_ID
  + COURSE_ID
  + INSTRUCTOR
  + MATERIAL
  + ORGANIZATION
  + TEACH
    + INSTRUCTOR_ID
      + COURSE_ID
  + USERS
    + USER_ID
      + USER_FNAME
      + USER_LNAME

```

Reports

Worksheet | Query Builder

```

/*After changing*/
select user_id, user_fname, user_lname, user_timezone
from users
where user_id in (72, 83, 198);

```

Script Output | SQL | All Rows Fetched 3 in 0.082 seconds

USER_ID	USER_FNAME	USER_LNAME	USER_TIMEZONE
1	72 Holly	Kurosawa	Los Angeles (PDT)
2	83 Margaret	Powell	Phoenix (MST)
3	198 Dheeraj	Alexander	Denver (MDT)

**USERS**

```

Connections
+ USER_ID
  + COURSE_ID
  + INSTRUCTOR
  + MATERIAL
  + ORGANIZATION
  + TEACH
    + INSTRUCTOR_ID
      + COURSE_ID
  + USERS
    + Views
    + Editioning Views
    + Indexes

```

Reports

- All Reports
- Analytic View Reports
- Data Dictionary Reports

Worksheet | Query Builder

```

update users
set user_timezone = 'Chicago (CDT)'
where user_id in (72, 83, 198);

/*After changing*/
select user_id, user_fname, user_lname, user_timezone
from users
where user_id in (72, 83, 198);

```

Script Output | SQL | All Rows Fetched 3 in 0.085 seconds

USER_ID	USER_FNAME	USER_LNAME	USER_TIMEZONE
1	72 Holly	Kurosawa	Chicago (CDT)
2	83 Margaret	Powell	Chicago (CDT)
3	198 Dheeraj	Alexander	Chicago (CDT)

### Update-(4):

A user whose id is "70' changed its email address to the Seneca's one.

Connections

```

/*Before changing*/
select user_id, user_fname, user_lname, user_email
from users
where user_id = 70;

```

Script Output | All Rows Fetched 1 in 0.028 seconds

USER_ID	USER_FNAME	USER_LNAME	USER_EMAIL	
1	70	Billy	Dench	billy.dench@caracara.com

Connections

```

update users
set user_email = 'billy.dench@seneca.ca'
where user_id = 70;

/*After changing*/
select user_id, user_fname, user_lname, user_email
from users
where user_id = 70;

```

Script Output | All Rows Fetched 1 in 0.017 seconds

USER_ID	USER_FNAME	USER_LNAME	USER_EMAIL	
1	70	Billy	Dench	billy.dench@seneca.ca

### Delete-(1):

As for a course, Introduction to Programming Languages, its material altered: its material 3 and 4 are aggregated into one.

Connections

```

/*before change*/
select course_id, course_name, course_level, material_id, material_name
from course join material using (course_id)
where course_id = 5;

```

Script Output | All Rows Fetched 4 in 0.033 seconds

COURSE_ID	COURSE_NAME	COURSE_LEVEL	MATERIAL_ID	MATERIAL_NAME
1	5 Introduction to Programming Languages Beginner		13	Introduction to Programming Languages - Class 1
2	5 Introduction to Programming Languages Beginner		14	Introduction to Programming Languages - Class 2
3	5 Introduction to Programming Languages Beginner		15	Introduction to Programming Languages - Class 3
4	5 Introduction to Programming Languages Beginner		16	Introduction to Programming Languages - Class 4

Connections

```

delete from material
where course_id = 5 and material_id = 16;

/*after change*/
select course_id, course_name, course_level, material_id, material_name
from course join material using (course_id)
where course_id = 5;

```

Script Output | All Rows Fetched 3 in 0.015 seconds

COURSE_ID	COURSE_NAME	COURSE_LEVEL	MATERIAL_ID	MATERIAL_NAME
1	5 Introduction to Programming Languages Beginner		13	Introduction to Programming Languages - Class 1
2	5 Introduction to Programming Languages Beginner		14	Introduction to Programming Languages - Class 2
3	5 Introduction to Programming Languages Beginner		15	Introduction to Programming Languages - Class 3

### Delete-(2):

A user, Shammi Pacino (id is 17), dropped the course “How to launch New Business”.

The screenshot shows two separate sessions in Oracle SQL Developer. Both sessions have the same schema tree on the left, which includes tables like USER\_ID, COURSE\_ID, INSTRUCTOR, MATERIAL, ORGANIZATION, TEACH, and USERS, along with Views, Editioning Views, and Indexes.

**Session 1 (Top):**

- Worksheet:** Contains a query script:

```
/*before changing*/
select user_id, user_fname, user_lname, course_id, course_name
from (select user_id, user_fname, user_lname, course_id,
           from enroll join users using (user_id) join course using (course_id)
      where user_id = 12;
```
- Script Output:** Shows the results of the select query:

USER_ID	USER_FNAME	USER_LNAME	COURSE_ID	COURSE_NAME
1	12 Shammi	Pacino	8	Introduction to Business
2	12 Shammi	Pacino	13	Business Management
3	12 Shammi	Pacino	14	Business Analytics
4	12 Shammi	Pacino	17	How to launch New Business

**Session 2 (Bottom):**

- Worksheet:** Contains a query script:

```
delete from enroll
where user_id = 12 and course_id = 17;

/*after changing*/
select user_id, user_fname, user_lname, course_id, course_name
from (select user_id, user_fname, user_lname, course_id,
           from enroll join users using (user_id) join course using (course_id)
      where user_id = 12;|
```
- Script Output:** Shows the results of the select query after the delete:

USER_ID	USER_FNAME	USER_LNAME	COURSE_ID	COURSE_NAME
1	12 Shammi	Pacino	8	Introduction to Business
2	12 Shammi	Pacino	13	Business Management
3	12 Shammi	Pacino	14	Business Analytics

### Delete-(3):

It changed the number of instructors who are taught the course, How to create Algorithm in Python.

```

/*before changing*/
select instructor_id, instructor_fname, instructor_lname, course_id, course_name
from (select course_id, instructor_id, instructor_fname, instructor_lname
      from teach join instructor using (instructor_id)
     join course using (course_id)
   where course_id = 23);

/*after changing*/
delete from teach
where instructor_id = 36 and course_id = 23;

/*select instructor_id, instructor_fname, instructor_lname, course_id, course_name
from (select course_id, instructor_id, instructor_fname, instructor_lname
      from teach join instructor using (instructor_id)
     join course using (course_id)
   where course_id = 23);

```

#### Delete-(4):

The least popular courses (those course ids are 31, 34) are deleted by the e-Learning company. However, each course relates to the three tables – ENROLL, TEACH, MATERIAL. Thus, we must deal with some related information to those course ids before deleting specific courses directly in order to avoid the violation between the primary and foreign keys.

```

--before changing
select *
from (select course_id, course_name, count(course_id) as num_enroll
      from enroll join user using (user_id) join course using (course_id)
     group by course_id, course_name
    order by num_enroll
   where num_enroll < 10);

--script output
1 31 Mental Health Disease
2 34 Statistics Methods for Epidemiology
3 35 Mental Health Risk of Illness
4 32 Statistics in Public Health
5 30 Statistics in Public Health
6 33 Correlation Data Analysis
7 22 Business Mathematics Principles
8 17 How to Launch New Business
9 24 History of Mathematics
10 9 Business Analytics

--script output
delete from enroll
where course_id in (31, 34);

delete from teach
where course_id in (31, 34);

delete from material
where course_id in (31, 34);

delete from course
where course_id in (31, 34);

/*before changing*/
select *
from (select course_id, course_name, count(course_id) as num_enroll
      from enroll join user using (user_id) join course using (course_id)
     group by course_id, course_name
    order by num_enroll
   where num_enroll < 10);

--script output
1 31 Mental Health Disease of BMH
2 32 Statistics in Public Health
3 30 Statistics in Public Health
4 33 Correlation Data Analysis
5 22 Business Mathematics Principles
6 17 How to Launch New Business
7 24 History of Mathematics
8 4 Business Statistics
9 24 Business Mathematics
10 9 Business Analytics

```