Junior BI Analyst Assessment – SQL Task

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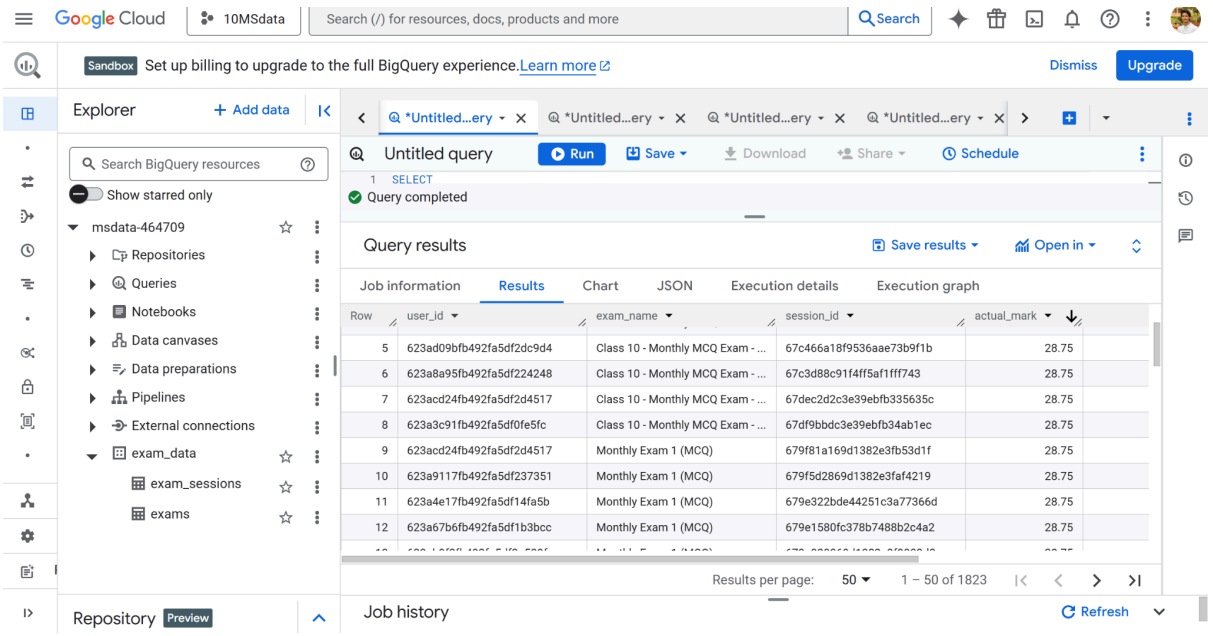
Note: Due to BigQuery Sandbox limitations (no billing enabled), it is not possible to save queries as named views or make datasets public. Therefore, all SQL queries and results are documented here as per the alternative submission instructions. For clarity and readability, I have included only two screenshots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

Process Overview

To complete this assessment, I followed these steps:

1. **Created a Google Cloud Project:**
    - Project name: `msdata-464709`
2. **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).
3. **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:



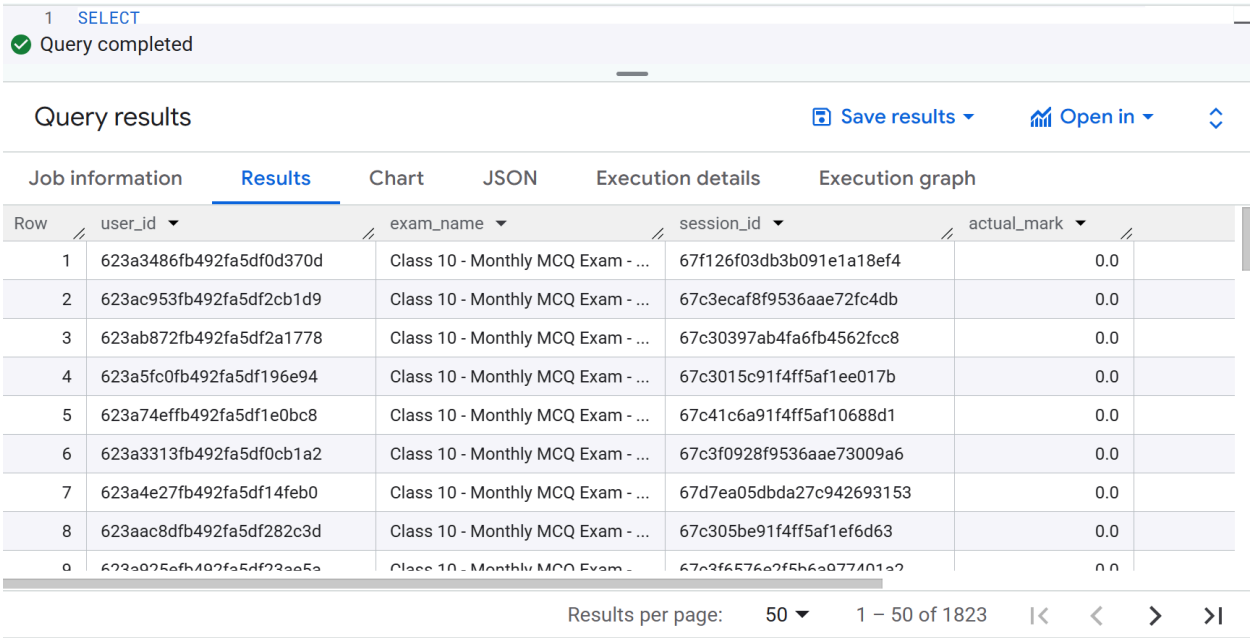
Question Solutions

Question 1: Actual Mark Calculation

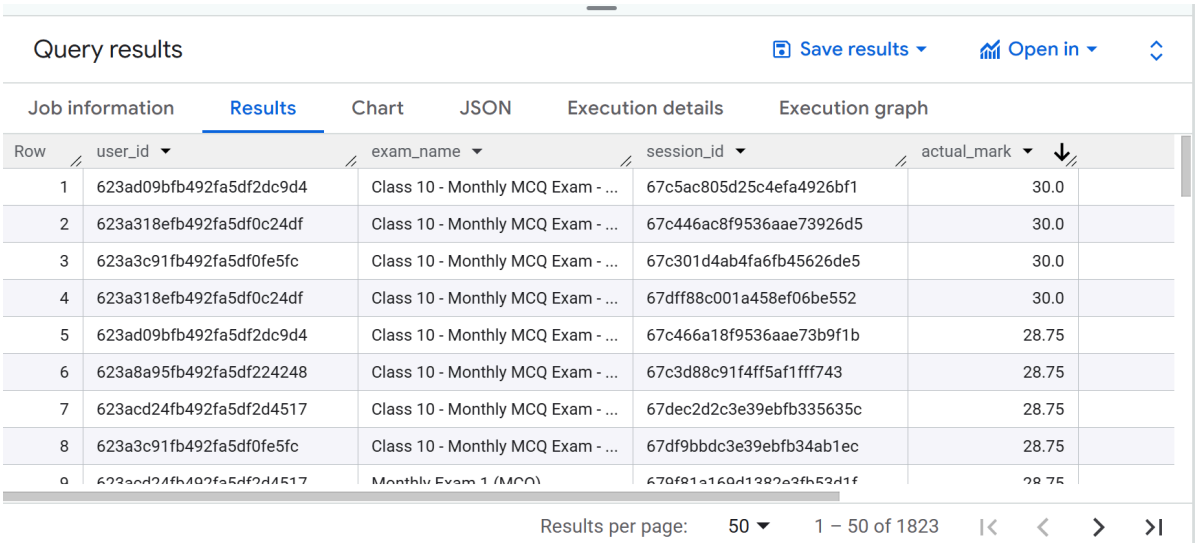
SQL Query:

```
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:



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 - ...	67c3f6576e2f5b6a977401a2	0.0

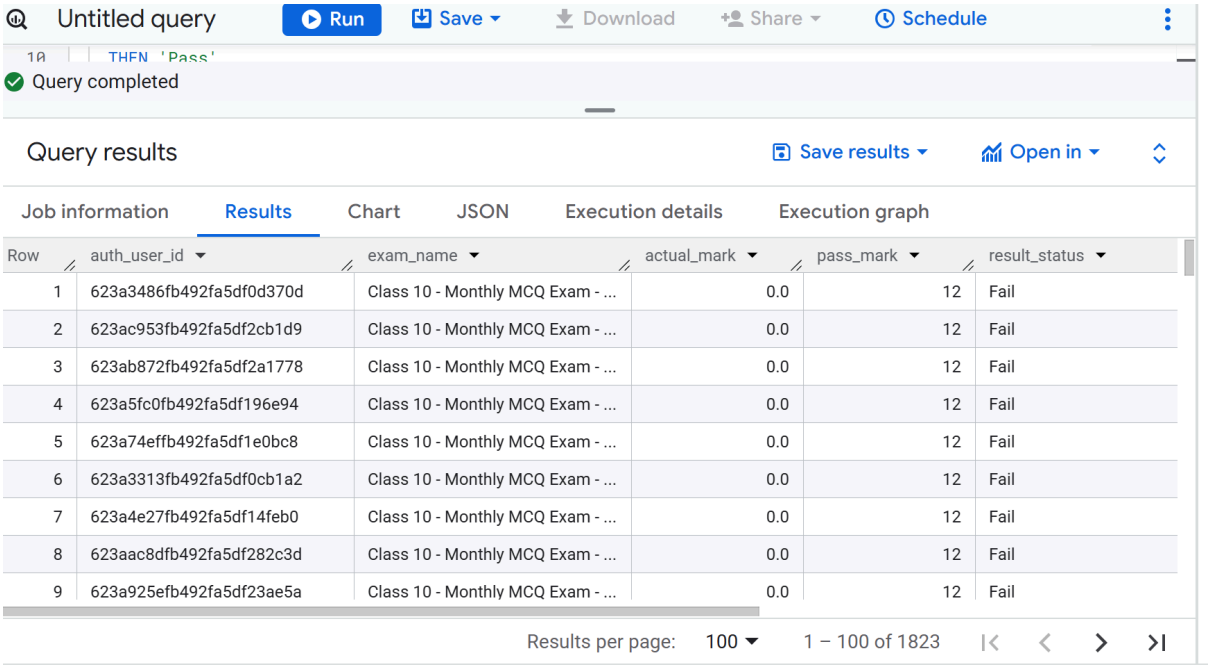


Question 2: Pass/Fail Classification

SQL Query:

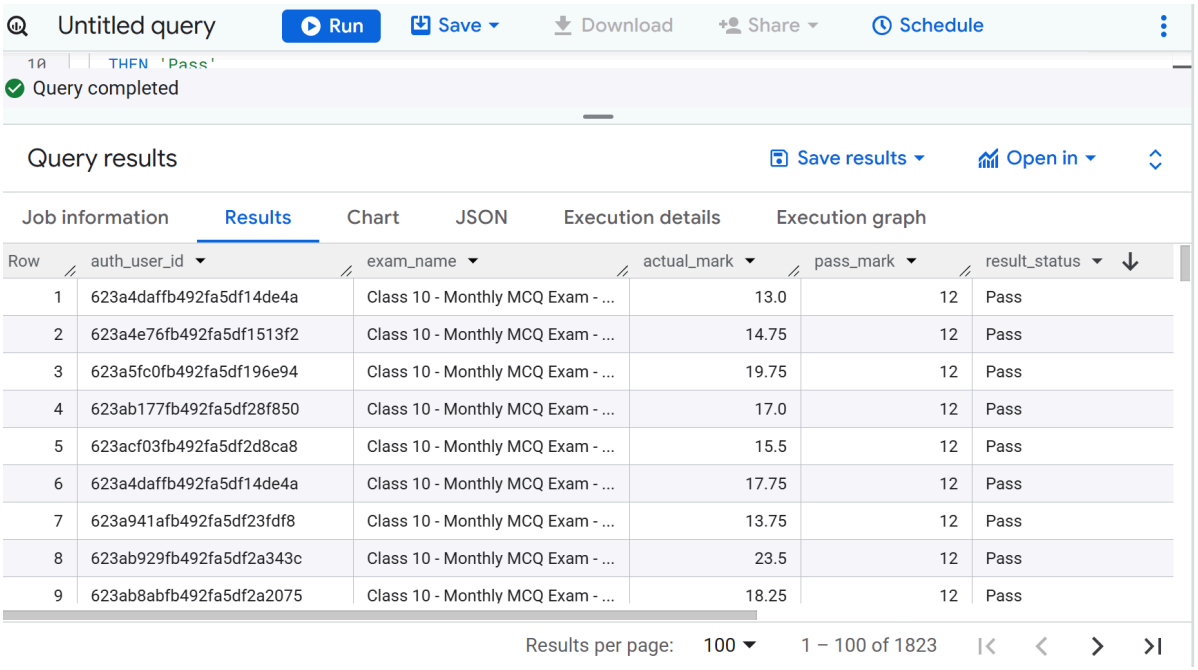
```
SELECT
  s.user_id AS auth_user_id,
  e.exam_name,
  (s.total_correct_answers * e.each_ques_mark) -
    (s.total_false_answers * e.per_ques_negative_marking) AS actual_mark,
  e.pass_mark,
  CASE
    WHEN ((s.total_correct_answers * e.each_ques_mark) -
          (s.total_false_answers * e.per_ques_negative_marking)) >= 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:



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



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

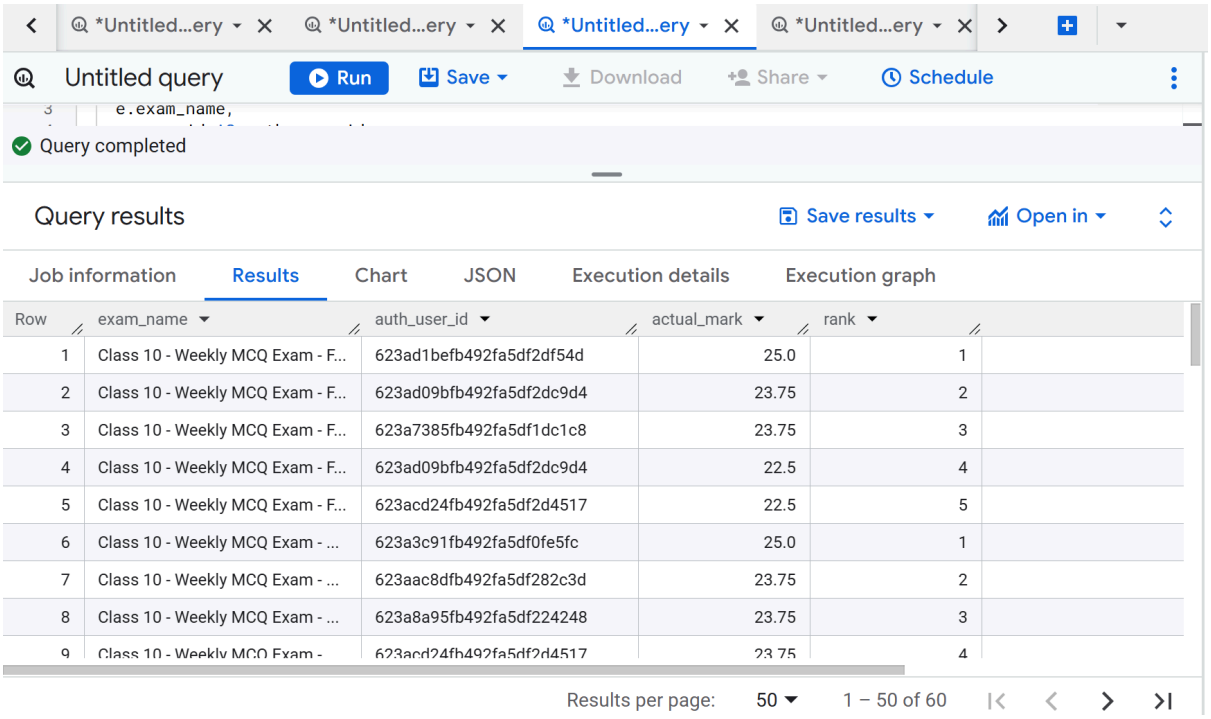
Question 3: Top Performers

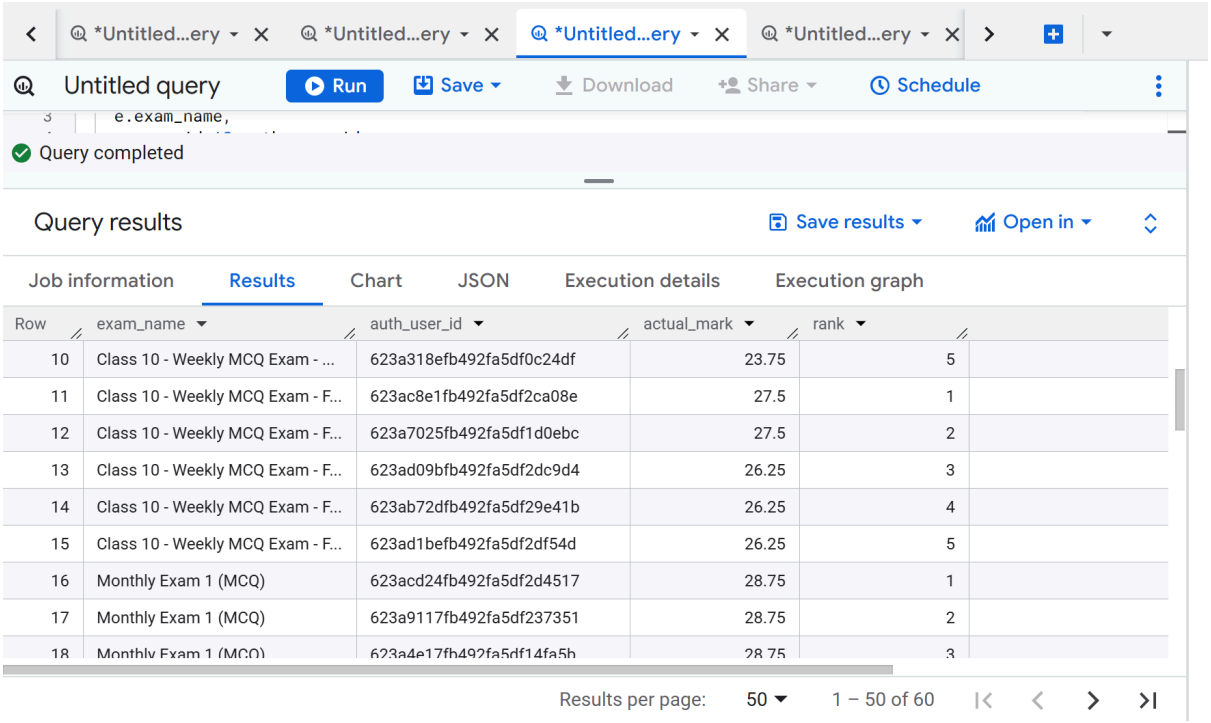
SQL Query:

```
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:





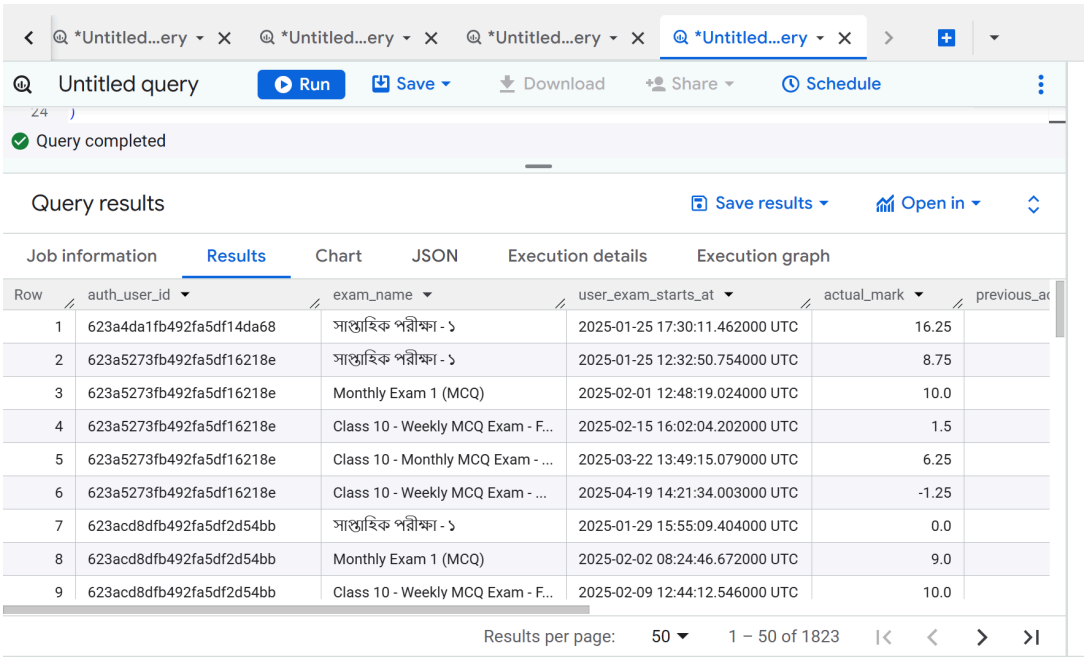
Question 4: Performance Trend per Student Across Exams

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
```

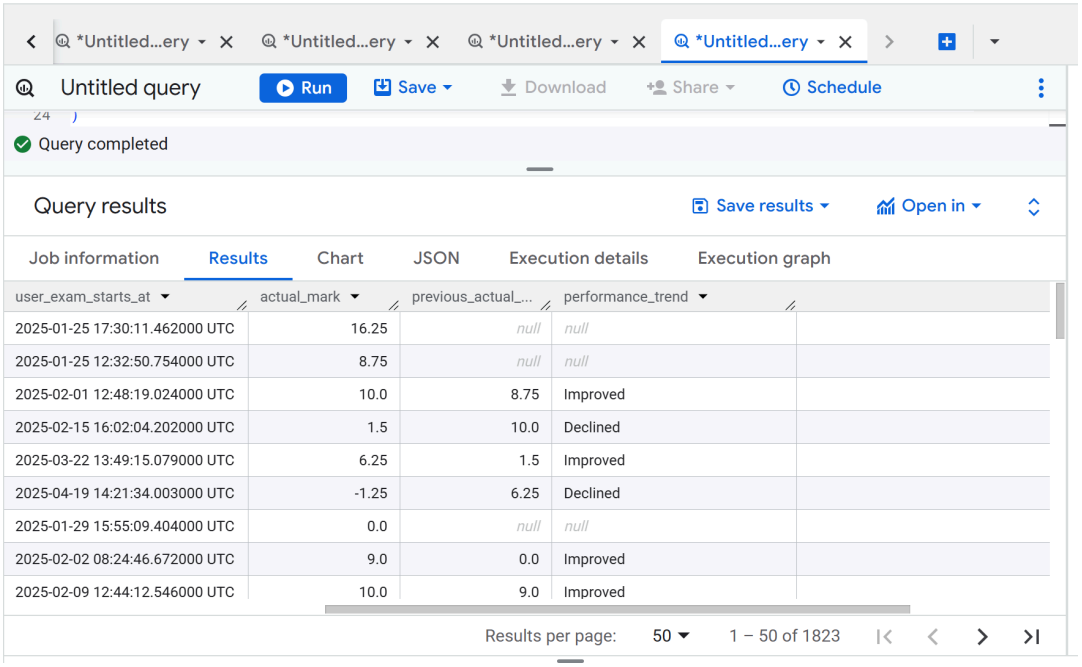
```
  auth_user_id,
  exam_name,
  user_exam_starts_at,
  actual_mark,
  previous_actual_mark,
  CASE
    WHEN previous_actual_mark IS NULL THEN NULL
    WHEN actual_mark > previous_actual_mark THEN 'Improved'
    WHEN actual_mark < previous_actual_mark THEN 'Declined'
    WHEN actual_mark = previous_actual_mark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

Screenshots of Result:



Row	auth_user_id	exam_name	user_exam_starts_at	actual_mark	previous_ac
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



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