מיני פרויקט בבסיסי נתונים – תרגיל בית 3

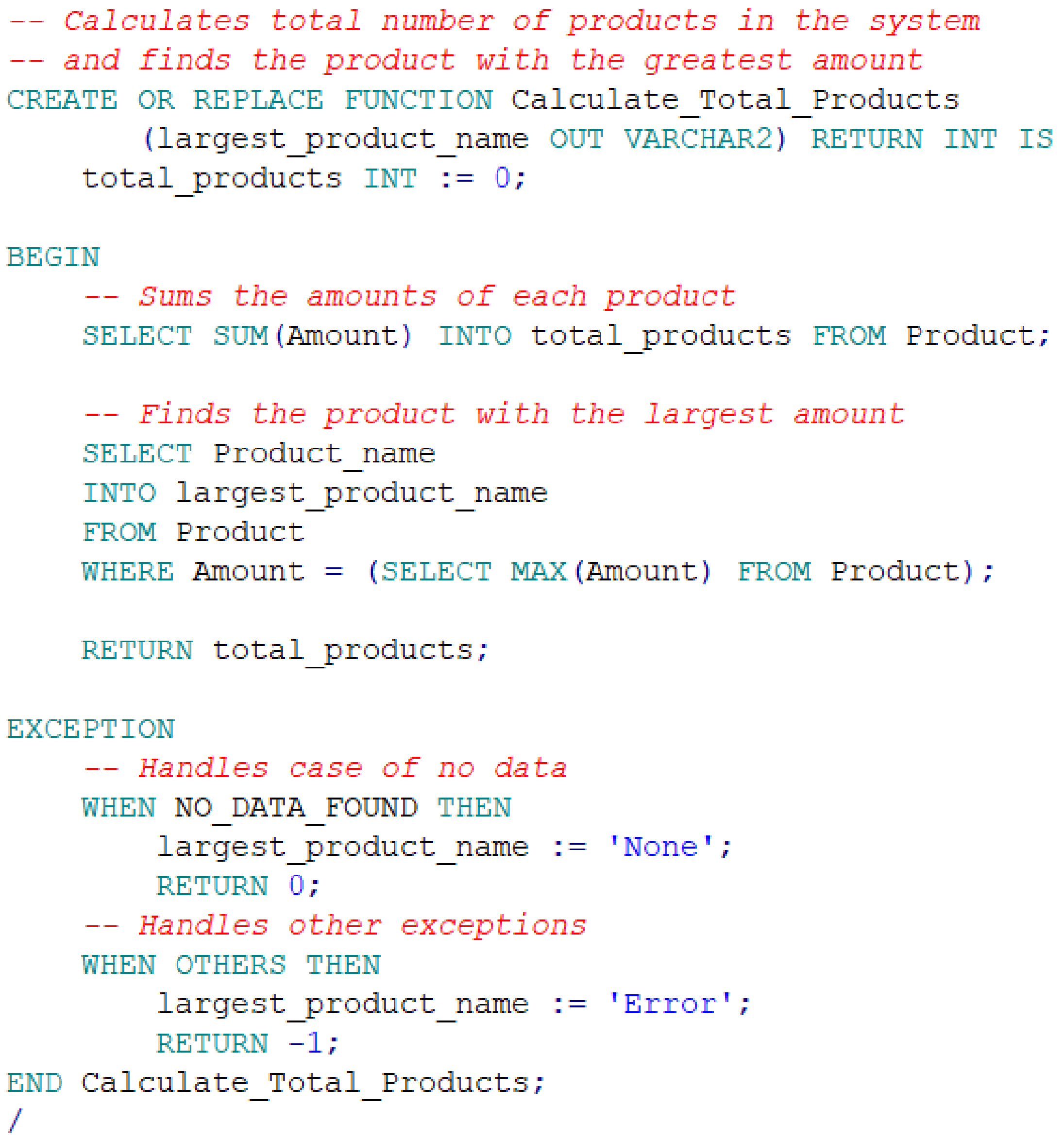
מגישים: אביעד לביא (215867722), אשי הרמן (214993727)

SHEKEM - בסיס נתונים לאחסון נתוני שקם

תוכן עניינים

פונקציה #1

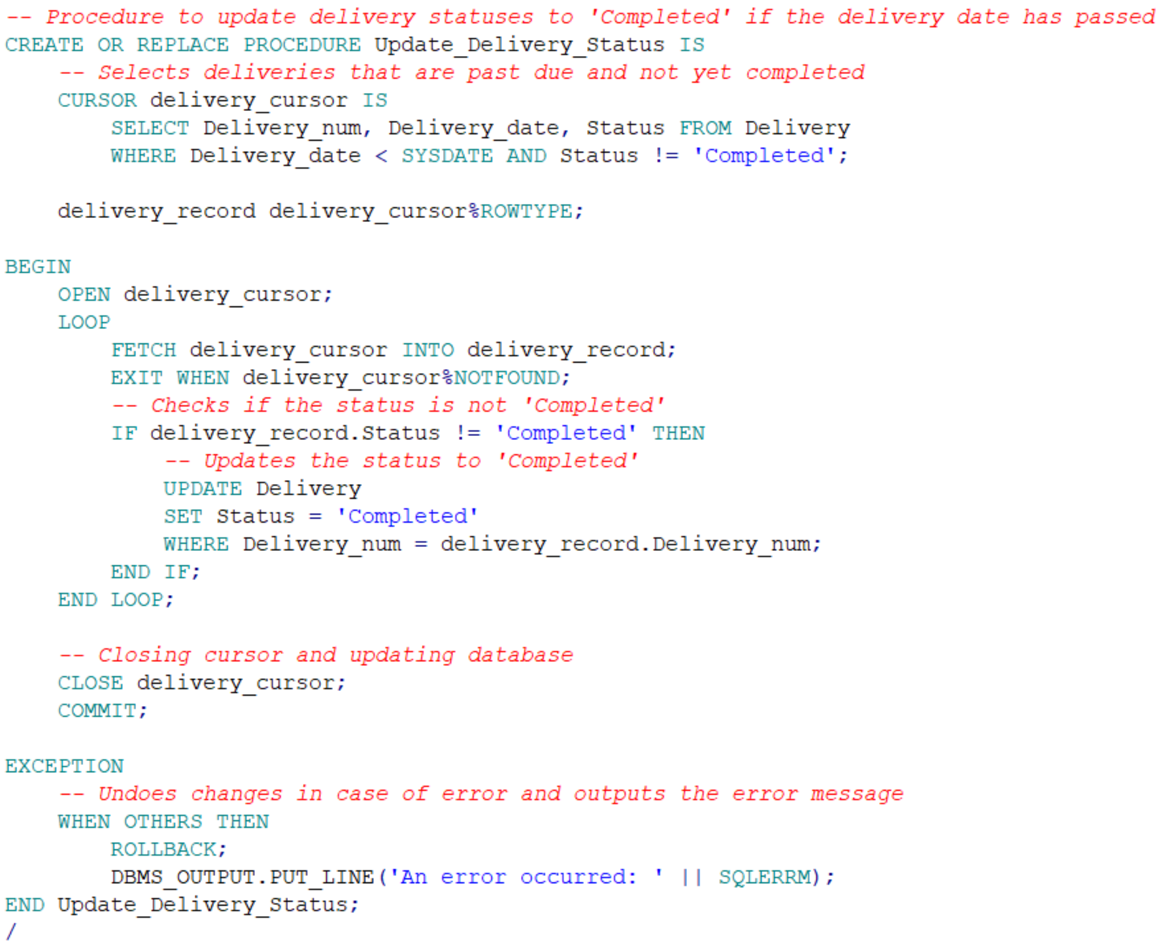
הפונקציה מחשבת את כמות המוצרים בכל השקמים, ואת המוצר ממנו יש הכי הרבה.



```
-- Calculates total number of products in the system
-- and finds the product with the greatest amount
CREATE OR REPLACE FUNCTION Calculate_Total_Products
       (largest_product_name OUT VARCHAR2) RETURN INT IS
    total_products INT := 0;

BEGIN
    -- Sums the amounts of each product
    SELECT SUM(Amount) INTO total_products FROM Product;

    -- Finds the product with the largest amount
    SELECT Product_name
    INTO largest_product_name
    FROM Product
    WHERE Amount = (SELECT MAX(Amount) FROM Product);

    RETURN total_products;

EXCEPTION
    -- Handles case of no data
    WHEN NO_DATA_FOUND THEN
        largest_product_name := 'None';
        RETURN 0;
    -- Handles other exceptions
    WHEN OTHERS THEN
        largest_product_name := 'Error';
        RETURN -1;
END Calculate_Total_Products;
/
```

פרוצדורה #1

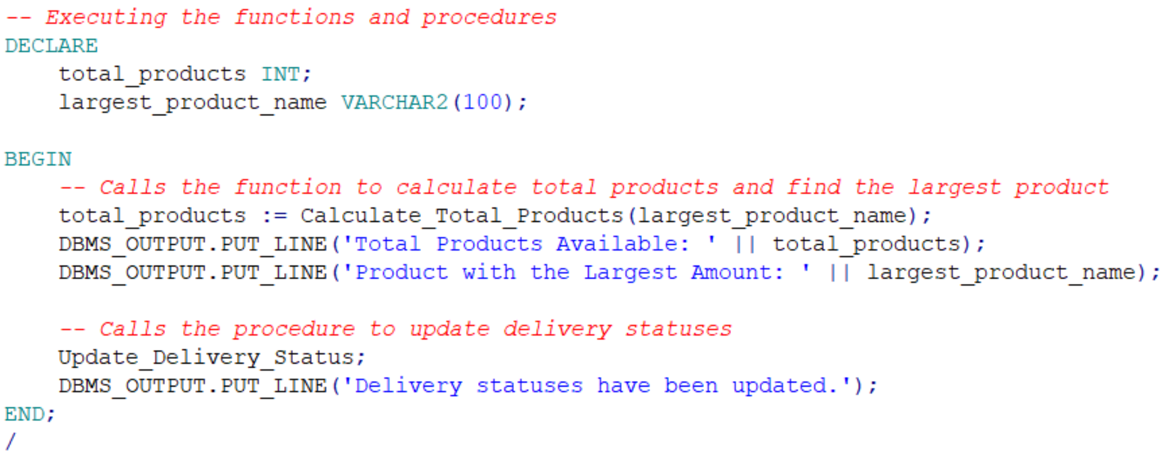
הפרוצדורה מוצאת את כל המשלוחים לפני התאריך הנוכחי (SYSDATE) שלא סומן שהושלמו,
ומעדכנת את הסטטוס שלהם ל-"הושלם".



```
-- Procedure to update delivery statuses to 'Completed' if the delivery date has passed
CREATE OR REPLACE PROCEDURE Update_Delivery_Status IS
    -- Selects deliveries that are past due and not yet completed
    CURSOR delivery_cursor IS
        SELECT Delivery_num, Delivery_date, Status FROM Delivery
        WHERE Delivery_date < SYSDATE AND Status != 'Completed';

    delivery_record delivery_cursor%ROWTYPE;

BEGIN
    OPEN delivery_cursor;
    LOOP
        FETCH delivery_cursor INTO delivery_record;
        EXIT WHEN delivery_cursor%NOTFOUND;
        -- Checks if the status is not 'Completed'
        IF delivery_record.Status != 'Completed' THEN
            -- Updates the status to 'Completed'
            UPDATE Delivery
            SET Status = 'Completed'
            WHERE Delivery_num = delivery_record.Delivery_num;
        END IF;
    END LOOP;

    -- Closing cursor and updating database
    CLOSE delivery_cursor;
    COMMIT;

EXCEPTION
    -- Undoes changes in case of error and outputs the error message
    WHEN OTHERS THEN
        ROLLBACK;
        DBMS_OUTPUT.PUT_LINE('An error occurred: ' || SQLERRM);
END Update_Delivery_Status;
/
```

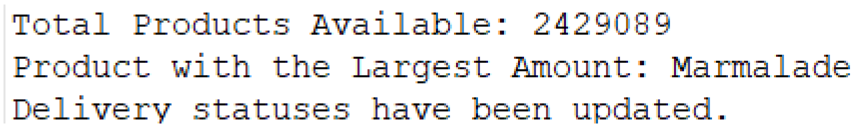
תוכנה #1

נריץ את השניים באמצעות הקוד הבא, שמדפיס את תוצאות ההרצות:



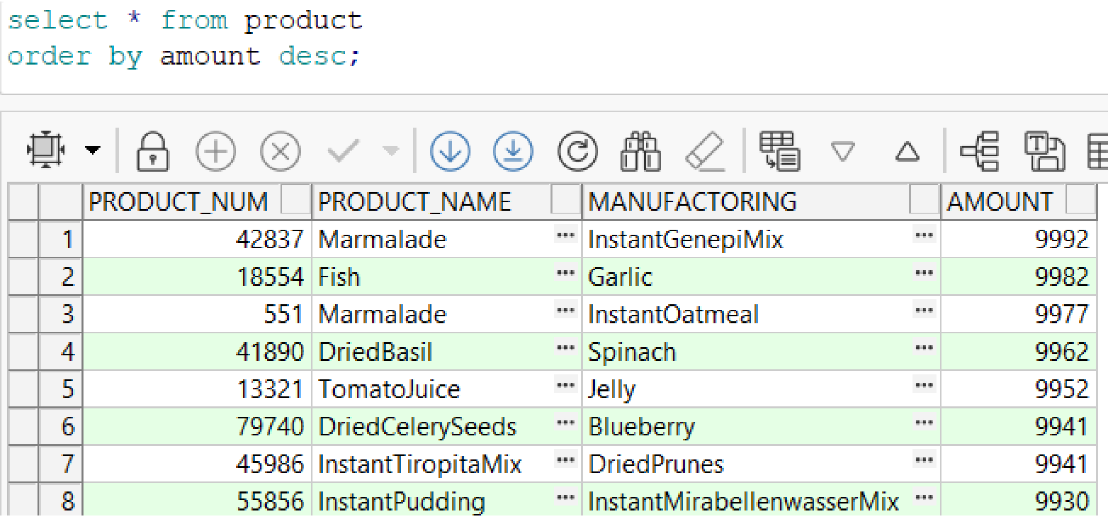
```
-- Executing the functions and procedures
DECLARE
    total_products INT;
    largest_product_name VARCHAR2(100);

BEGIN
    -- Calls the function to calculate total products and find the largest product
    total_products := Calculate_Total_Products(largest_product_name);
    DBMS_OUTPUT.PUT_LINE('Total Products Available: ' || total_products);
    DBMS_OUTPUT.PUT_LINE('Product with the Largest Amount: ' || largest_product_name);

    -- Calls the procedure to update delivery statuses
    Update_Delivery_Status;
    DBMS_OUTPUT.PUT_LINE('Delivery statuses have been updated.');
END;
/
```

הפלט המתקבל עבור בסיס הנתונים שלנו הוא:



```
Total Products Available: 2429089
Product with the Largest Amount: Marmalade
Delivery statuses have been updated.
```

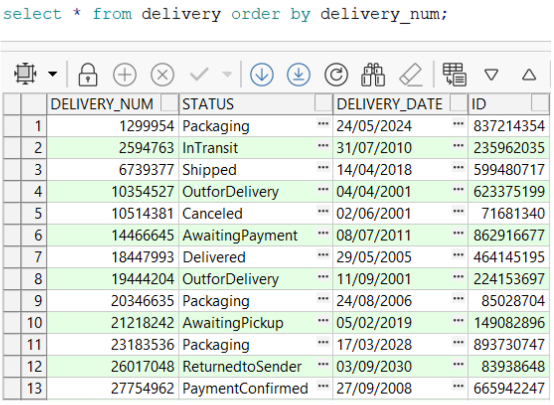
נבדוק שאכן השורה השנייה מדויקת:



```
select * from product
order by amount desc;
```

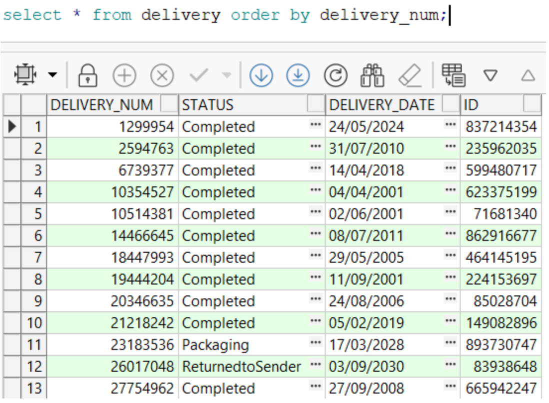
	PRODUCT_NUM	PRODUCT_NAME	MANUFACTORING	AMOUNT
1	42837	Marmalade	InstantGenepiMix	9992
2	18554	Fish	Garlic	9982
3	551	Marmalade	InstantOatmeal	9977
4	41890	DriedBasil	Spinach	9962
5	13321	TomatoJuice	Jelly	9952
6	79740	DriedCelerySeeds	Blueberry	9941
7	45986	InstantTiropitaMix	DriedPrunes	9941
8	55856	InstantPudding	InstantMirabellenwasserMix	9930

ונראה שסטטוס המשלוחים באמת עודכן. (כל משלוח עד היום עבר למצב "הושלם")



```
select * from delivery order by delivery_num;
```

	DELIVERY_NUM	STATUS	DELIVERY_DATE	ID
1	1299954	Packaging	24/05/2024	837214354
2	2594763	InTransit	31/07/2010	235962035
3	6739377	Shipped	14/04/2018	599480717
4	10354527	OutforDelivery	04/04/2001	623375199
5	10514381	Canceled	02/06/2001	71681340
6	14466645	AwaitingPayment	08/07/2011	862916677
7	18447993	Delivered	29/05/2005	464145195
8	19444204	OutforDelivery	11/09/2001	224153697
9	20346635	Packaging	24/08/2006	85028704
10	21218242	AwaitingPickup	05/02/2019	149082896
11	23183536	Packaging	17/03/2028	893730747
12	26017048	ReturnedtoSender	03/09/2030	83938648
13	27754962	PaymentConfirmed	27/09/2008	665942247

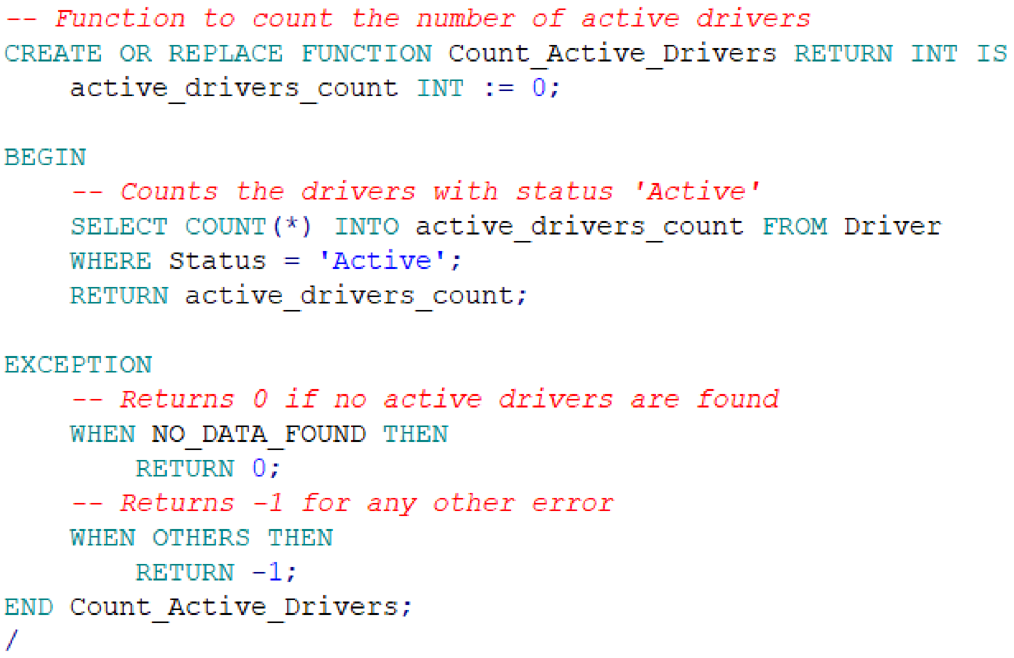


```
select * from delivery order by delivery_num;
```

	DELIVERY_NUM	STATUS	DELIVERY_DATE	ID
1	1299954	Completed	24/05/2024	837214354
2	2594763	Completed	31/07/2010	235962035
3	6739377	Completed	14/04/2018	599480717
4	10354527	Completed	04/04/2001	623375199
5	10514381	Completed	02/06/2001	71681340
6	14466645	Completed	08/07/2011	862916677
7	18447993	Completed	29/05/2005	464145195
8	19444204	Completed	11/09/2001	224153697
9	20346635	Completed	24/08/2006	85028704
10	21218242	Completed	05/02/2019	149082896
11	23183536	Packaging	17/03/2028	893730747
12	26017048	ReturnedtoSender	03/09/2030	83938648
13	27754962	Completed	27/09/2008	665942247

פונקציה #2

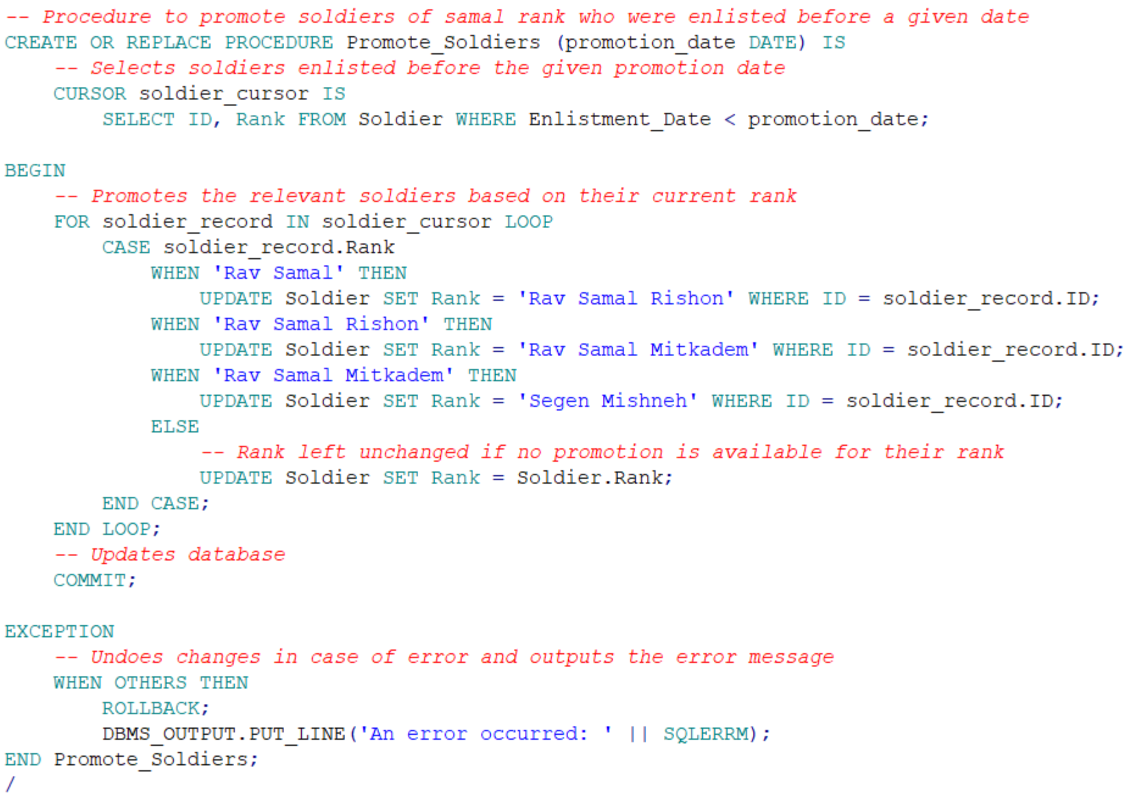
הפונקציה סופרת ומחזירה את כמות הנהגים ה"פעילים":



```
-- Function to count the number of active drivers
CREATE OR REPLACE FUNCTION Count_Active_Drivers RETURN INT IS
    active_drivers_count INT := 0;

BEGIN
    -- Counts the drivers with status 'Active'
    SELECT COUNT(*) INTO active_drivers_count FROM Driver
    WHERE Status = 'Active';
    RETURN active_drivers_count;

EXCEPTION
    -- Returns 0 if no active drivers are found
    WHEN NO_DATA_FOUND THEN
        RETURN 0;
    -- Returns -1 for any other error
    WHEN OTHERS THEN
        RETURN -1;
END Count_Active_Drivers;
/
```

פרוצדורה #2

הפרוצדורה מעלה בדרגה סמלים שהתגייסו לפני תאריך שניתן ע"י הקוד הראשי:



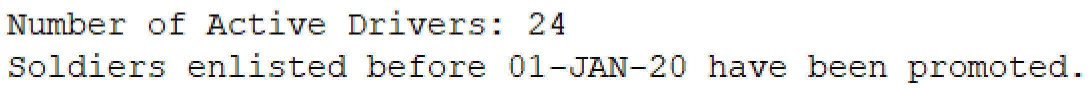
```
-- Procedure to promote soldiers of samal rank who were enlisted before a given date
CREATE OR REPLACE PROCEDURE Promote_Soldiers (promotion_date DATE) IS
    -- Selects soldiers enlisted before the given promotion date
    CURSOR soldier_cursor IS
        SELECT ID, Rank FROM Soldier WHERE Enlistment_Date < promotion_date;

BEGIN
    -- Promotes the relevant soldiers based on their current rank
    FOR soldier_record IN soldier_cursor LOOP
        CASE soldier_record.Rank
            WHEN 'Rav Samal' THEN
                UPDATE Soldier SET Rank = 'Rav Samal Rishon' WHERE ID = soldier_record.ID;
            WHEN 'Rav Samal Rishon' THEN
                UPDATE Soldier SET Rank = 'Rav Samal Mitkadem' WHERE ID = soldier_record.ID;
            WHEN 'Rav Samal Mitkadem' THEN
                UPDATE Soldier SET Rank = 'Segen Mishneh' WHERE ID = soldier_record.ID;
            ELSE
                -- Rank left unchanged if no promotion is available for their rank
                UPDATE Soldier SET Rank = Soldier.Rank;
        END CASE;
    END LOOP;
    -- Updates database
    COMMIT;

EXCEPTION
    -- Undoes changes in case of error and outputs the error message
    WHEN OTHERS THEN
        ROLLBACK;
        DBMS_OUTPUT.PUT_LINE('An error occurred: ' || SQLERRM);
END Promote_Soldiers;
/
```

תוכנה #2

נריץ את השניים באמצעות הקוד הבא, שמדפיס את תוצאות ההרצות:

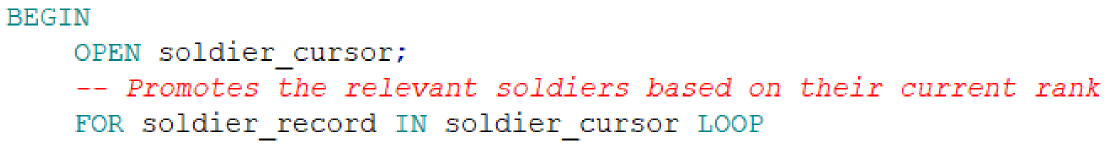
```
-- Executing the function and procedure
DECLARE
    active_drivers_count INT;
    promotion_date DATE := TO_DATE('2020-01-01', 'YYYY-MM-DD');

BEGIN
    -- Calls the function to count active drivers
    active_drivers_count := Count_Active_Drivers;
    DBMS_OUTPUT.PUT_LINE('Number of Active Drivers: ' || active_drivers_count);

    -- Calls the procedure to promote soldiers based on the promotion date
    Promote_Soldiers(promotion_date);
    DBMS_OUTPUT.PUT_LINE('Soldiers enlisted before ' || promotion_date || ' have been promoted.');
END;
/
```

נקבל:



```
Number of Active Drivers: 24
Soldiers enlisted before 01-JAN-20 have been promoted.
```

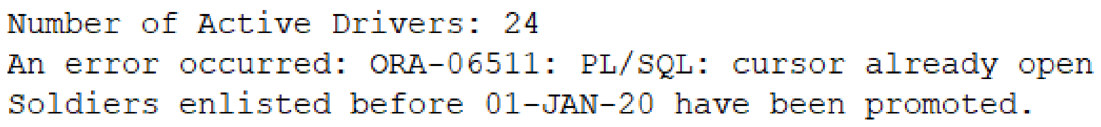
נדגים מה קורה כאשר נכתוב בפרוצדורה קוד מוטעה וייעשה שימוש ב-Exception Manager.



```
BEGIN
    OPEN soldier_cursor;
    -- Promotes the relevant soldiers based on their current rank
    FOR soldier_record IN soldier_cursor LOOP
```

(במקרה זה, לולאת ה-for פותחת את ה-cursor בעצמה, ולכן זו טעות לפתוח אותו בנפרד.)

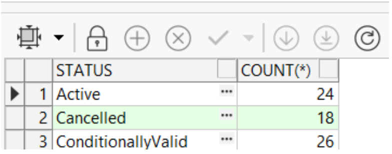
נקבל:



```
Number of Active Drivers: 24
An error occurred: ORA-06511: PL/SQL: cursor already open
Soldiers enlisted before 01-JAN-20 have been promoted.
```

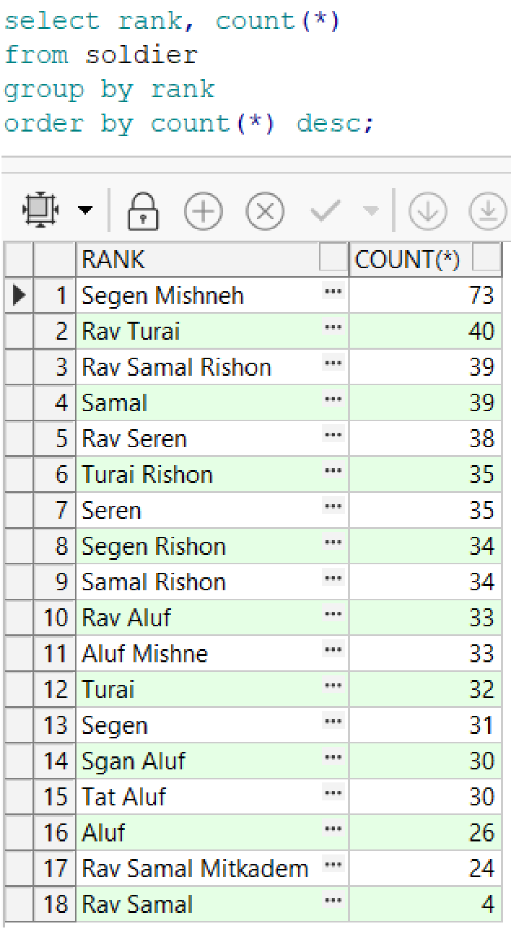
נבדוק שמספר הנהגים הפעילים אכן מדויק:

```
select status, count(*) from driver
group by status order by status;
```



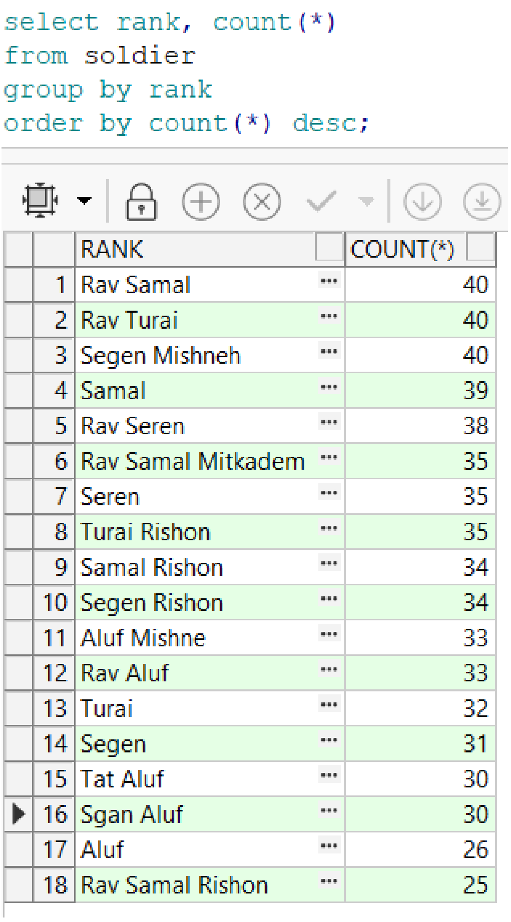
	STATUS	COUNT(*)
1	Active	24
2	Cancelled	18
3	ConditionallyValid	26

נראה שהפרוצדורה אכן מעלה את הסמלים בדרגה:
(מה שניתן לראות מהמנייה של "סגן משנה" ו-"רב סמל ראשון")



```
select rank, count(*)
from soldier
group by rank
order by count(*) desc;
```

	RANK	COUNT(*)
1	Segen Mishneh	73
2	Rav Turai	40
3	Rav Samal Rishon	39
4	Samal	39
5	Rav Seren	38
6	Turai Rishon	35
7	Seren	35
8	Segen Rishon	34
9	Samal Rishon	34
10	Rav Aluf	33
11	Aluf Mishne	33
12	Turai	32
13	Segen	31
14	Sgan Aluf	30
15	Tat Aluf	30
16	Aluf	26
17	Rav Samal Mitkadem	24
18	Rav Samal	4



```
select rank, count(*)
from soldier
group by rank
order by count(*) desc;
```

	RANK	COUNT(*)
1	Rav Samal	40
2	Rav Turai	40
3	Segen Mishneh	40
4	Samal	39
5	Rav Seren	38
6	Rav Samal Mitkadem	35
7	Seren	35
8	Turai Rishon	35
9	Samal Rishon	34
10	Segen Rishon	34
11	Aluf Mishne	33
12	Rav Aluf	33
13	Turai	32
14	Segen	31
15	Tat Aluf	30
16	Sgan Aluf	30
17	Aluf	26
18	Rav Samal Rishon	25