

Junior BI Analyst Assessment – SQL Task

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Note: Due to BigQuery Sandbox limitations (no billing enabled), it is not possible to save queries as named views or make datasets public. Therefore, all SQL queries and results are documented here as per the alternative submission instructions. For clarity and readability, I have included only two screenshots per question.

Process Overview

To complete this assessment, I followed these steps:

- Created a Google Cloud Project:**
 - Project name: `msdata-464709`
- Set Up BigQuery Environment:**
 - Used the BigQuery Free Sandbox (no billing).
 - Created a dataset named `exam_data`.
 - Imported the provided `exam_sessions` and `exams` tables (converted to `CSV` from `xlsx` as there was no option of using excel file because of Sandbox limitation).
- Wrote and Ran SQL Queries:**
 - Used the BigQuery editor to write, test, and execute each SQL query.
 - Captured screenshots of result tables as proof of successful execution.

Below is a sample screenshot showing my BigQuery project, tables, and result preview:

The screenshot displays the Google Cloud BigQuery interface. On the left, the Explorer panel shows the project structure for 'msdata-464709', including datasets like 'exam_data', 'exam_sessions', and 'exams'. The main area shows a query editor with a completed query and its results. The query is a SELECT statement. The results table shows 12 rows of data, including user_id, exam_name, session_id, and actual_mark.

Row	user_id	exam_name	session_id	actual_mark
5	623ad09bfb492fa5df2dc9d4	Class 10 - Monthly MCQ Exam - ...	67c466a18f9536aae73b9f1b	28.75
6	623a8a95fb492fa5df224248	Class 10 - Monthly MCQ Exam - ...	67c3d88c91f4ff5af1fff743	28.75
7	623acd24fb492fa5df2d4517	Class 10 - Monthly MCQ Exam - ...	67dec2d2c3e9ebfb335635c	28.75
8	623a3c91fb492fa5df0fe5fc	Class 10 - Monthly MCQ Exam - ...	67df9bbdc3e9ebfb34ab1ec	28.75
9	623acd24fb492fa5df2d4517	Monthly Exam 1 (MCQ)	679f81a169d1382e3fb53d1f	28.75
10	623a9117fb492fa5df237351	Monthly Exam 1 (MCQ)	679f5d2869d1382e3faf4219	28.75
11	623a4e17fb492fa5df14fa5b	Monthly Exam 1 (MCQ)	679e322bde44251c3a77366d	28.75
12	623a67b6fb492fa5df1b3bcc	Monthly Exam 1 (MCQ)	679e1580fc378b7488b2c4a2	28.75

Question Solutions

Question 1: Actual Mark Calculation

SQL Query:

```
SELECT
  s.user_id,
  e.exam_name,
  s.session_id,
  (s.total_correct_answers * e.each_ques_mark) -
  (s.total_false_answers * e.per_ques_negative_marking) AS actual_mark
FROM
  `msdata-464709.exam_data.exam_sessions` s
JOIN
  `msdata-464709.exam_data.exams` e
ON
  s.exam_id = e.exam_id;
```

Screenshots of Result:

1 SELECT

Query completed

Query results

Save resultsOpen in

Job informationResultsChartJSONExecution detailsExecution graph

Row	user_id	exam_name	session_id	actual_mark
1	623a3486fb492fa5df0d370d	Class 10 - Monthly MCQ Exam - ...	67f126f03db3b091e1a18ef4	0.0
2	623ac953fb492fa5df2cb1d9	Class 10 - Monthly MCQ Exam - ...	67c3ecaf8f9536aae72fc4db	0.0
3	623ab872fb492fa5df2a1778	Class 10 - Monthly MCQ Exam - ...	67c30397ab4fa6fb4562fcc8	0.0
4	623a5fc0fb492fa5df196e94	Class 10 - Monthly MCQ Exam - ...	67c3015c91f4ff5af1ee017b	0.0
5	623a74effb492fa5df1e0bc8	Class 10 - Monthly MCQ Exam - ...	67c41c6a91f4ff5af10688d1	0.0
6	623a3313fb492fa5df0cb1a2	Class 10 - Monthly MCQ Exam - ...	67c3f0928f9536aae73009a6	0.0
7	623a4e27fb492fa5df14feb0	Class 10 - Monthly MCQ Exam - ...	67d7ea05dbda27c942693153	0.0
8	623aac8dfb492fa5df282c3d	Class 10 - Monthly MCQ Exam - ...	67c305be91f4ff5af1ef6d63	0.0
9	623a925efb492fa5df23ae5a	Class 10 - Monthly MCQ Exam - ...	67c3f6576e2f5b6e977401e2	0.0

Results per page: 501 - 50 of 1823

Query results						Save results	Open in	
Job information		Results	Chart	JSON	Execution details	Execution graph		
Row	user_id	exam_name	session_id	actual_mark				
1	623ad09bfb492fa5df2dc9d4	Class 10 - Monthly MCQ Exam - ...	67c5ac805d25c4efa4926bf1	30.0				
2	623a318efb492fa5df0c24df	Class 10 - Monthly MCQ Exam - ...	67c446ac8f9536aae73926d5	30.0				
3	623a3c91fb492fa5df0fe5fc	Class 10 - Monthly MCQ Exam - ...	67c301d4ab4fa6fb45626de5	30.0				
4	623a318efb492fa5df0c24df	Class 10 - Monthly MCQ Exam - ...	67dff88c001a458ef06be552	30.0				
5	623ad09bfb492fa5df2dc9d4	Class 10 - Monthly MCQ Exam - ...	67c466a18f9536aae73b9f1b	28.75				
6	623a8a95fb492fa5df224248	Class 10 - Monthly MCQ Exam - ...	67c3d88c91f4ff5af1fff743	28.75				
7	623acd24fb492fa5df2d4517	Class 10 - Monthly MCQ Exam - ...	67dec2d2c3e39ebfb335635c	28.75				
8	623a3c91fb492fa5df0fe5fc	Class 10 - Monthly MCQ Exam - ...	67df9bbdc3e39ebfb34ab1ec	28.75				
9	623acd24fb492fa5df2d4517	Monthly Exam 1 (MCQ)	670f91a160d1389a2fb52d1f	28.75				

Results per page: 50 1 – 50 of 1823

Question 2: Pass/Fail Classification

SQL Query:

```
SELECT
  s.user_id AS auth_user_id,
  e.exam_name,
  (s.total_correct_answers * e.each_ques_mark) -
  (s.total_false_answers * e.per_ques_negative_marking) AS actual_mark,
  e.pass_mark,
  CASE
    WHEN ((s.total_correct_answers * e.each_ques_mark) -
          (s.total_false_answers * e.per_ques_negative_marking)) >= e.pass_mark
    THEN 'Pass'
    ELSE 'Fail'
  END AS result_status
FROM
  `msdata-464709.exam_data.exam_sessions` s
JOIN
  `msdata-464709.exam_data.exams` e
ON
  s.exam_id = e.exam_id;
```

Screenshots of Result:

Untitled query Run Save Download Share Schedule

10 | THFN 'Pass'

Query completed

Query results Save results Open in

Job information

Results

Chart

JSON

Execution details

Execution graph

Row	auth_user_id	exam_name	actual_mark	pass_mark	result_status
1	623a3486fb492fa5df0d370d	Class 10 - Monthly MCQ Exam - ...	0.0	12	Fail
2	623ac953fb492fa5df2cb1d9	Class 10 - Monthly MCQ Exam - ...	0.0	12	Fail
3	623ab872fb492fa5df2a1778	Class 10 - Monthly MCQ Exam - ...	0.0	12	Fail
4	623a5fc0fb492fa5df196e94	Class 10 - Monthly MCQ Exam - ...	0.0	12	Fail
5	623a74effb492fa5df1e0bc8	Class 10 - Monthly MCQ Exam - ...	0.0	12	Fail
6	623a3313fb492fa5df0cb1a2	Class 10 - Monthly MCQ Exam - ...	0.0	12	Fail
7	623a4e27fb492fa5df14feb0	Class 10 - Monthly MCQ Exam - ...	0.0	12	Fail
8	623aac8dfb492fa5df282c3d	Class 10 - Monthly MCQ Exam - ...	0.0	12	Fail
9	623a925efb492fa5df23ae5a	Class 10 - Monthly MCQ Exam - ...	0.0	12	Fail

Results per page: 100 1 - 100 of 1823

Untitled query Run Save Download Share Schedule

10 | THFN 'Pass'

Query completed

Query results Save results Open in

Job information

Results

Chart

JSON

Execution details

Execution graph

Row	auth_user_id	exam_name	actual_mark	pass_mark	result_status
1	623a4daffb492fa5df14de4a	Class 10 - Monthly MCQ Exam - ...	13.0	12	Pass
2	623a4e76fb492fa5df1513f2	Class 10 - Monthly MCQ Exam - ...	14.75	12	Pass
3	623a5fc0fb492fa5df196e94	Class 10 - Monthly MCQ Exam - ...	19.75	12	Pass
4	623ab177fb492fa5df28f850	Class 10 - Monthly MCQ Exam - ...	17.0	12	Pass
5	623acf03fb492fa5df2d8ca8	Class 10 - Monthly MCQ Exam - ...	15.5	12	Pass
6	623a4daffb492fa5df14de4a	Class 10 - Monthly MCQ Exam - ...	17.75	12	Pass
7	623a941afb492fa5df23fdf8	Class 10 - Monthly MCQ Exam - ...	13.75	12	Pass
8	623ab929fb492fa5df2a343c	Class 10 - Monthly MCQ Exam - ...	23.5	12	Pass
9	623ab8abfb492fa5df2a2075	Class 10 - Monthly MCQ Exam - ...	18.25	12	Pass

Results per page: 100 1 - 100 of 1823

Question 3: Top Performers

SQL Query:

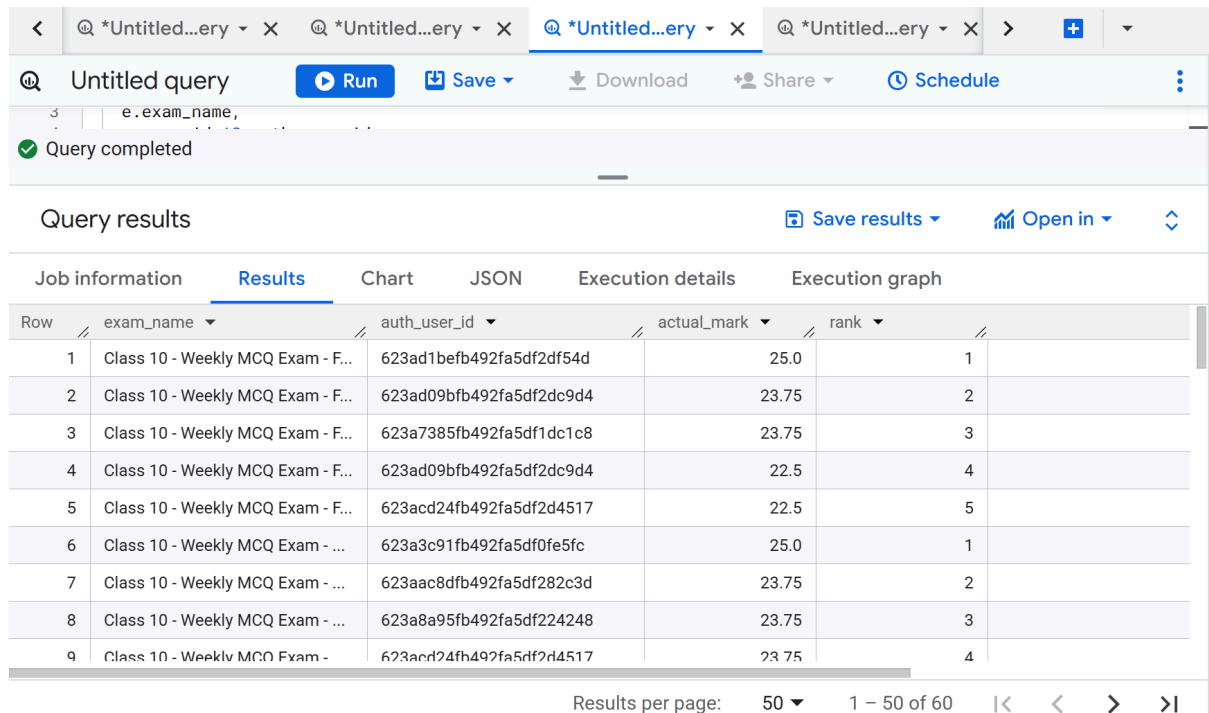
```
WITH scored AS (  
  SELECT  
    e.exam_name,  
    s.user_id AS auth_user_id,  
    (s.total_correct_answers * e.each_ques_mark) -  
    (s.total_false_answers * e.per_ques_negative_marking) AS actual_mark,  
    ROW_NUMBER() OVER (  
      PARTITION BY s.exam_id  
      ORDER BY (s.total_correct_answers * e.each_ques_mark) -
```

```

(s.total_false_answers * e.per_ques_negative_marking) DESC
) AS rank
FROM
`msdata-464709.exam_data.exam_sessions` s
JOIN
`msdata-464709.exam_data.exams` e
ON
s.exam_id = e.exam_id
)
SELECT
exam_name,
auth_user_id,
actual_mark,
rank
FROM
scored
WHERE
rank <= 5;

```

Screenshots of Result:



The screenshot shows a web-based query execution interface. At the top, there are tabs for multiple queries, with the active one titled "Untitled query". Below the tabs, there's a toolbar with buttons for "Run", "Save", "Download", "Share", and "Schedule". A status bar indicates "Query completed".

The main section displays "Query results" with a table of data. The table has columns for "Row", "exam_name", "auth_user_id", "actual_mark", and "rank". The results are sorted by rank in ascending order.

Row	exam_name	auth_user_id	actual_mark	rank
1	Class 10 - Weekly MCQ Exam - F...	623ad1befb492fa5df2df54d	25.0	1
2	Class 10 - Weekly MCQ Exam - F...	623ad09bfb492fa5df2dc9d4	23.75	2
3	Class 10 - Weekly MCQ Exam - F...	623a7385fb492fa5df1dc1c8	23.75	3
4	Class 10 - Weekly MCQ Exam - F...	623ad09bfb492fa5df2dc9d4	22.5	4
5	Class 10 - Weekly MCQ Exam - F...	623acd24fb492fa5df2d4517	22.5	5
6	Class 10 - Weekly MCQ Exam - ...	623a3c91fb492fa5df0fe5fc	25.0	1
7	Class 10 - Weekly MCQ Exam - ...	623aac8dfb492fa5df282c3d	23.75	2
8	Class 10 - Weekly MCQ Exam - ...	623a8a95fb492fa5df224248	23.75	3
9	Class 10 - Weekly MCQ Exam - ...	623acd24fb492fa5df2d4517	23.75	4

At the bottom, there's a pagination bar showing "Results per page: 50" and "1 - 50 of 60", along with navigation arrows.

Query completed

Query results

Save results Open in

Job information Results Chart JSON Execution details Execution graph

Row	exam_name	auth_user_id	actual_mark	rank
10	Class 10 - Weekly MCQ Exam - ...	623a318efb492fa5df0c24df	23.75	5
11	Class 10 - Weekly MCQ Exam - F...	623ac8e1fb492fa5df2ca08e	27.5	1
12	Class 10 - Weekly MCQ Exam - F...	623a7025fb492fa5df1d0ebc	27.5	2
13	Class 10 - Weekly MCQ Exam - F...	623ad09bfb492fa5df2dc9d4	26.25	3
14	Class 10 - Weekly MCQ Exam - F...	623ab72dfb492fa5df29e41b	26.25	4
15	Class 10 - Weekly MCQ Exam - F...	623ad1befb492fa5df2df54d	26.25	5
16	Monthly Exam 1 (MCQ)	623acd24fb492fa5df2d4517	28.75	1
17	Monthly Exam 1 (MCQ)	623a9117fb492fa5df237351	28.75	2
18	Monthly Exam 1 (MCQ)	623a4e17fb492fa5df14fa5h	28.75	3

Results per page: 50 1 - 50 of 60

Question 4: Performance Trend per Student Across Exams

SQL Query:

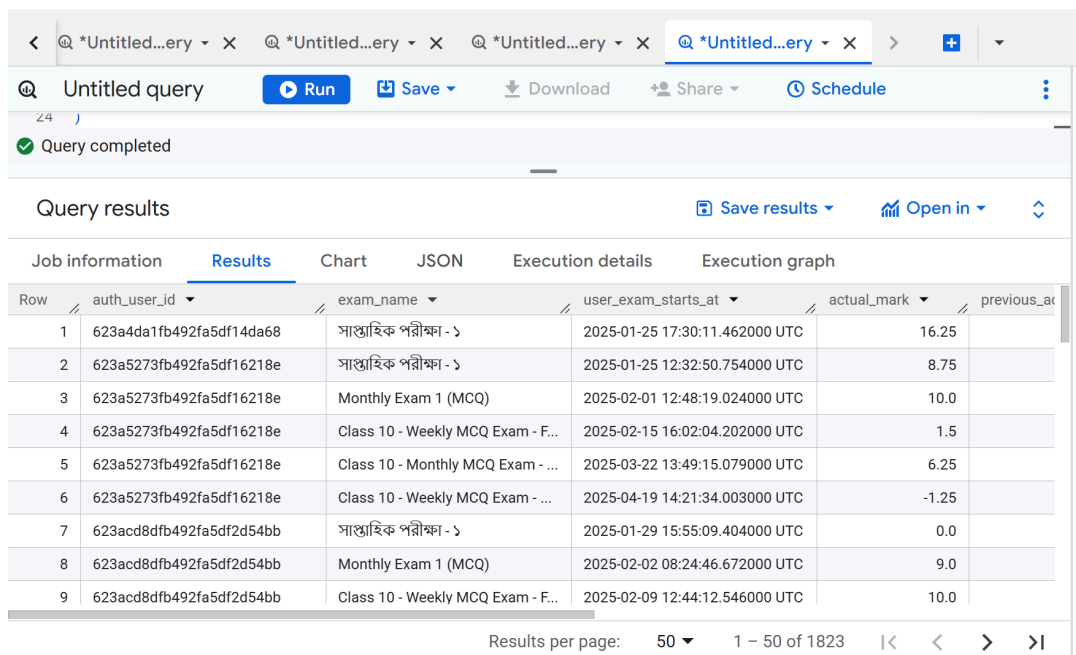
```
WITH calc AS (
  SELECT
    s.user_id AS auth_user_id,
    e.exam_name,
    s.user_exam_starts_at,
    (s.total_correct_answers * e.each_ques_mark) -
    (s.total_false_answers * e.per_ques_negative_marking) AS actual_mark
  FROM
    `msdata-464709.exam_data.exam_sessions` s
  JOIN
    `msdata-464709.exam_data.exams` e
  ON
    s.exam_id = e.exam_id
),
lagged AS (
  SELECT
    *,
    LAG(actual_mark) OVER (
      PARTITION BY auth_user_id
      ORDER BY user_exam_starts_at
    ) AS previous_actual_mark
  FROM
    calc
)
SELECT
```

```

auth_user_id,
exam_name,
user_exam_starts_at,
actual_mark,
previous_actual_mark,
CASE
  WHEN previous_actual_mark IS NULL THEN NULL
  WHEN actual_mark > previous_actual_mark THEN 'Improved'
  WHEN actual_mark < previous_actual_mark THEN 'Declined'
  WHEN actual_mark = previous_actual_mark THEN 'Same'
END AS performance_trend
FROM
  lagged;

```

Screenshots of Result:



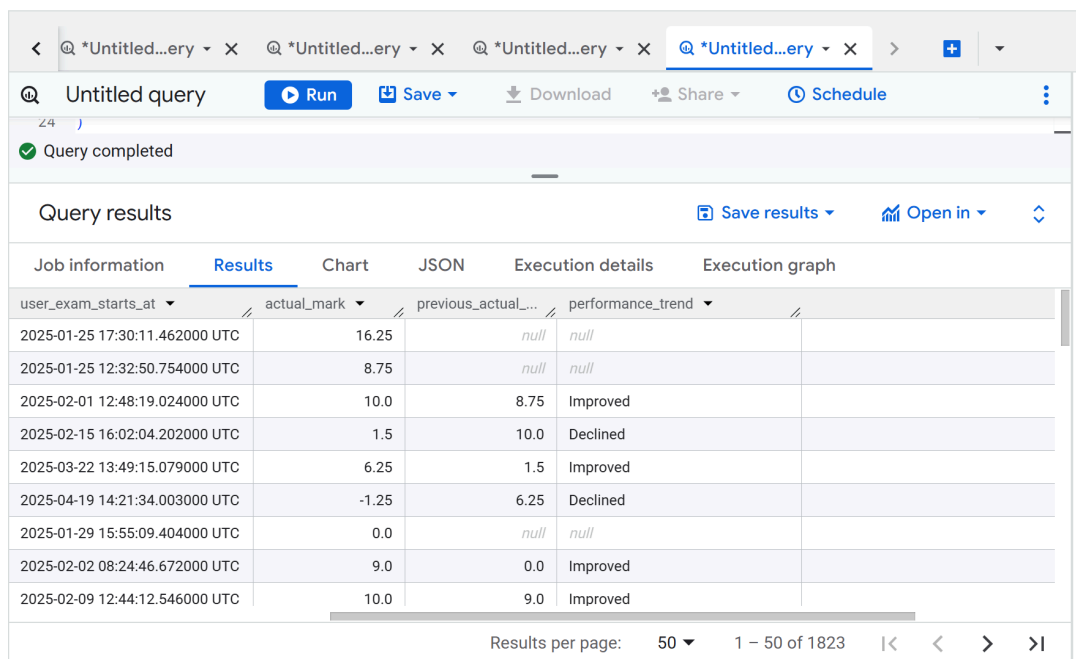
Query completed

Query results

Save results Open in

Job information	Results	Chart	JSON	Execution details	Execution graph
Row	auth_user_id	exam_name	user_exam_starts_at	actual_mark	previous_act
1	623a4da1fb492fa5df14da68	সাপ্তাহিক পরীক্ষা - ১	2025-01-25 17:30:11.462000 UTC	16.25	
2	623a5273fb492fa5df16218e	সাপ্তাহিক পরীক্ষা - ১	2025-01-25 12:32:50.754000 UTC	8.75	
3	623a5273fb492fa5df16218e	Monthly Exam 1 (MCQ)	2025-02-01 12:48:19.024000 UTC	10.0	
4	623a5273fb492fa5df16218e	Class 10 - Weekly MCQ Exam - F...	2025-02-15 16:02:04.202000 UTC	1.5	
5	623a5273fb492fa5df16218e	Class 10 - Monthly MCQ Exam - ...	2025-03-22 13:49:15.079000 UTC	6.25	
6	623a5273fb492fa5df16218e	Class 10 - Weekly MCQ Exam - ...	2025-04-19 14:21:34.003000 UTC	-1.25	
7	623acd8dfb492fa5df2d54bb	সাপ্তাহিক পরীক্ষা - ১	2025-01-29 15:55:09.404000 UTC	0.0	
8	623acd8dfb492fa5df2d54bb	Monthly Exam 1 (MCQ)	2025-02-02 08:24:46.672000 UTC	9.0	
9	623acd8dfb492fa5df2d54bb	Class 10 - Weekly MCQ Exam - F...	2025-02-09 12:44:12.546000 UTC	10.0	

Results per page: 50 1 - 50 of 1823



Query completed

Query results

Save results Open in

Job information	Results	Chart	JSON	Execution details	Execution graph
user_exam_starts_at	actual_mark	previous_actual...	performance_trend		
2025-01-25 17:30:11.462000 UTC	16.25	null	null		
2025-01-25 12:32:50.754000 UTC	8.75	null	null		
2025-02-01 12:48:19.024000 UTC	10.0	8.75	Improved		
2025-02-15 16:02:04.202000 UTC	1.5	10.0	Declined		
2025-03-22 13:49:15.079000 UTC	6.25	1.5	Improved		
2025-04-19 14:21:34.003000 UTC	-1.25	6.25	Declined		
2025-01-29 15:55:09.404000 UTC	0.0	null	null		
2025-02-02 08:24:46.672000 UTC	9.0	0.0	Improved		
2025-02-09 12:44:12.546000 UTC	10.0	9.0	Improved		

Results per page: 50 1 - 50 of 1823

