

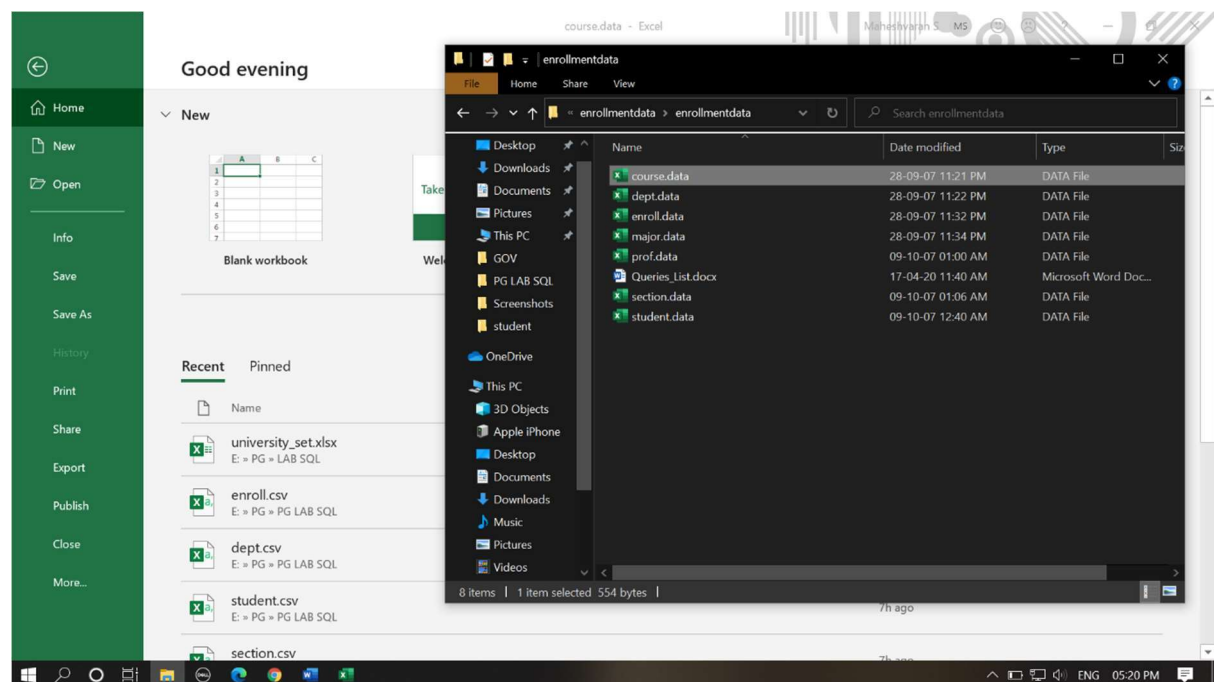
LAB7. UNIVERSITY COURSE ENROLLMENT DATA ANALYTICS PART-1

In this lab, you will use the dataset that contains 7 course enrolment data files of a university (Course.data, dept.data, enroll.data, major.data, prof.data, section.data and student.data) that are given to you.

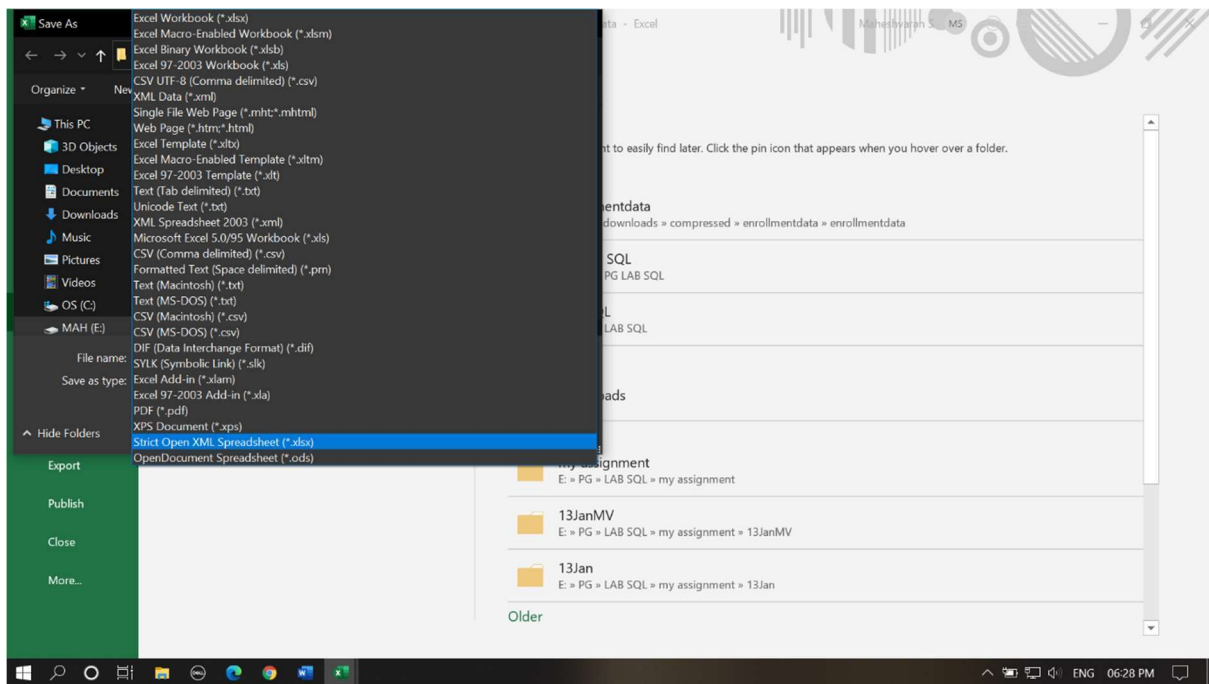
STEP 1:

We need to open these given “.data” format file in a excel. So just open ms excel or any other application which handle xls and csv that may be wps office or anything which related to this. Then just drag and drop the course.data and other “.data” files one by one you can save it as csv or xls file using save as option. Then you can work flawlessly.

Eg1:



Eg2:



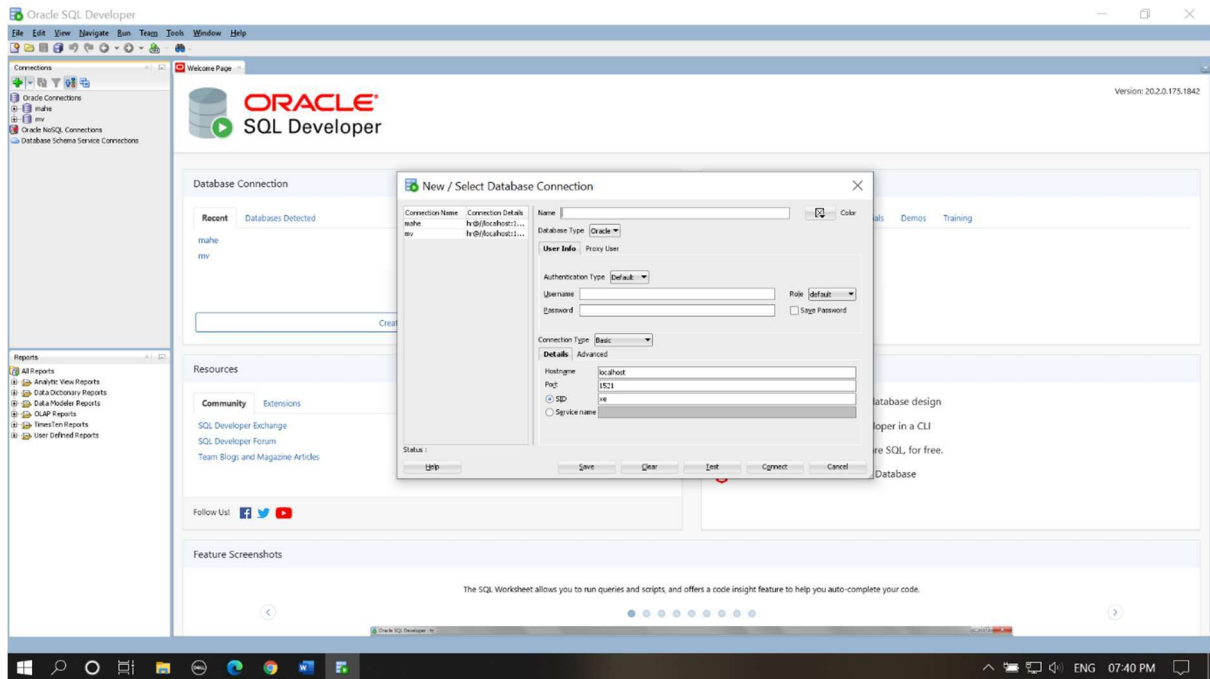
The above eg1, eg2 screenshot shows that you can save the data file into several format like `xlsx`, `xls`, `csv` and many so you can choose one of these and save the file with the name you want.

STEP 2:

After converting all these “.data” files into the excel file format we are ready to import our data to the database through sql developer.

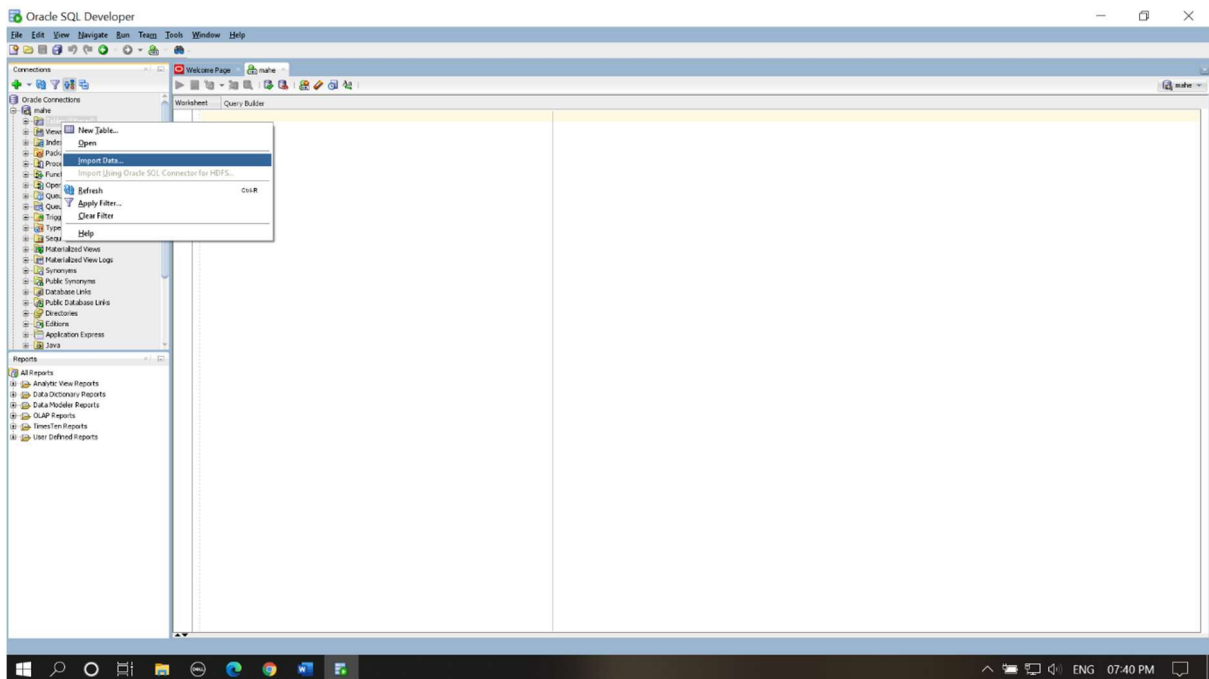
The following steps involve to import the data:

Eg1:



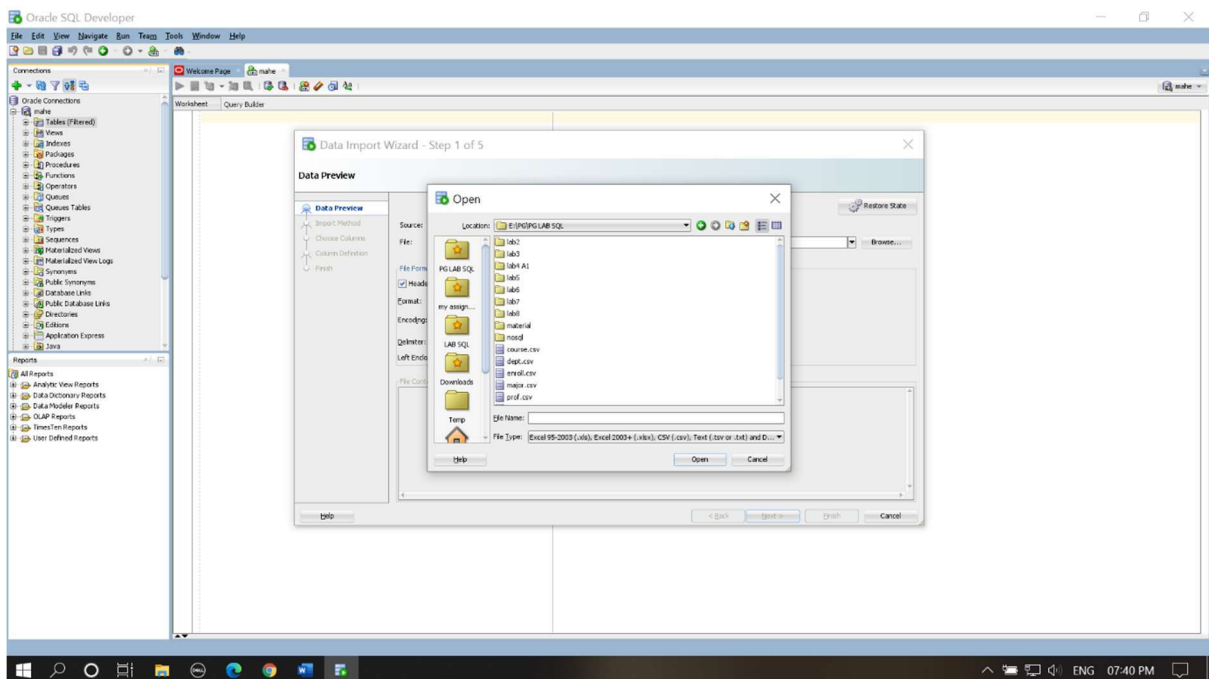
1. You need to download **SQL** developer from the following link and extract the file:
<https://www.filehorse.com/download-oracle-sql-developer-64/download/>
2. You no need to install sql developer like any other software just click on the application icon with sql developer named file. The your sql developer starts load
3. The above eg1 file shows that you need to create a new connection then enter the user name and password for the schema you need to access.
4. After completing all these steps you can test the connection using test button when it shows success then click on connect.

Eg2:

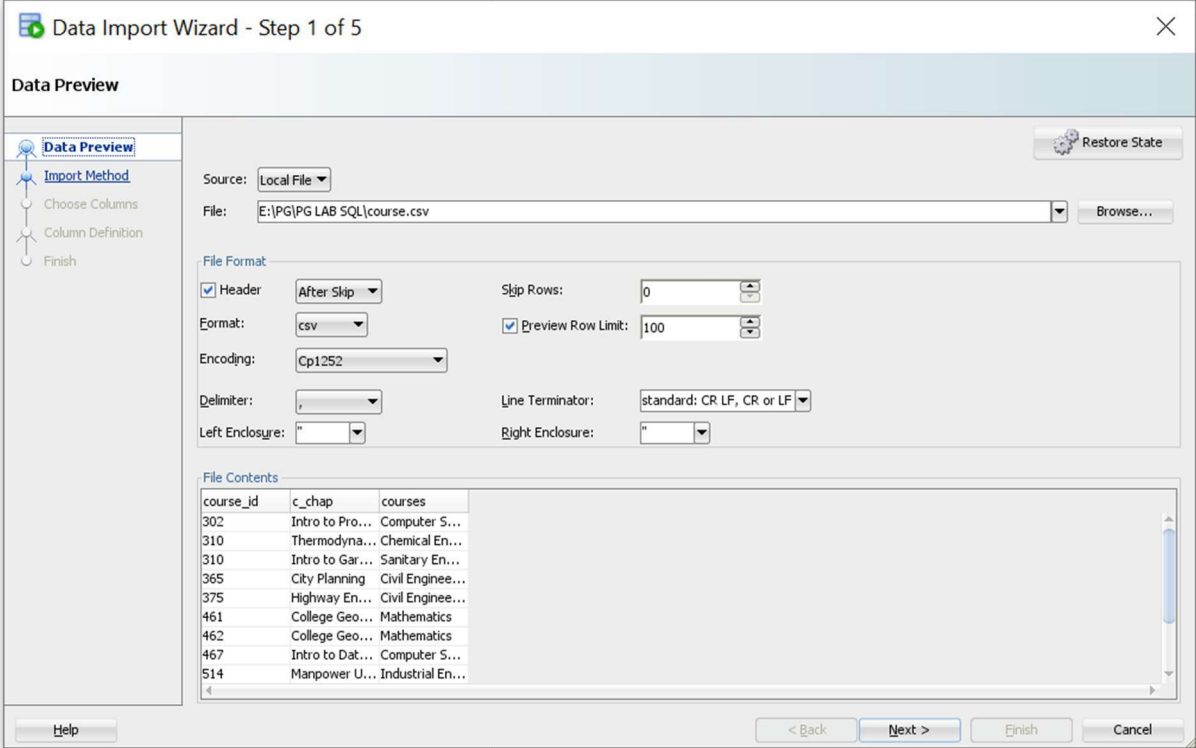


1. By clicking “+” icon on the left under the connections menu you can see the connection name what you gave. Just right click on table click import data then you can see browse button just click on that you will be prompt to open the file which you want to import to the database. Which shows below as like eg3:

Eg3:



STEP 3:

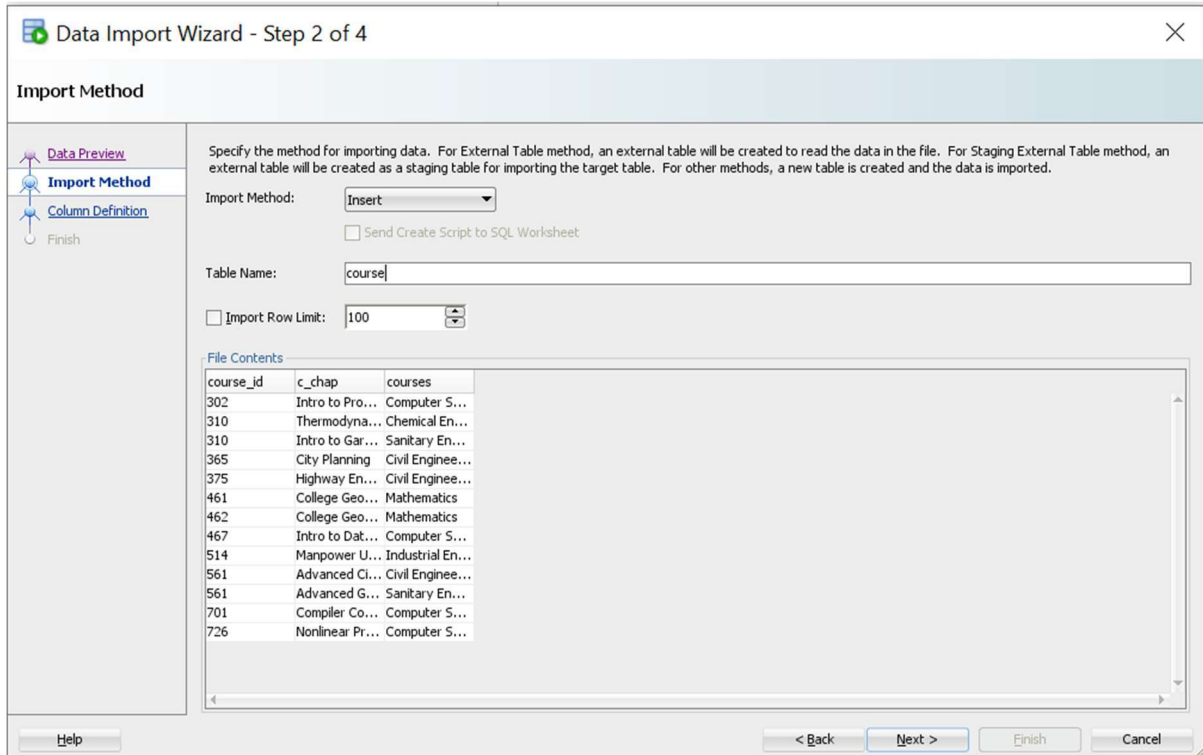


The screenshot shows the 'Data Import Wizard - Step 1 of 5' window. The 'Data Preview' tab is selected in the left sidebar. The main area displays the source file 'E:\PG\LAB SQL\course.csv' and various file format settings. The 'File Format' section includes options for 'Header' (checked), 'Format' (csv), 'Encoding' (Cp1252), 'Delimiter' (comma), 'Line Terminator' (standard: CR LF, CR or LF), 'Skip Rows' (0), 'Preview Row Limit' (100), 'Left Enclosure' (double quote), and 'Right Enclosure' (double quote). A 'Restore State' button is in the top right. The 'File Contents' section shows a table with columns 'course_id', 'c_chap', and 'courses'. The table contains 10 rows of data.

course_id	c_chap	courses
302	Intro to Pro...	Computer S...
310	Thermodyna...	Chemical En...
310	Intro to Gar...	Sanitary En...
365	City Planning	Civil Enginee...
375	Highway En...	Civil Enginee...
461	College Geo...	Mathematics
462	College Geo...	Mathematics
467	Intro to Dat...	Computer S...
514	Manpower U...	Industrial En...

1. By following all the above steps you are ready to choose the file which you want to import. Now this is the first step to import data into the database.
2. You can preview the row limit by specifying 100 or 200 anything it depends upon the data you have.
3. You can simply have a look on file contents where the data in the table will be displayed.
4. You can check the data and click on next.

STEP 4:



The screenshot shows the 'Data Import Wizard - Step 2 of 4' window. The 'Import Method' tab is selected in the left sidebar. The main area contains instructions on how to import data using different methods. The 'Import Method' dropdown is set to 'Insert'. There is a checkbox for 'Send Create Script to SQL Worksheet' which is unchecked. The 'Table Name' field contains the text 'course'. The 'Import Row Limit' checkbox is unchecked, and the limit is set to 100. Below this is a 'File Contents' section showing a table of data.

Specify the method for importing data. For External Table method, an external table will be created to read the data in the file. For Staging External Table method, an external table will be created as a staging table for importing the target table. For other methods, a new table is created and the data is imported.

Import Method:

☐ Send Create Script to SQL Worksheet

Table Name:

☐ Import Row Limit:

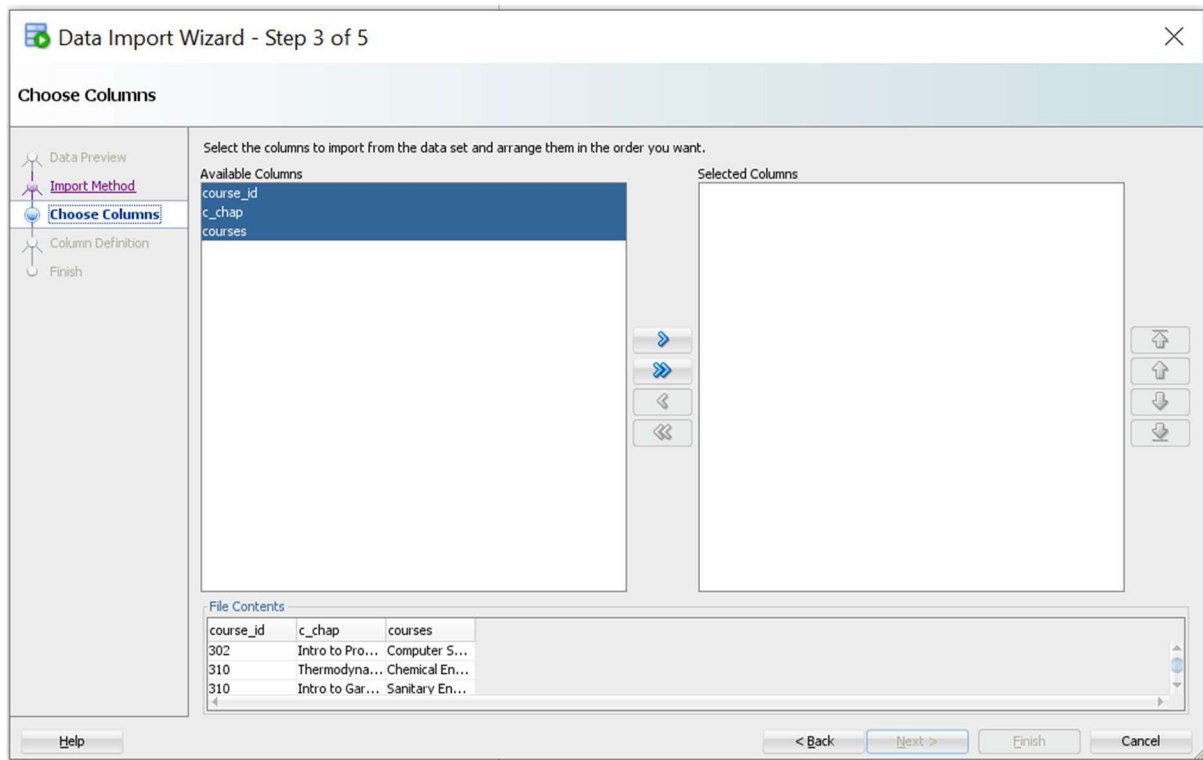
File Contents

course_id	c_chap	courses
302	Intro to Pro...	Computer S...
310	Thermodyna...	Chemical En...
310	Intro to Gar...	Sanitary En...
365	City Planning	Civil Enginee...
375	Highway En...	Civil Enginee...
461	College Geo...	Mathematics
462	College Geo...	Mathematics
467	Intro to Dat...	Computer S...
514	Manpower U...	Industrial En...
561	Advanced Ci...	Civil Enginee...
561	Advanced G...	Sanitary En...
701	Compiler Co...	Computer S...
726	Nonlinear Pr...	Computer S...

Help < Back Next > Finish Cancel

1. In this case I have imported course data set. So I specify the table name with course as easy to work on it. But you can create a table name whatever you want.
2. You can specify the row limit to import then click on next.

STEP 5:



1. You can select the column names that you want to import into the database by clicking the >> right arrow.
2. After selecting all these columns then finally click next.

STEP 6:

Data Import Wizard - Step 4 of 5

Column Definition

For each column on left, define the column details of the database table that will be created to import this data into.

Source Data Columns

- course_id
- c_chap
- courses

Target Table Columns

Name: course_id

Data Type: NUMBER

Size/Precision: 38

Scale: 0

☒ Nullable? Default:

Comment:

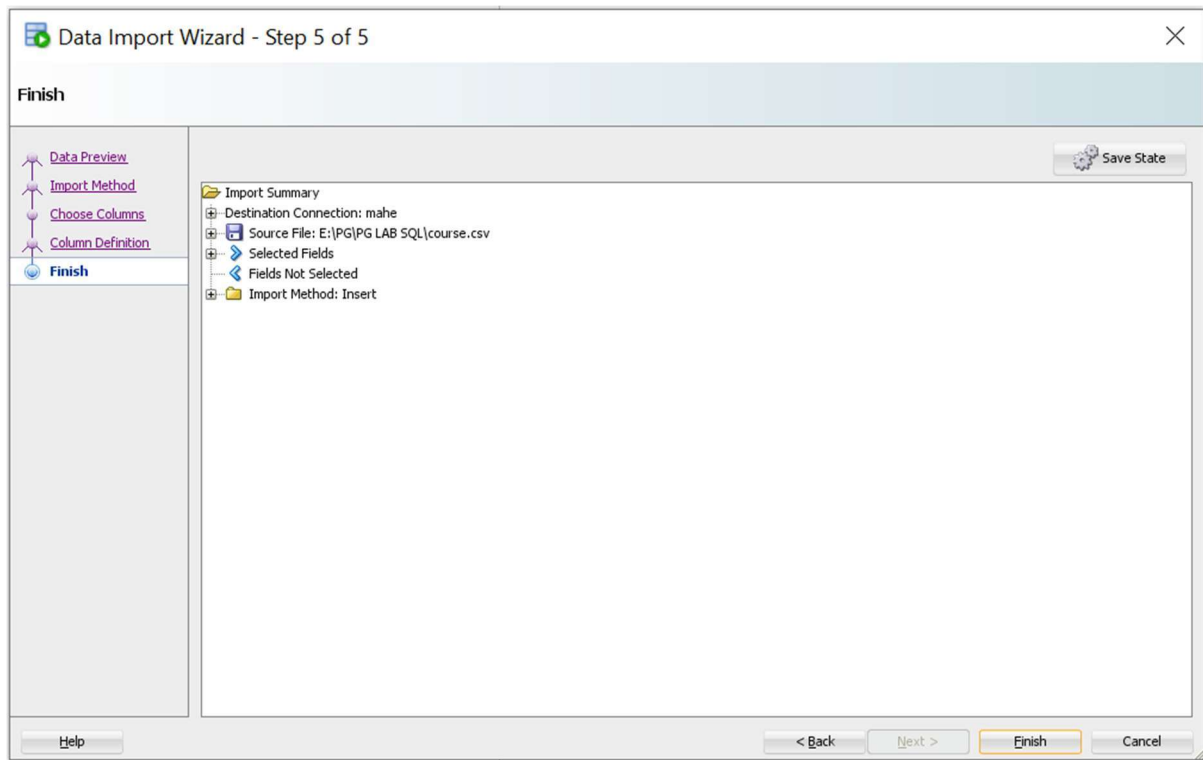
Data

- 302
- 310
- 310
- 365
- 375
- 461
- 462
- 467
- 514
- 561

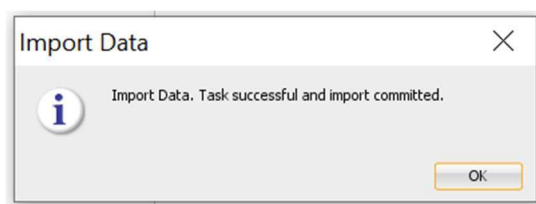
Buttons: Help, < Back, Next >, Finish, Cancel

1. You need to check the column one by one. On the right side you have several options to choose the data type, name and nullable.
2. Data type will be in dropdown list so you can simply choose the data type that relates the value. By default, it automatically senses the type of data in many cases you need to choose for data format data it may take as date format or you can change in to varchar.
3. Do the same process for all the column name then click next.

STEP 7:



1. The above image shows the import summary in a quick view then by clicking finish button you will be prompted as import committed successfully.



2. All the above steps are followed to insert other tables similarly (dept, enroll, major, prof, section and student)

LAB-7. UNIVERSITY COURSE ENROLLMENT DATA ANALYTICS PART-2

Question1:

Print the names of professors who work in departments that have fewer than 50 PhD students.

```
SQL> select d.dname, d.num_phd, p.pname from prof p, dept d where d.num_phd<50
order by num_phd;
```

DNAME	NUM_PHD	PNAME
Sanitary Engineering	3	Jones, J.
Sanitary Engineering	3	Smith, S.
Sanitary Engineering	3	Brown, S.
Sanitary Engineering	3	Brian, C.
Sanitary Engineering	3	Randolph, B.
Sanitary Engineering	3	Bucket, T.
Sanitary Engineering	3	Robinson, T.
Sanitary Engineering	3	Clark, E.
Sanitary Engineering	3	Walter, A.
Sanitary Engineering	3	Edison, L.
Chemical Engineering	32	Walter, A.

DNAME	NUM_PHD	PNAME
Chemical Engineering	32	Clark, E.
Chemical Engineering	32	Robinson, T.
Chemical Engineering	32	Bucket, T.
Chemical Engineering	32	Edison, L.
Chemical Engineering	32	Brian, C.

Chemical Engineering	32	Brown, S.
Chemical Engineering	32	Smith, S.
Chemical Engineering	32	Jones, J.
Chemical Engineering	32	Randolph, B.
Industrial Engineering	41	Jones, J.
Industrial Engineering	41	Smith, S.

DNAME	NUM_PHD	PNAME
-----	-----	-----
Industrial Engineering	41	Randolph, B.
Industrial Engineering	41	Walter, A.
Industrial Engineering	41	Clark, E.
Industrial Engineering	41	Robinson, T.
Industrial Engineering	41	Bucket, T.
Industrial Engineering	41	Edison, L.
Industrial Engineering	41	Brian, C.
Industrial Engineering	41	Brown, S.
Computer Sciences	47	Walter, A.
Computer Sciences	47	Jones, J.
Computer Sciences	47	Smith, S.

DNAME	NUM_PHD	PNAME
-----	-----	-----
Computer Sciences	47	Brown, S.
Computer Sciences	47	Randolph, B.
Computer Sciences	47	Edison, L.
Computer Sciences	47	Bucket, T.
Computer Sciences	47	Robinson, T.
Computer Sciences	47	Clark, E.

Computer Sciences 47 Brian, C.

40 rows selected.

Question2:

Print the names of the students with the lowest GPA.

SQL> select sname, gpa from student where gpa=(select min(gpa) from student);

SNAME	GPA

Jetplane, Leaving O.	0

Question3:

For each computer Science class, print the class number, section number, and the average GPA of the students enrolled in the class section.

SQL> select e.cno, e.sect_no, avg(s.gpa) from enroll e, student s where dname = 'Computer Sciences' and s.sid = e.sid group by dname,cno,sect_no;

CNO	SECT_NO	AVG(S.GPA)

302	1	3
726	1	2.64117648
467	1	2.98000002
302	2	3.07499999
701	1	3.28333333

Question4:

Print the names and section numbers of all sections with more than six students enrolled in them.

```
SQL> select c.cname,c.cno,e.sect_no,count(e.sid) as student_count from course c left join
enroll e on e.cno=c.cno group by c.cname,c.cno,e.sect_no having count(e.sid)>6;
```

CNAME

CNO	SECT_NO	STUDENT_COUNT
-----	---------	---------------

Intro to Garbage

310	1	7
-----	---	---

Manpower Utilization

514	1	9
-----	---	---

Nonlinear Programming

726	1	17
-----	---	----

CNAME

CNO	SECT_NO	STUDENT_COUNT
-----	---------	---------------

Advanced City Planning

561	1	13
-----	---	----

Intro to Data Structures

467	1	10
-----	---	----

Compiler Construction

701	1	12
-----	---	----

CNAME

CNO	SECT_NO	STUDENT_COUNT
-----	---------	---------------

Thermodynamics

310	1	7
-----	---	---

Highway Engineering

375	1	9
-----	---	---

Intro to Programming

302	1	10
-----	---	----

CNAME

CNO	SECT_NO	STUDENT_COUNT
-----	---------	---------------

Intro to Programming

302	2	8
-----	---	---

City Planning

365	1	8
-----	---	---

College Geometry 1

461	1	9
-----	---	---

CNAME

CNO	SECT_NO	STUDENT_COUNT
-----	---------	---------------

College Geometry 2

462	1	9
-----	---	---

Advanced Garbage Collection

561	1	13
-----	---	----

14 rows selected.

Question5:

Print the name(s) and sid(s) of the student(s) enrolled in the most sections.

**SQL> select sname, sid from student where sid in (select sid from enroll group by sid
having count(*)>=all(select count(*) from enroll group by sid));**

SNAME	SID
-------	-----

Hamilton, S.	29
--------------	----

Question6:

Print the names of departments that have one or more majors who are under 18 years old.

SQL> select distinct m.dname from major m,student s where m.sid=s.sid and s.age<18;

DNAME

Mathematics

Industrial Engineering

Question7:

Print the names and majors of students who are taking one of college Geometry courses.

SQL> select m.sid, m.dname from major m inner join enroll e on e.sid = m.sid where e.cno in(461,462);

SID DNAME

4 Computer Sciences

14 Computer Sciences

17 Computer Sciences

18 Computer Sciences

19 Computer Sciences

26 Chemical Engineering

28 Chemical Engineering

35 Chemical Engineering

37 Civil Engineering

40 Civil Engineering

53 Civil Engineering

SID DNAME

55 Civil Engineering

59 Civil Engineering

90 Mathematics

91 Mathematics

94 Mathematics

101 Mathematics

102 Mathematics

18 rows selected.

Question8:

For those departments that have no major taking a college Geometry course print the department name and the number of PhD students in the department.

SQL> select dept.dname, dept.num_phd from dept where not exists(select 1 from course where course.dname=dept.dname and course.cname like '% college geometry%');

DNAME	NUM_PHD
-------	---------

Industrial Engineering	41
------------------------	----

Chemical Engineering	32
----------------------	----

Mathematics	129
-------------	-----

Computer Sciences	47
-------------------	----

Sanitary Engineering	3
----------------------	---

Civil Engineering	88
-------------------	----

6 rows selected.

Question9:

Print the names of students who are taking both a Computer Sciences course and a Mathematics course.

```
SQL> select s.sname from student s inner join enroll e on e.sid = s.sid where e.dname = 'Computer Sciences' and e.dname = 'Mathematics';
```

no rows selected

Question10:

Print the age difference between the oldest and the youngest Computer Sciences major.

```
SQL> select max(s.age) - min(s.age) as "age dif" from student s inner join major m on m.sid = s.sid where m.dname='Computer Science';
```

age dif

38

Question11:

For each department that has one or more majors with a gpa under 1.0, print the name of the department and the average GPA of its majors.

```
SQL> select dname, cno, avg(grade) from enroll enroll group by dname, cno;
```

DNAME	CNO	AVG(GRADE)
-------	-----	------------

Mathematics	462	3.5
-------------	-----	-----

Civil Engineering	365	2.6875
Computer Sciences	302	3.01666667
Computer Sciences	701	3.20833333
Civil Engineering	561	2.54166667
Sanitary Engineering	561	2.6
Industrial Engineering	514	3.16666667
Computer Sciences	726	3.23529412
Chemical Engineering	310	3
Mathematics	461	3.11111111
Computer Sciences	467	3.1

DNAME	CNO	AVG(GRADE)

Civil Engineering	375	3.11111111

12 rows selected.

Question12:

Print the ids, names and GPAs of the students who are currently taking all the Civil Engineering courses.

SQL> select e.sid, s.sname, s.gpa from student s right outer join enroll e on s.sid = e.sid where e.dname = 'Civil Engineering' order by gpa;

SID	SNAME	GPA

81	Smith, Ike Z.	1.10000002
18	Gooch	1.39999998
47	Roger, Blotter N.	1.89999998
47	Roger, Blotter N.	1.89999998

9 Smith, Joyce A.	2
61 Kennedy, Ed	2.29999995
34 Kasten, Norman L.	2.5
60 Calcmity, J.	2.59999991
66 Altenhaus, Stuart	2.79999995
29 Hamilton, S.	2.79999995
29 Hamilton, S.	2.79999995

SID SNAME	GPA
-----------	-----

66 Altenhaus, Stuart	2.79999995
29 Hamilton, S.	2.79999995
36 Burroughs, Susan S.	3
54 Maximillian	3
76 Zorhoff, C.	3
70 Caucutt, B.	3
23 Bomber, C.	3.20000005
96 Birch, M.	3.5
85 Mayer, N.	3.5
96 Birch, M.	3.5
33 Chao, Tsechih	3.59999991

SID SNAME	GPA
-----------	-----

74 Andrus, J.	3.70000005
32 Liu, Huihusan	3.90000001
79 Evert, Chris	3.90000001
3 Zeene, Ben N.	3.90000001

64 Fred, Edwin B.	4
48 Natividad, A.	4
73 Quarnty, G.	4

29 rows selected.