

Final Exam Report

Question 1

(a)

The screenshot shows the pgAdmin 4 interface. The left pane displays the database structure, including the 'ba' schema. The main pane shows a query editor with the following SQL script:

```

-- Create a new table:
CREATE TABLE ba.students (
    studentid integer NOT NULL,
    fullname varchar(50) NOT NULL,
    email varchar(50) NOT NULL
);
INSERT INTO ba.students(studentid, fullname, email) VALUES
(2132300562, 'Nguyen Thanh Dat', 'dat.n.bbs21@eiu.edu.vn');
-- Q1.A Check tables
SELECT table_name, column_name, data_type
FROM information_schema.columns
WHERE table_schema = 'ba'
ORDER BY table_name, ordinal_position;
    
```

The 'Data Output' pane shows the results of the query, displaying a list of columns for the 'ba' schema:

table_name	column_name	data_type
bookings	bookid	integer
bookings	facid	integer
bookings	memid	integer
bookings	starttime	timestamp without time zone
bookings	slots	integer
facilities	facid	integer
facilities	name	character varying
facilities	membercost	numeric
facilities	questcost	numeric
facilities	initialoutlay	numeric

(b)

The screenshot shows the pgAdmin 4 interface. The left pane displays the database structure, including the 'ba' schema. The main pane shows a query editor with the following SQL script:

```

-- Q1.A Check tables
SELECT table_name, column_name, data_type
FROM information_schema.columns
WHERE table_schema = 'ba'
ORDER BY table_name, ordinal_position;
-- Q1. B. check table student
-- Your answer here
SELECT table_name, column_name, data_type
FROM information_schema.columns
WHERE table_schema = 'ba' and table_name = 'students'
ORDER BY table_name, ordinal_position;
-- End your answer
/*
Question 2 (10 marks): Write an SQL query to find the top 3 facilities that have been booked the most number of total slots (not just number of bookings).
    
```

The 'Data Output' pane shows the results of the query, displaying a list of columns for the 'ba' schema:

table_name	column_name	data_type
students	studentid	integer
students	fullname	character varying
students	email	character varying

Question 2: *I wrote this query to eliminate the bias when using 'order by' and 'limit'. This is because when sometimes I combine 'order by' and 'limit', the output is able to remove some rows which have the same values with the last row of the output.*

The screenshot shows the pgAdmin 4 interface. The left sidebar displays the database structure, including the 'ba' schema with tables 'bookings', 'facilities', 'members', and 'students'. The main pane shows a SQL query in the 'Query' tab, which is designed to find the top 3 facilities by total slots booked, using a window function to handle ties.

```
30 ORDER BY table_name, format_position,
31 -- End your answer
32
33 /*
34 Question 2 (10 marks): Write an SQL query to find the top 3 facilities that have been booked the most number of total slots (not just number of bookings).
35 Display their facility ID and the total number of slots booked, sorted from highest to lowest.
36 */
37 -- Your answer here
38 select facid, total_slots from (select
39     bo.facid,
40     sum(slots) as total_slots,
41     rank() over(order by sum(slots) desc) as ranking
42 from ba.bookings bo
43 group by bo.facid)
44 where ranking <= 3
45 order by total_slots desc;
46 -- End your answer
```

The 'Data Output' tab shows the results of the query, displaying the facility ID and the total number of slots booked for the top 3 facilities.

facid	total_slots
1	1404
2	1320
3	1278

The bottom of the image shows the Windows taskbar with the search bar and various application icons.

Question 3:

The screenshot shows the pgAdmin 4 interface with a PostgreSQL 17 database. The query editor displays the following SQL query:

```
40 sum(slots) as total_slots,
41 rank() over(order by sum(slots) desc) as ranking
42 from ba.bookings bo
43 group by bo.facid
44 where ranking <= 3;
45
46 -- End your answer
47
48 Question 3 (20 marks): Write an SQL query to display all bookings that lasted more than 2 slots, along with the member ID, facility ID, and facility name,
49 sorted by member ID and then by start time (ascending).
50
51 /*
52 -- Your answer here
53 select bo.bookid, bo.memid, bo.facid, fa.name as facility_name, starttime, slots from ba.bookings bo
54 left join ba.facilities fa on fa.facid = bo.facid
55 where slots > 2
56 order by bo.memid, starttime;
57 -- End your answer
```

The Data Output tab shows the results of the query:

bookid	memid	facid	facility_name	starttime	slots
1	17	0	Tennis Court 2	2012-07-05 17:30:00	3
2	26	0	Tennis Court 1	2012-07-06 08:00:00	3
3	27	0	Tennis Court 1	2012-07-06 14:00:00	3
4	37	0	Tennis Court 1	2012-07-07 12:30:00	3
5	74	0	Tennis Court 2	2012-07-09 13:00:00	3
6	84	0	Snooker Table	2012-07-09 18:30:00	4
7	77	0	Badminton Court	2012-07-09 19:00:00	3
8	88	0	Tennis Court 1	2012-07-10 11:30:00	3
9	89	0	Tennis Court 1	2012-07-10 16:00:00	3
10	109	0	Tennis Court 1	2012-07-11 12:00:00	3

Question 4:

The screenshot shows the pgAdmin 4 interface with a PostgreSQL 17 database. The query editor displays the following SQL query:

```
58 Question 4 (20 marks): Write an SQL query to display each member and the number of bookings they made for facility ID = 1.
59 Include all members, even those who have never booked that facility.
60
61 /*
62 -- Your answer here
63 with memid_and_fac1_bookings as (
64 select bo.memid, count(bookid) as facility1_bookings from ba.bookings bo
65 where bo.facid = 1
66 group by bo.memid
67 order by facility1_bookings desc)
68 select
69 mb.memid,
70 mb.firstname || ' ' || mb.surname as member_name,
71 fa1.facility1_bookings
72 from ba.members mb
73 left join memid_and_fac1_bookings fa1 on fa1.memid = mb.memid
74 order by (case when fa1.facility1_bookings is null then 1 else 0 end), fa1.facility1_bookings desc, mb.memid;
75 -- End your answer
```

The Data Output tab shows the results of the query:

memid	member_name	facility1_bookings
1	0 GUEST GUEST	113
2	8 Tim Boothe	52
3	10 Charles Owen	41
4	12 Anne Baker	35
5	9 Ponder Stibbons	31
6	11 David Jones	30
7	1 Darren Smith	19
8	7 Nancy Dare	11
9	24 Ramnaresh Sarwin	11
10	4 Janice Joplette	8

Question 5:

pgAdmin 4

File Object Tools Edit View Window Help

2 - Final Exam MIS 443 Q4 - 2024-2025 - Skeleton.sql* x ba.bookings/nguy... x ba.facilities/nguye... x ba.members/nguy...

nguyenthanhdta/postgres@PostgreSQL 17

Query Query History

```

74 -- End your answer
75 /*
76 Question 5 (20 marks): Write an SQL query to show the total number of slots booked by guests (memid = 0) for each facility.
77 Include the facility name and display the result in descending order of total slots used.
78 */
79 -- Your answer here
80 with filtered_0_memid as (select * from ba.bookings bo
81 where memid = 0)
82 select cte.facid, fa.name, sum(cte.slots) as total_slots from filtered_0_memid cte
83 left join ba.facilities fa on fa.facid = cte.facid
84 group by cte.facid, fa.name
85 order by total_slots desc
86 -- End your answer
87 /*
88 Question 6 (20 marks): Write an SQL query to rank members based on their total number of bookings.
89 Members with the same number of bookings should have the same rank. Only include members who have made at least one booking
90 */

```

Data Output Messages Notifications

Showing rows: 1 to 9 Page No: 1 of 1

	facid	name	total_slots
	integer	character varying (100)	bigint
1	6	Squash Court	686
2	4	Massage Room 1	520
3	1	Tennis Court 2	396
4	0	Tennis Court 1	363
5	5	Massage Room 2	174
6	2	Badminton Court	123
7	8	Pool Table	54
8	7	Snooker Table	48
9	3	Table Tennis	36

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Question 6:

pgAdmin 4

File Object Tools Edit View Window Help

2 - Final Exam MIS 443 Q4 - 2024-2025 - Skeleton.sql* x ba.bookings/nguy... x ba.facilities/nguye... x ba.members/nguy...

nguyenthanhdta/postgres@PostgreSQL 17

Query Query History

```

91 -- Your answer here
92 with members_and_bookings as (
93 select
94     bo.memid,
95     mb.firstname || ' ' || mb.surname as member_name,
96     count(bookid) as total_bookings
97 from ba.bookings bo
98 left join ba.members mb on mb.memid = bo.memid
99 group by bo.memid, member_name
100 order by total_bookings desc)
101 select
102     mab.memid,
103     mab.member_name,
104     mab.total_bookings,
105     rank() over(order by total_bookings desc)
106 from members_and_bookings mab
107 where total_bookings > 0;

```

Data Output Messages Notifications

Showing rows: 1 to 30 Page No: 1 of 1

	memid	member_name	total_bookings	rank
	integer	text	bigint	bigint
1	0	GUEST GUEST	883	1
2	3	Tim Rownam	408	2
3	1	Darren Smith	261	3
4	2	Tracy Smith	210	4
5	8	Tim Boothe	188	5
6	6	Burton Tracy	176	6
7	16	Timothy Baker	166	7
8	5	Gerald Butters	164	8
9	4	Janice Joplette	159	9
10	10	Charles Owen	131	10

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