

Database Concepts Answer Sheet

Assignment 2, Semester 2, 2020

Student Information

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Assignment Declaration

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2. I accept that use of my RMIT account to electronically submit this assessment constitutes my agreement to the Declaration and Statement of Authorship
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Compulsory Worklog Snapshots

Place your snapshots below. One snapshot showing the tables in your account. One snapshot including the SQL history for each connection session that you work on the assignment. **Your snapshot must be a full screenshot** showing your account and connection and the timestamps of each entry your SQL history – only copy the SQL history is not sufficient.

The screenshot shows the Oracle SQL Developer interface. The top menu bar includes File, Edit, View, Navigate, Run, Source, Team, Tools, Window, and Help. Below the menu is a toolbar with various icons. On the left, there's a navigation pane with tabs for 'Co...', 'C...', and 'T...'. Under 'T...', several tables are listed: ACADEMIC, AUTHOR, DEPARTMENT, FIELD, INTEREST, and PAPER. Below this is a 'Reports' section with categories like All Reports, Data Dictionary, Data Modeler, OLAP Reports, TimesTen Rep, and User Defined. The main workspace has tabs for 'Worksheet' and 'Query Builder'. In the Worksheet tab, the following SQL query is entered:

```
select * from tab
```

Below the query, the results are displayed in a table titled 'Script Output' with a 'Query Result' tab selected. The results show the following data:

TNAME	TABTYPE	CLUSTERID
1 ACADEMIC	TABLE	(null)
2 AUTHOR	TABLE	(null)
3 DEPARTMENT	TABLE	(null)
4 FIELD	TABLE	(null)
5 INTEREST	TABLE	(null)
6 PAPER	TABLE	(null)

Oracle SQL Developer EN English (United Kingdom)

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Tables S3787033

Worksheet Query Builder

```
SELECT academic.givename, academic.famname, academic.title
FROM academic, author
WHERE academic.acnum=author.acnum
GROUP BY academic.givename, academic.famname, academic.title
HAVING COUNT(panum) = (SELECT MAX(COUNT(panum)) FROM author GROUP BY acnum);
```

Script Output Query Result SQL | All Rows Fetched: 1 in 0.016 seconds

GIVENAME	FAMNAME	TITLE
1 Jeremy	Read	Dr

SQL History

SQL	Connection	TimeStamp	Type	Executed	Duration(se...
SELECT academic.givename, academic.famname, academic.titleFROM a...	CSAMPR1	15/SEP/20 09:52 AM	SQL	1	0.016
SELECT academic.givename, academic.famname, academic.titleFROM a...	CSAMPR1	15/SEP/20 09:51 AM	SQL	1	0.047
SELECT academic.acnum, famname, givename, COUNT(panum)FROM a...	CSAMPR1	15/SEP/20 09:49 AM	SQL	1	0.047
SELECT MAX(COUNT(author.panum)),MIN(COUNT(author.panum)) FRO...	CSAMPR1	15/SEP/20 09:30 AM	SQL	1	0.022
SELECT department.ininame, department.deptnameFROM department...	CSAMPR1	15/SEP/20 09:21 AM	SQL	2	0.034
SELECT academic.acnum, academic.famname, academic.givename, aca...	CSAMPR1	15/SEP/20 08:52 AM	SQL	3	0.016
SELECT academic.acnum, academic.famname, academic.givename, aca...	CSAMPR1	15/SEP/20 08:52 AM	SQL	1	0.015
SELECT academic.acnum, academic.famname, academic.givename, aca...	CSAMPR1	15/SEP/20 08:52 AM	SQL	2	0.079
SELECT field.fieldnum, field.titleFROM field WHERE field.fieldnum IN (SEL...	CSAMPR1	15/SEP/20 08:39 AM	SQL	2	0.018
SELECT field.fieldnum, field.titleFROM field, interestWHERE field.fieldnu...	CSAMPR1	15/SEP/20 08:38 AM	SQL	1	0.024
(SELECT fieldnum FROM interest WHERE acnum = 100);	CSAMPR1	15/SEP/20 08:37 AM	SQL	2	0.015
select count(*) from field;	CSAMPR1	15/SEP/20 08:37 AM	SQL	1	0.016
select count(*) from interest;	CSAMPR1	15/SEP/20 08:37 AM	SQL	1	0.016
SELECT academic.acnum, academic.givename, academic.famname, cou...	CSAMPR1	15/SEP/20 08:33 AM	SQL	2	0.015
SELECT academic.acnum, academic.givename, academic.famname, cou...	CSAMPR1	15/SEP/20 08:33 AM	SQL	1	0.019
SELECT academic.acnum, academic.givename, academic.famname, cou...	CSAMPR1	15/SEP/20 08:33 AM	SQL	1	0.023
SELECT paper.panum, paper.title, count(author.acnum) AS 'NO. AUTH...' CSAMPR1	15/SEP/20 08:29 AM	SQL	1	0.031	
SELECT paper.panum, paper.title, count(author.acnum)FROM paper, a...	CSAMPR1	15/SEP/20 08:28 AM	SQL	1	0.031
SELECT paper.panum, paper.title, count(academic.acnum)FROM paper,...	CSAMPR1	15/SEP/20 08:27 AM	SQL	1	0.328
SELECT famname, givenameFROM academic ORDER BY famname, given...	CSAMPR1	15/SEP/20 08:24 AM	SQL	1	0.015
SELECT *FROM academic WHERE academic.title is not null;	CSAMPR1	15/SEP/20 08:21 AM	SQL	2	0.015
SELECT *FROM academic WHERE academic.title is null;	CSAMPR1	15/SEP/20 08:21 AM	SQL	1	0.015
SELECT famname, givename, academic.acnum FROM academic, interest...	CSAMPR1	15/SEP/20 08:19 AM	SQL	1	0.016
SELECT famname, givename FROM academic, interest WHERE academic...	CSAMPR1	15/SEP/20 08:19 AM	SQL	1	0.032
SELECT COUNT(*)FROM academic;	CSAMPR1	15/SEP/20 08:16 AM	SQL	1	0.016

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Tables S3787033

Worksheet Query Builder

```
SELECT *
FROM academic
WHERE academic.title is not null;
```

Script Output Query Result SQL Fetched 50 rows in 0.015 seconds

ACNUM	DEPTNUM	FAMNAME	GIVENAME	INITIALS	TITLE
1	392	138 Benjamin	Steve	S R A	AProf
2	393	138 Sun	James	J N	Dr
3	394	136 Ditlefesen	Sanjay	S M	Ms
4	395	123 Heine	Kevin	K M	Mr

SQL History

SQL	Connection	TimeStamp	Type	Executed	Duration(se...
SELECT *FROM academic WHERE academic.title is not null;	CSAMPR1	15/SEP/20 08:21 AM	SQL	2	0.015
SELECT *FROM academic WHERE academic.title is null;	CSAMPR1	15/SEP/20 08:21 AM	SQL	1	0.015
SELECT famname, givename, academic.acnum FROM academic, interest...	CSAMPR1	15/SEP/20 08:19 AM	SQL	1	0.016
SELECT famname, givename FROM academic, interest WHERE academic...	CSAMPR1	15/SEP/20 08:19 AM	SQL	1	0.032
SELECT COUNT(*)FROM academic;	CSAMPR1	15/SEP/20 08:16 AM	SQL	1	0.016
select * from tab	CSAMPR1	15/SEP/20 08:14 AM	SQL	1	0.05
purge RECYCLEBIN;	CSAMPR1	15/SEP/20 08:14 AM	SQL	1	0.86
select * from tab;	CSAMPR1	15/SEP/20 08:13 AM	SQL	1	0.063

Query Result

All Rows Fetched: 20 in 2.006 seconds

INSTNAME	DEPTNAME				
SQL History					
SQL	Connection	TimeStamp	Type	Executed	Duration(se...)
SELECT department.ininame, department.deptname, department.dep... CSAMPR1	CSAMPR1	15/SEP/20 02:47 PM	SQL	3	2.006
SELECT academic.deptnum, interest.DESCRIPT FROM academic, interest... CSAMPR1	CSAMPR1	15/SEP/20 02:47 PM	SQL	1	0.022
SELECT department.ininame, department.deptnameFROM department... CSAMPR1	CSAMPR1	15/SEP/20 02:43 PM	SQL	7	0.018
SELECT academic.deptnum, interest.DESCRIPT FROM academic, interest... CSAMPR1	CSAMPR1	15/SEP/20 02:43 PM	SQL	1	0.019
SELECT academic.deptnum FROM academic, interest WHERE academic.... CSAMPR1	CSAMPR1	15/SEP/20 02:43 PM	SQL	1	0.02
SELECT academic.deptnum FROM academic, interest WHERE academic.... CSAMPR1	CSAMPR1	15/SEP/20 02:42 PM	SQL	2	0.02
select deptlum from academic natural join author group b... CSAMPR1	CSAMPR1	15/SEP/20 02:34 PM	SQL	2	0.018
select * from academic where acnum = 463; CSAMPR1	CSAMPR1	15/SEP/20 02:34 PM	SQL	1	0.018
SELECT *FROM interestWHERE acnum = 463; CSAMPR1	CSAMPR1	15/SEP/20 02:34 PM	SQL	2	0.016
SELECT *FROM interestWHERE acnum = 463 CSAMPR1	CSAMPR1	15/SEP/20 02:33 PM	SQL	1	0.019
select givename, fname, deptname, acnumfrom academic natural joi... CSAMPR1	CSAMPR1	15/SEP/20 02:33 PM	SQL	1	0.034
select givename, fname, deptnamefrom academic natural join depart... CSAMPR1	CSAMPR1	15/SEP/20 02:32 PM	SQL	2	0.073
SELECT academic.acnum, academic.fname, academic.givename, aca... CSAMPR1	CSAMPR1	15/SEP/20 02:14 PM	SQL	7	0.096
SELECT field.fieldnum, field.titleFROM field, interestWHERE field.fieldnu... CSAMPR1	CSAMPR1	15/SEP/20 02:13 PM	SQL	4	0.025
SELECT academic.acnum, academic.givename, academic.fname, cou... CSAMPR1	CSAMPR1	15/SEP/20 02:07 PM	SQL	2	0.03
SELECT paper.panum, paper.title, count(author.acnum) AS "NO. AUTH... CSAMPR1	CSAMPR1	15/SEP/20 02:06 PM	SQL	7	0.022
SELECT fname, givenameFROM academicORDER BY fname, givename... CSAMPR1	CSAMPR1	15/SEP/20 02:04 PM	SQL	4	0.018
SELECT *FROM academicWHERE academic.title is not null; CSAMPR1	CSAMPR1	15/SEP/20 02:04 PM	SQL	7	0.017
SELECT *FROM academicWHERE academic.title is null; CSAMPR1	CSAMPR1	15/SEP/20 02:04 PM	SQL	2	0.034
SELECT fname, givename FROM academic, interest WHERE academic... CSAMPR1	CSAMPR1	15/SEP/20 02:03 PM	SQL	5	0.075
SELECT acnum FROM INTEREST where interest.descrip = 'Data Structur... CSAMPR1	CSAMPR1	15/SEP/20 02:03 PM	SQL	1	0.03
SELECT COUNT(*)FROM academic; CSAMPR1	CSAMPR1	15/SEP/20 02:02 PM	SQL	5	0.02
SELECT academic.acnum, academic.givename, academic.fname, cou... CSAMPR1	CSAMPR1	15/SEP/20 01:42 PM	SQL	1	0.027
SELECT academic.acnum, academic.givename, academic.fname, cou... CSAMPR1	CSAMPR1	15/SEP/20 01:40 PM	SQL	4	0.031
select count(*)FROM paper; CSAMPR1	CSAMPR1	15/SEP/20 01:40 PM	SQL	1	0.018
SELECT fname, givename, academic.acnum FROM academic, interest... CSAMPR1	CSAMPR1	15/SEP/20 12:27 PM	SQL	2	0.022
SELECT count(*)FROM academic; CSAMPR1	CSAMPR1	15/SEP/20 12:25 PM	SQL	1	0.017

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Worksheet Query Builder

```

GROUP BY panum
HAVING count(acnum) > 1
GROUP BY author.acnum
);

SELECT COUNT(panum), acnum

```

Query Result

COUNT(PANUM) ACNUM

COUNT(PANUM)	ACNUM
346	27
347	28
347	457

SQL History

SQL	Connection	TimeStamp	Type	Executed	Duration(se...)
SELECT COUNT(panum), acnumFROM author WHERE author.panum in (... CSAMPR1	CSAMPR1	15/SEP/20 05:03 PM	SQL	1	0.033
SELECT COUNT(panum), acnumFROM author WHERE author.panum in (... CSAMPR1	CSAMPR1	15/SEP/20 05:02 PM	SQL	3	0.023
SELECT COUNT(panum), acnumFROM author WHERE author.panum in (... CSAMPR1	CSAMPR1	15/SEP/20 05:02 PM	SQL	1	0.032
SELECT givename, fname, title, acnumFROM academicWHERE acade... CSAMPR1	CSAMPR1	15/SEP/20 05:02 PM	SQL	5	0.056
SELECT COUNT(panum), acnumFROM author WHERE author.panum in (... CSAMPR1	CSAMPR1	15/SEP/20 05:02 PM	SQL	1	0.028
SELECT COUNT(panum)FROM author WHERE author.panum in (SELECT ... CSAMPR1	CSAMPR1	15/SEP/20 05:00 PM	SQL	1	0.025
SELECT department.ininame, department.deptnameFROM department... CSAMPR1	CSAMPR1	15/SEP/20 04:57 PM	SQL	8	0.049
SELECT academic.acnum, academic.fname, academic.givename, aca... CSAMPR1	CSAMPR1	15/SEP/20 04:55 PM	SQL	9	0.245
SELECT field.fieldnum, field.titleFROM field, interestWHERE field.fieldnu... CSAMPR1	CSAMPR1	15/SEP/20 04:54 PM	SQL	5	0.021
SELECT academic.acnum, academic.givename, academic.fname, cou... CSAMPR1	CSAMPR1	15/SEP/20 04:53 PM	SQL	3	0.039
SELECT paper.panum, paper.title, count(author.acnum) AS "NO. AUTH... CSAMPR1	CSAMPR1	15/SEP/20 04:53 PM	SQL	8	0.069
SELECT fname, givenameFROM academic, interest WHERE academic... CSAMPR1	CSAMPR1	15/SEP/20 04:52 PM	SQL	6	0.038
SELECT COUNT(*)FROM academic; CSAMPR1	CSAMPR1	15/SEP/20 04:52 PM	SQL	6	0.021
SELECT MIN(count(author.panum)) FROM author, academic WHERE a... CSAMPR1	CSAMPR1	15/SEP/20 04:37 PM	SQL	1	0.026
SELECT academic.acnum, academic.fname, academic.givename, aca... CSAMPR1	CSAMPR1	15/SEP/20 04:36 PM	SQL	4	0.414
SELECT academic.acnum, academic.fname, academic.givename, aca... CSAMPR1	CSAMPR1	15/SEP/20 03:21 PM	SQL	3	0.285
SELECT academic.acnum, academic.fname, academic.givename, aca... CSAMPR1	CSAMPR1	15/SEP/20 02:58 PM	SQL	3	0.248
SELECT academic.acnum, academic.fname, academic.givename, aca... CSAMPR1	CSAMPR1	15/SEP/20 02:57 PM	SQL	1	0.078
SELECT department.ininame, department.deptname, department.dep... CSAMPR1	CSAMPR1	15/SEP/20 02:47 PM	SQL	3	2.006
SELECT academic.deptnum, interest.DESCRIPT FROM academic, interest... CSAMPR1	CSAMPR1	15/SEP/20 02:47 PM	SQL	1	0.022
SELECT academic.deptnum, interest.DESCRIPT FROM academic, interest... CSAMPR1	CSAMPR1	15/SEP/20 02:43 PM	SQL	1	0.019
SELECT academic.deptnum FROM academic, interest WHERE academic... CSAMPR1	CSAMPR1	15/SEP/20 02:43 PM	SQL	1	0.02

Question 1

Reference number	QC1-19
Text of Your Question	How many academics are there in the database? Write a query to find the answer.

The answer is as follows.

```
SELECT COUNT(*)  
FROM academic;
```

Question 2

Reference number	QC1-18
Text of Your Question	Return the famname and givename of academics having interests in 'Data Structures' (descrip) with acnum in the range [100...399]. The output should be in alphabetical order of famname and then givename.

The answer is as follows.

```
SELECT famname, givename  
FROM academic, interest  
WHERE academic.acnum = interest.acnum  
AND interest.descrip = 'Data Structures'  
AND academic.acnum >= 100 AND academic.acnum <= 399  
ORDER BY academic.famname, academic.givename;
```

Question 3

Reference number	QC1-16
Text of Your Question	Find academics who have a title (title) available in the database. Write a query to return all details of these academics.

The answer is as follows.

```
SELECT *
FROM academic
WHERE academic.title is not null;
```

Question 4

Reference number	QC1-14
Text of Your Question	List the famname, givename of all academics in the database, in alphabetical order.

The answer is as follows.

```
SELECT famname, givename  
FROM academic  
ORDER BY famname, givename;
```

Question 5

Reference number	QC2-15
Text of Your Question	List the panum, title, and total number of academics (under the heading "NO. AUTHORS") for each paper, in increasing order (i.e. ascending order) of panum.

The answer is as follows.

```
SELECT paper.panum, paper.title, count(author.acnum) AS "NO. AUTHORS"  
FROM paper, author  
WHERE paper.panum = author.panum  
GROUP BY paper.panum, paper.title  
ORDER BY paper.panum;
```

Question 6

Reference number	QC2-14
Text of Your Question	For each academic, give the acnum, givename, fname and the total number of fields s/he has worked in. Note that if an academic has not worked in any fields, his/her total should be zero.

The answer is as follows.

```
SELECT academic.acnum, academic.givename, academic.fname,  
count(interest.fieldnum)  
FROM academic LEFT JOIN interest on academic.acnum = interest.acnum  
GROUP BY academic.acnum, academic.givename, academic.fname;
```

Question 7

Reference number	QC2-13
Text of Your Question	List the field number and title of fields interested by the academic whose acnum is 100.

The answer is as follows.

```
SELECT field.fieldnum, field.title  
FROM field, interest  
WHERE field.fieldnum = interest.fieldnum  
AND interest.acnum = 100;
```

Question 8

Reference number	QC2-19
Text of Your Question	The research productivity of an academic is measured by the number of his/her papers. List details (acnum, famname, givename and title) of the most productive academic together with the total number of his/her papers.

The answer is as follows.

```
SELECT academic.acnum, academic.famname, academic.givename, academic.title,  
count(author.panum)  
FROM academic, author  
WHERE academic.acnum = author.acnum  
HAVING COUNT(author.panum) >= ALL (SELECT MAX(COUNT(author.panum)) FROM  
author, academic WHERE author.acnum = academic.acnum GROUP BY author.acnum)  
GROUP BY academic.acnum, academic.famname, academic.givename, academic.title;
```

Question 9

Reference number	QC3-19
Text of Your Question	Explain the following query in English. A literal explanation will receive 0 marks.

The answer is as follows.

```
select givename, famname, deptname
from academic natural join department
where acnum not in
    (select acnum
     from academic natural join interest)
and deptNum in
    (select deptNum
     from academic natural join author
     group by deptNum
     having count(panum)>100)
```

It returns the given name, family name and department number of the academics who don't have an interest and belong to a department that's members in total have co-authored over 100 books.

Question 10

Reference number	QC3-20
Text of Your Question	Find departments where there are academics that have at least two research interests without any description. List their instname and deptname in alphabetical order.

The answer is as follows.

```
SELECT department.instname, department.deptname
FROM department
WHERE department.deptnum IN (SELECT academic.deptnum FROM academic, interest
WHERE academic.acnum = interest.acnum AND interest.descrip IS NULL GROUP BY
academic.deptnum HAVING count(academic.deptnum) >= 2);
```

-- Assumption: The query is requesting the interest does not have a description, not the department not having a description. As confirmed by tutor.

Question 11

Reference number	QC3-16
Text of Your Question	The productivity of an academic is measured by the total number of papers s/he has written. Find the papers that have the most productive author/s or the least productive author/s. Output the acnum, title, and the givename, famname of the most productive author/s or the least productive author/s together with the number of their papers.

The answer is as follows.

```
SELECT academic.acnum, academic.famname, academic.givename, academic.title,  
count(author.panum)  
FROM academic, author  
WHERE academic.acnum = author.acnum  
HAVING COUNT(author.panum) = ALL (SELECT MAX(COUNT(author.panum)) FROM  
author, academic WHERE author.acnum = academic.acnum GROUP BY author.acnum)  
OR COUNT(author.panum) = ALL (SELECT MIN(COUNT(author.panum)) FROM author,  
academic WHERE author.acnum = academic.acnum GROUP BY author.acnum)  
GROUP BY academic.acnum, academic.famname, academic.givename, academic.title;
```

-- Assumption: A person has to have written atleast 1 book to be considered an author. This means that the least productive is 15 rather than 0. This was confirmed by tutor.

Question 12

Reference number	QC3-15
Text of Your Question	Find the academic/s who have the biggest number of co-authors. Output the givename, famname, and title of the academic.

The answer is as follows.

```
SELECT givename, famname, title
FROM academic
WHERE academic.acnum = ANY (SELECT author.acnum
                             FROM author
                             WHERE panum in (SELECT panum
                                              FROM author
                                              GROUP BY panum
                                              HAVING count(acnum) > 1)
                             GROUP BY acnum
                             HAVING SUM(panum) >= (SELECT MAX(SUM(panum))
                                              FROM author
                                              WHERE panum in (SELECT panum
                                                               FROM author
                                                               GROUP BY panum
                                                               HAVING count(acnum) > 1)
                                                               GROUP BY acnum));
```