Project Documentation & Solutions

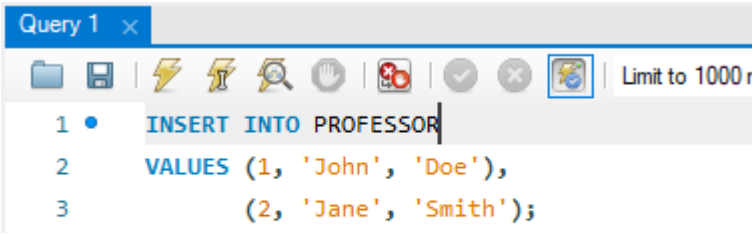
Please note, we are using a universal grade boundary of: A: 90-100, B: 80-89, C: 70-79, D: 60-69, E: 50-59, else F.

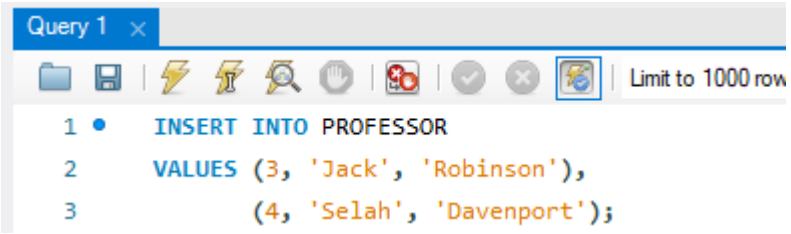
Link to video walkthrough -> **Project_Demo.mp4**

Q2)-- Table PROFESSOR

```
1  CREATE TABLE PROFESSOR (
2      PROF_ID INT PRIMARY KEY,
3      PROF_FNAME VARCHAR(50),
4      PROF_LNAME VARCHAR(50)
5  );
```

-- Inserting values into PROFESSOR table

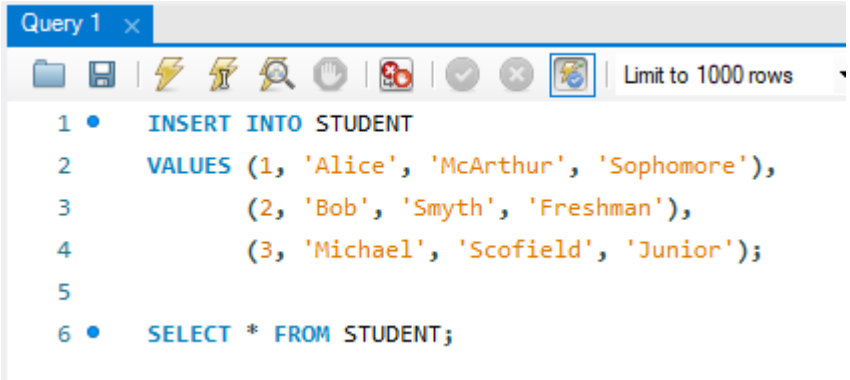




-- Table STUDENT

```
1  CREATE TABLE STUDENT (
2      STUD_ID INT PRIMARY KEY,
3      STUD_FNAME VARCHAR(50),
4      STUD_LNAME VARCHAR(50),
5      Student_Classification VARCHAR(20)
6  );
```

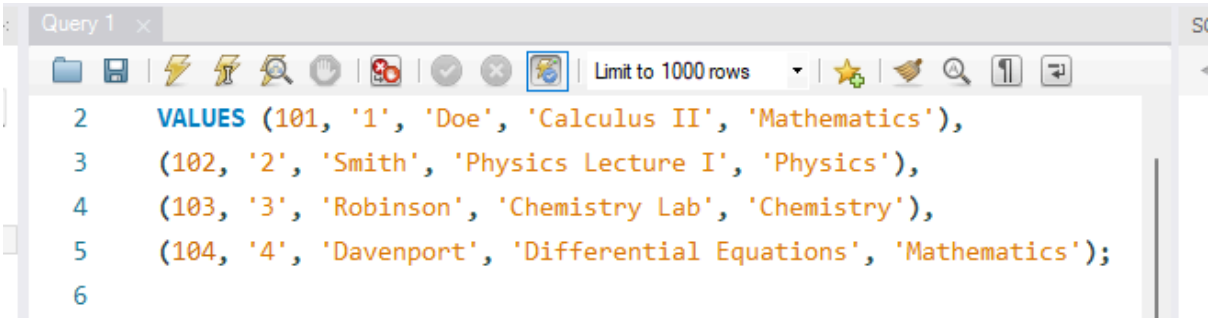
-- Inserting values into STUDENT table



-- Table COURSE_CATALOGUE

```
CREATE TABLE COURSE_CATALOGUE (
    COURSE_NUM INT PRIMARY KEY,
    PROF_ID INT,
    FOREIGN KEY (PROF_ID) REFERENCES PROFESSOR(PROF_ID),
    PROF_LNAME VARCHAR(50),
    COURSE_NAME VARCHAR(50),
    DEPARTMENT VARCHAR(50)
);
```

-- Inserting values into COURSE_CATALOGUE table



-- Table GRADEBOOK

```sql
CREATE TABLE GRADEBOOK (
    STUD_ID INT,
    PROF_ID INT,
    STUD_LNAME VARCHAR(50),
    COURSE_NUM INT,
    COURSE_NAME VARCHAR(50),
    Cumm_Grade VARCHAR(2),
    PRIMARY KEY (STUD_ID, COURSE_NUM),
    FOREIGN KEY (PROF_ID) REFERENCES PROFESSOR(PROF_ID),
    FOREIGN KEY (COURSE_NUM) REFERENCES COURSE_CATALOGUE(COURSE_NUM)
);

```

-- Inserting values into GRADEBOOK table

```sql
INSERT INTO GRADEBOOK
VALUES (1, 1, 'McArthur', 101, 'Calculus II', 'A'),
       (2, 2, 'Smyth', 102, 'Physics Lecture I', 'B'),
       (3, 2, 'Scofield', 102, 'Physics Lecture I', 'A'),
       (3, 4, 'Scofield', 104, 'Differential Equations', 'A');

```

-- Table GRADING_CATEGORIES

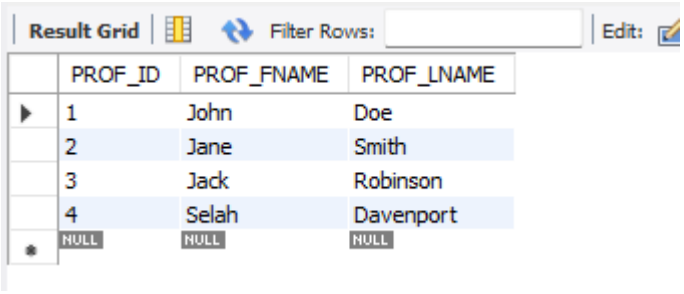
```sql
CREATE TABLE GRADING_CATEGORIES (
TASK_ID INT,
COURSE_NUM INT,
STUD_ID INT,
TASK_NAME VARCHAR(50),
TASK_RAW_POINTS INT,
TASK_WEIGHT INT,
PRIMARY KEY (TASK_ID, STUD_ID, COURSE_NUM),
FOREIGN KEY (COURSE_NUM) REFERENCES COURSE_CATALOGUE(COURSE_NUM),
FOREIGN KEY (STUD_ID) REFERENCES STUDENT(STUD_ID)
);

SELECT * FROM GRADING_CATEGORIES
```

-- Inserting values into GRADING_CATEGORIES table

```
INSERT INTO GRADING_CATEGORIES

VALUES (1, 101, 1, 'Homework 1', 100, 25),
       (2, 101, 1, 'Homework 2', 100, 25),
       (3, 101, 1, 'Homework 3', 90, 25),
       (4, 101, 1, 'Lab Report', 100, 25),
       (1, 102, 2, 'Mid Term', 95, 40),
       (2, 102, 2, 'Final', 75, 60),
       (1, 102, 3, 'Mid Term', 97, 40),
       (2, 102, 3, 'Final', 88, 60),
       (1, 104, 3, 'Project', 100, 30),
       (2, 104, 3, 'Mid Term', 85, 20),
       (3, 104, 3, 'Final', 94, 40);
```

Q3)

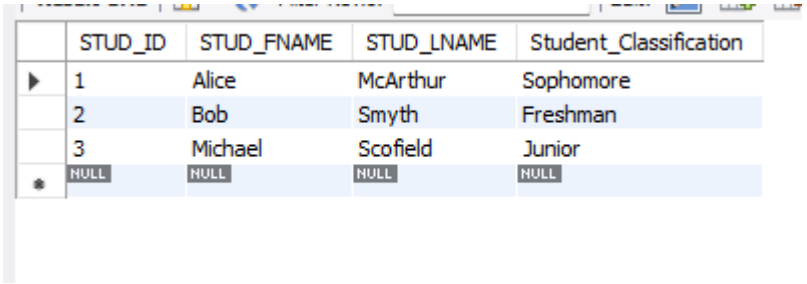
PROFESSOR Table:



Result Grid | Filter Rows: | Edit:

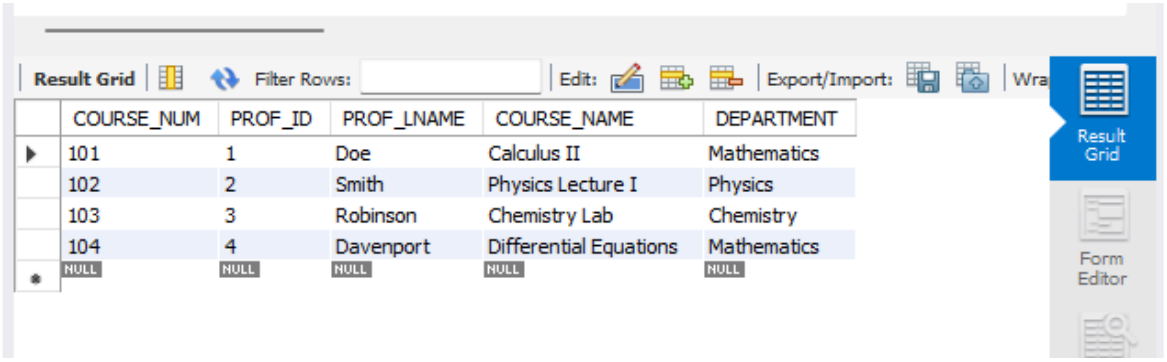
PROF_ID	PROF_FNAME	PROF_LNAME
1	John	Doe
2	Jane	Smith
3	Jack	Robinson
4	Selah	Davenport
NULL	NULL	NULL

STUDENT Table:



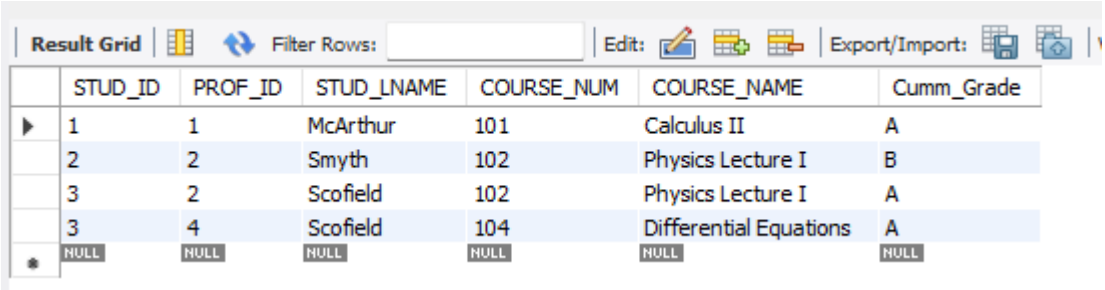
STUD_ID	STUD_FNAME	STUD_LNAME	Student_Classification
1	Alice	McArthur	Sophomore
2	Bob	Smyth	Freshman
3	Michael	Scofield	Junior
NULL	NULL	NULL	NULL

COURSE_CATALOGUE Table:



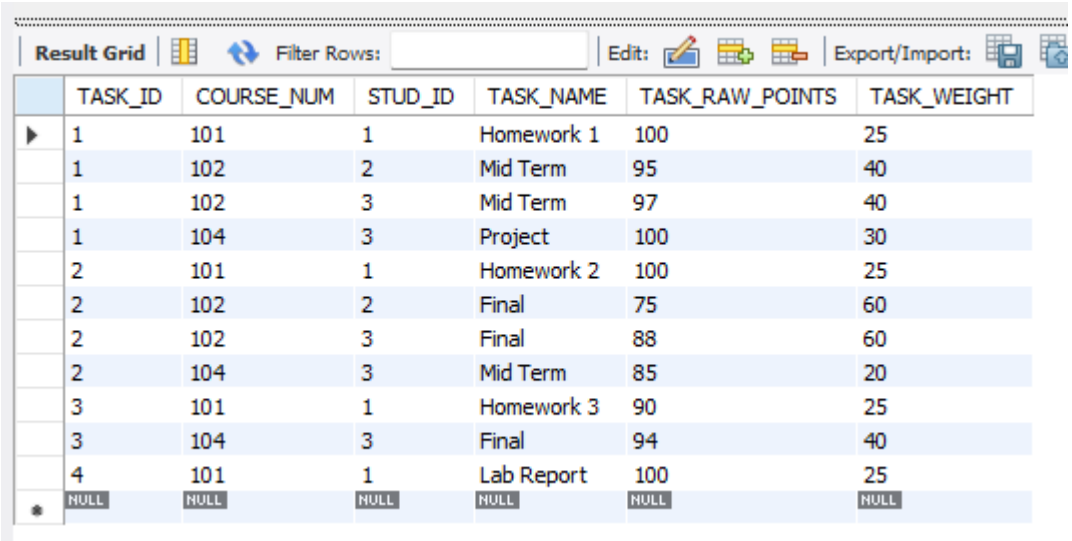
COURSE_NUM	PROF_ID	PROF_LNAME	COURSE_NAME	DEPARTMENT
101	1	Doe	Calculus II	Mathematics
102	2	Smith	Physics Lecture I	Physics
103	3	Robinson	Chemistry Lab	Chemistry
104	4	Davenport	Differential Equations	Mathematics
NULL	NULL	NULL	NULL	NULL

GRADEBOOK Table:



STUD_ID	PROF_ID	STUD_LNAME	COURSE_NUM	COURSE_NAME	Cumm_Grade
1	1	McArthur	101	Calculus II	A
2	2	Smyth	102	Physics Lecture I	B
3	2	Scofield	102	Physics Lecture I	A
3	4	Scofield	104	Differential Equations	A
NULL	NULL	NULL	NULL	NULL	NULL

GRADING_CATEGORIES Table:

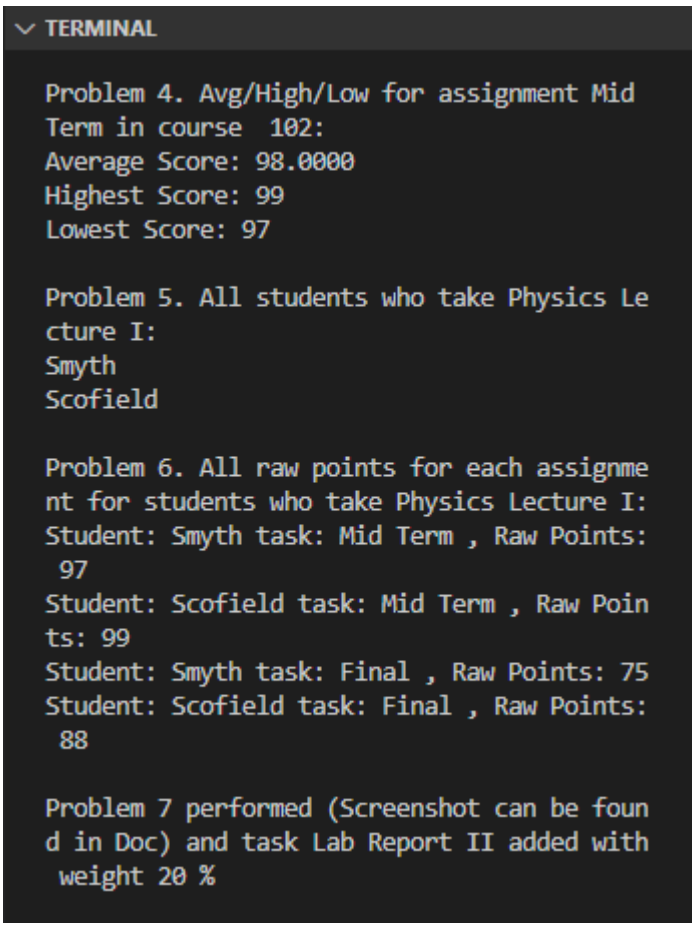


TASK_ID	COURSE_NUM	STUD_ID	TASK_NAME	TASK_RAW_POINTS	TASK_WEIGHT
1	101	1	Homework 1	100	25
1	102	2	Mid Term	95	40
1	102	3	Mid Term	97	40
1	104	3	Project	100	30
2	101	1	Homework 2	100	25
2	102	2	Final	75	60
2	102	3	Final	88	60
2	104	3	Mid Term	85	20
3	101	1	Homework 3	90	25
3	104	3	Final	94	40
4	101	1	Lab Report	100	25
NULL	NULL	NULL	NULL	NULL	NULL

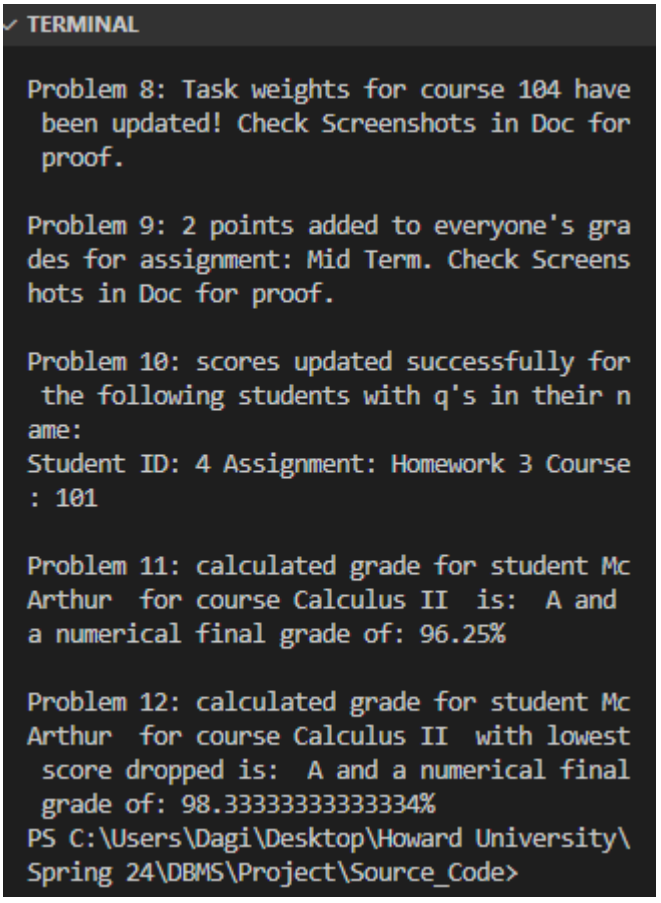
Making the TASK_RAW_POINTS optional allows us to add assignments whilst grades are not yet known/submitted.
We also created a delimiter so that we know that the sum of all task_weights add up to 100% at all times, and if not then weights are re-adjusted:

```
DELIMITER //

CREATE TRIGGER check_task_weight_sum
AFTER INSERT ON GRADING_CATEGORIES
FOR EACH ROW
BEGIN
    DECLARE total_weight DECIMAL(10, 2);

    -- Calculate the total task weight for the course
    SELECT SUM(task_weight) INTO total_weight
    FROM GRADING_CATEGORIES
    WHERE course_num = NEW.course_num;

    -- If total weight is not 100, adjust the weights
    IF total_weight IS NULL OR total_weight != 100 THEN
        SET @factor = 100 / total_weight;

        -- Update task_weight for the course
        UPDATE GRADING_CATEGORIES
        SET task_weight = task_weight * @factor
        WHERE course_num = NEW.course_num;
    END IF;
END;
//
```

Solutions for 4, 5, 6, 7, 8, 9, 10, 11, 12 are in the code, here are the outputs in the terminal/ proof of new state of the tables after run (next page):

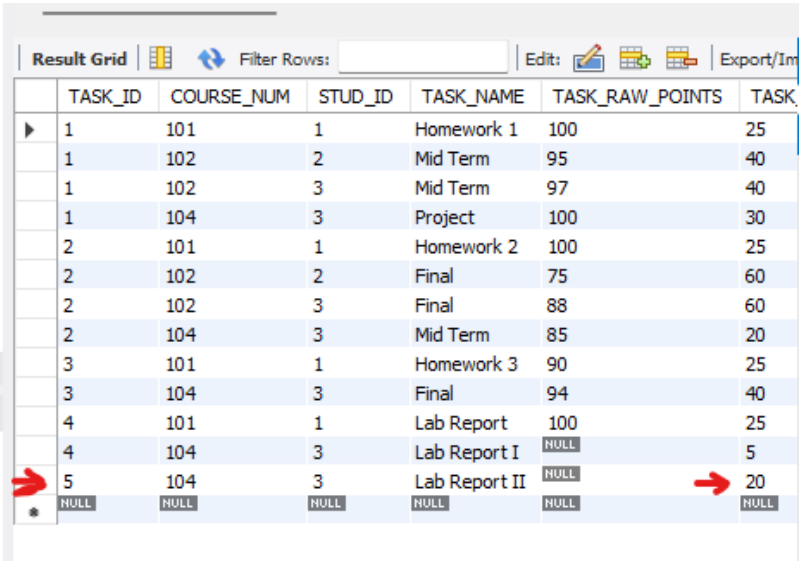


```
TERMINAL

Problem 4. Avg/High/Low for assignment Mid
Term in course  102:
Average Score: 98.0000
Highest Score: 99
Lowest Score: 97

Problem 5. All students who take Physics Le
cture I:
Smyth
Scofield

Problem 6. All raw points for each assignme
nt for students who take Physics Lecture I:
Student: Smyth task: Mid Term , Raw Points:
 97
Student: Scofield task: Mid Term , Raw Poin
ts: 99
Student: Smyth task: Final , Raw Points: 75
Student: Scofield task: Final , Raw Points:
 88

Problem 7 performed (Screenshot can be foun
d in Doc) and task Lab Report II added with
 weight 20 %
```



```
TERMINAL

Problem 8: Task weights for course 104 have
 been updated! Check Screenshots in Doc for
 proof.

Problem 9: 2 points added to everyone's gra
des for assignment: Mid Term. Check Screens
hots in Doc for proof.

Problem 10: scores updated successfully for
 the following students with q's in their n
ame:
Student ID: 4 Assignment: Homework 3 Course
: 101

Problem 11: calculated grade for student Mc
Arthur  for course Calculus II  is:  A and
a numerical final grade of: 96.25%

Problem 12: calculated grade for student Mc
Arthur  for course Calculus II  with lowest
 score dropped is:  A and a numerical final
 grade of: 98.33333333333334%
PS C:\Users\Dagi\Desktop\Howard University\
Spring 24\DBMS\Project\Source_Code>
```

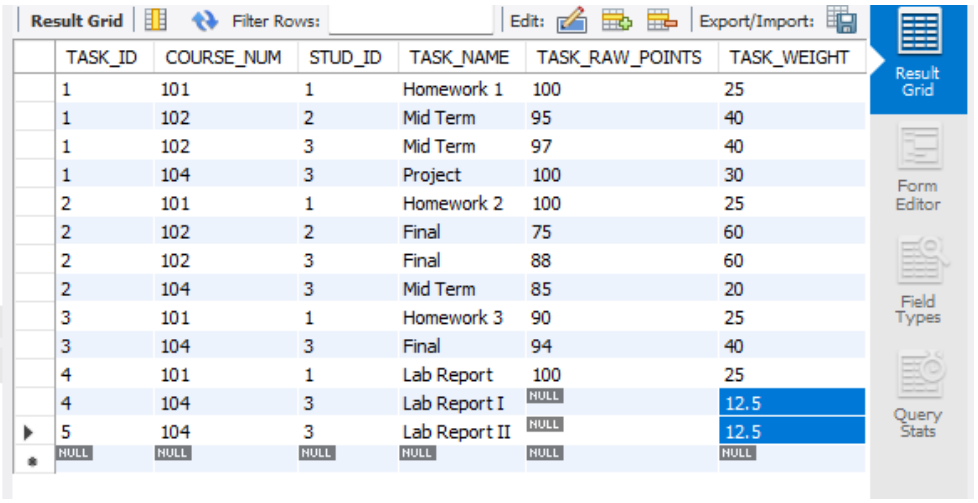
Q 7)



Result Grid | Filter Rows: | Edit: | Export/Im

TASK_ID	COURSE_NUM	STUD_ID	TASK_NAME	TASK_RAW_POINTS	TASK
1	101	1	Homework 1	100	25
1	102	2	Mid Term	95	40
1	102	3	Mid Term	97	40
1	104	3	Project	100	30
2	101	1	Homework 2	100	25
2	102	2	Final	75	60
2	102	3	Final	88	60
2	104	3	Mid Term	85	20
3	101	1	Homework 3	90	25
3	104	3	Final	94	40
4	101	1	Lab Report	100	25
4	104	3	Lab Report I	NULL	5
5	104	3	Lab Report II	NULL	20
NULL	NULL	NULL	NULL	NULL	NULL

Q8)

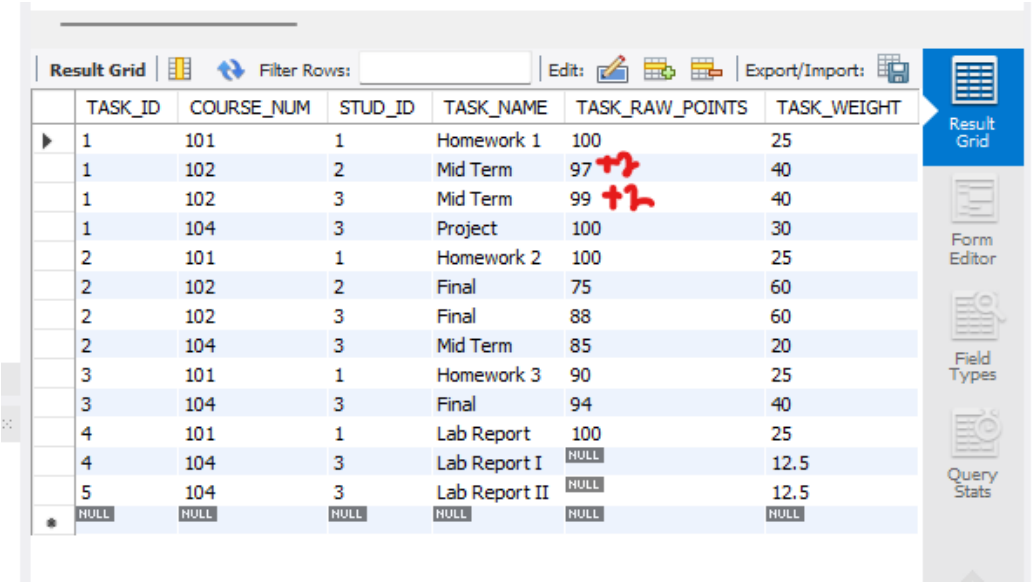


Result Grid | Filter Rows: | Edit: | Export/Import:

TASK_ID	COURSE_NUM	STUD_ID	TASK_NAME	TASK_RAW_POINTS	TASK_WEIGHT
1	101	1	Homework 1	100	25
1	102	2	Mid Term	95	40
1	102	3	Mid Term	97	40
1	104	3	Project	100	30
2	101	1	Homework 2	100	25
2	102	2	Final	75	60
2	102	3	Final	88	60
2	104	3	Mid Term	85	20
3	101	1	Homework 3	90	25
3	104	3	Final	94	40
4	101	1	Lab Report	100	25
4	104	3	Lab Report I	NULL	12.5
5	104	3	Lab Report II	NULL	12.5
NULL	NULL	NULL	NULL	NULL	NULL

Result Grid | Form Editor | Field Types | Query Stats

Q9)

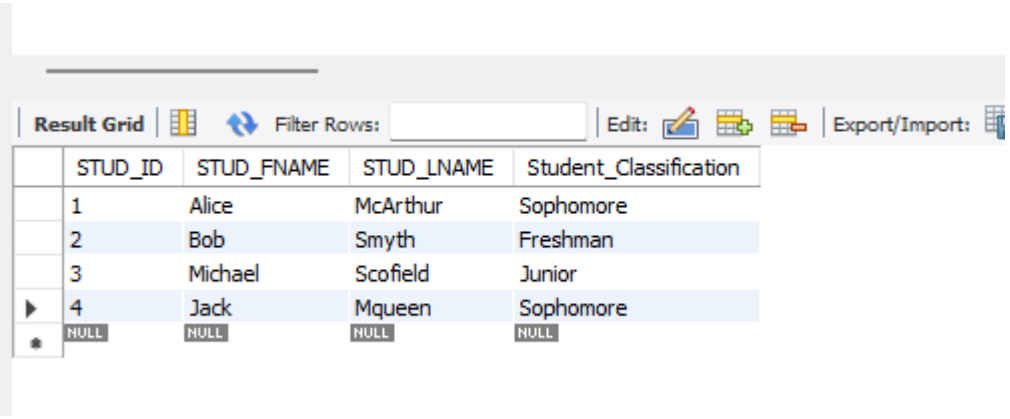


Result Grid | Filter Rows: | Edit: | Export/Import:

TASK_ID	COURSE_NUM	STUD_ID	TASK_NAME	TASK_RAW_POINTS	TASK_WEIGHT
1	101	1	Homework 1	100	25
1	102	2	Mid Term	97	40
1	102	3	Mid Term	99	40
1	104	3	Project	100	30
2	101	1	Homework 2	100	25
2	102	2	Final	75	60
2	102	3	Final	88	60
2	104	3	Mid Term	85	20
3	101	1	Homework 3	90	25
3	104	3	Final	94	40
4	101	1	Lab Report	100	25
4	104	3	Lab Report I	NULL	12.5
5	104	3	Lab Report II	NULL	12.5
NULL	NULL	NULL	NULL	NULL	NULL

Result Grid | Form Editor | Field Types | Query Stats

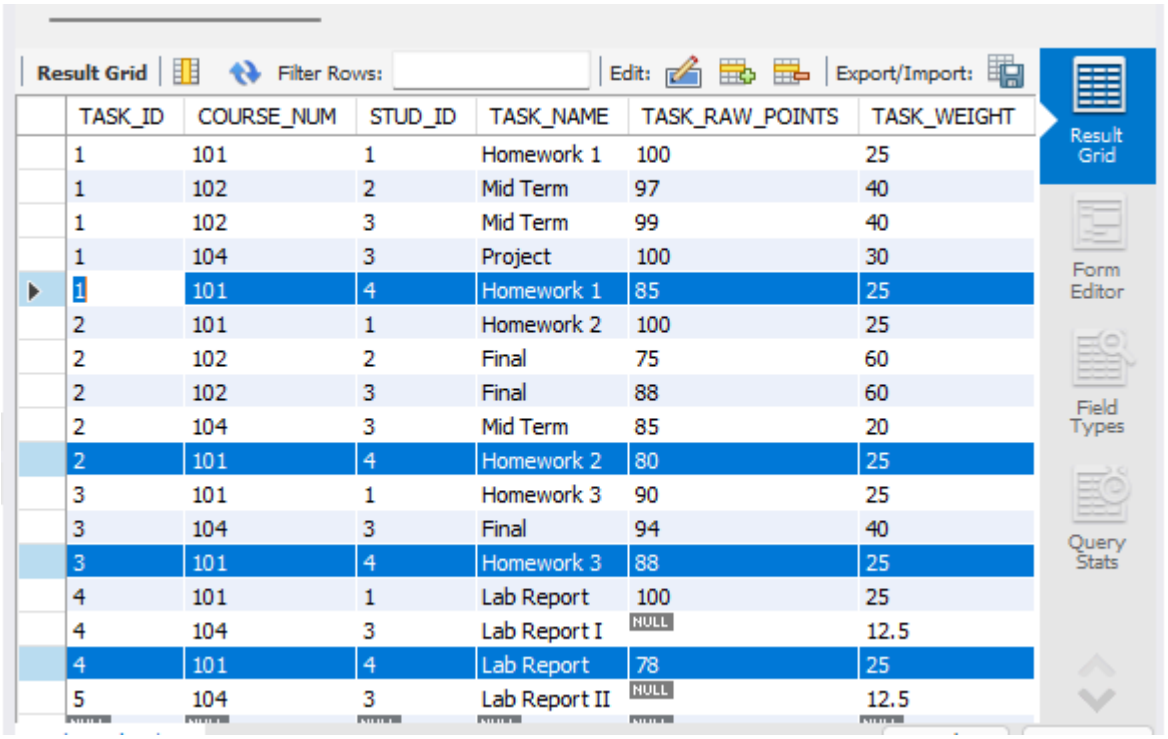
Q10) We added a new student with Q in his name so that there would be a change from this command:



Result Grid | Filter Rows: | Edit: | Export/Import:

STUD_ID	STUD_FNAME	STUD_LNAME	Student_Classification
1	Alice	McArthur	Sophomore
2	Bob	Smyth	Freshman
3	Michael	Scofield	Junior
4	Jack	Mqueen	Sophomore
NULL	NULL	NULL	NULL

Before command:

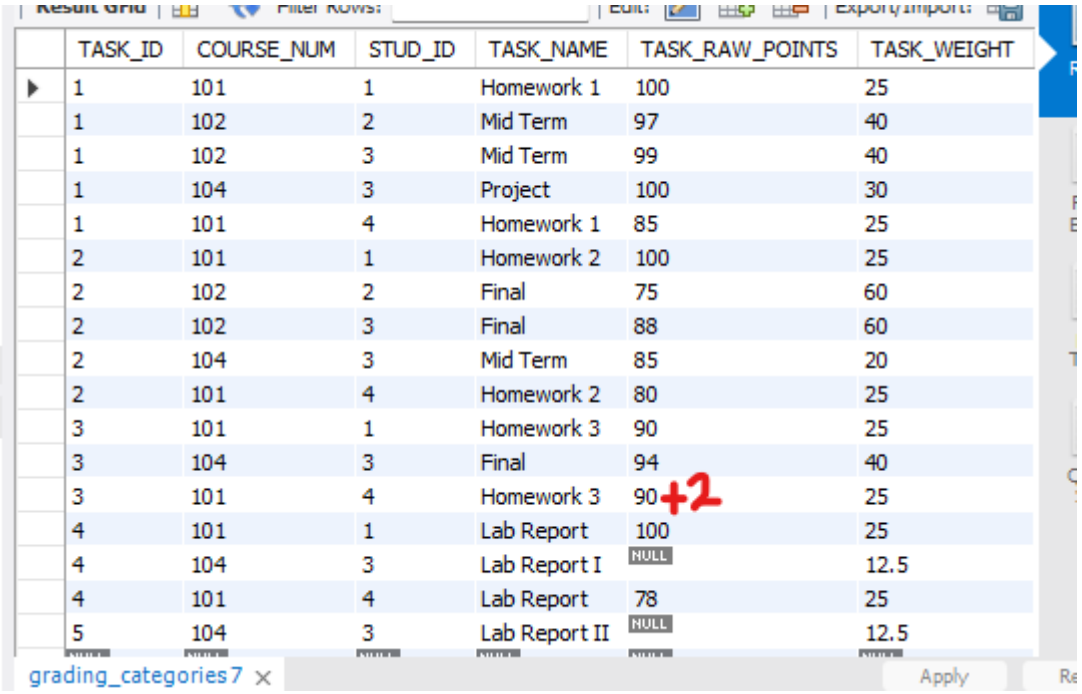


Result Grid | Filter Rows: | Edit: | Export/Import:

TASK_ID	COURSE_NUM	STUD_ID	TASK_NAME	TASK_RAW_POINTS	TASK_WEIGHT
1	101	1	Homework 1	100	25
1	102	2	Mid Term	97	40
1	102	3	Mid Term	99	40
1	104	3	Project	100	30
1	101	4	Homework 1	85	25
2	101	1	Homework 2	100	25
2	102	2	Final	75	60
2	102	3	Final	88	60
2	104	3	Mid Term	85	20
2	101	4	Homework 2	80	25
3	101	1	Homework 3	90	25
3	104	3	Final	94	40
3	101	4	Homework 3	88	25
4	101	1	Lab Report	100	25
4	104	3	Lab Report I	NULL	12.5
4	101	4	Lab Report	78	25
5	104	3	Lab Report II	NULL	12.5

Result Grid | Form Editor | Field Types | Query Stats

Now, the table after the command is run looks like:



TASK_ID	COURSE_NUM	STUD_ID	TASK_NAME	TASK_RAW_POINTS	TASK_WEIGHT
1	101	1	Homework 1	100	25
1	102	2	Mid Term	97	40
1	102	3	Mid Term	99	40
1	104	3	Project	100	30
1	101	4	Homework 1	85	25
2	101	1	Homework 2	100	25
2	102	2	Final	75	60
2	102	3	Final	88	60
2	104	3	Mid Term	85	20
2	101	4	Homework 2	80	25
3	101	1	Homework 3	90	25
3	104	3	Final	94	40
3	101	4	Homework 3	90 +2	25
4	101	1	Lab Report	100	25
4	104	3	Lab Report I	NULL	12.5
4	101	4	Lab Report	78	25
5	104	3	Lab Report II	NULL	12.5

grading_categories 7 ×

We can conclude, then, that all the question answers and outputs are correct and coherent with the database as seen by the terminal results for questions 4-6 and 11-12, and the changes in the tables for questions 7-10.