מעבדת תרומת דם

מגישות:
אורית רוקח 213279631
שירהל מיתר 214439101

תוכן העניינים

מערכת: תיאור מילולי.....3

שלב א

ERD של המערכת.....4

DSD של המערכת.....5

CreateTable.....6

DropTable.....10

Insert.....11

SelectAll.....12

Desc.....13

DataGenerators.....15

גיבוי.....17

שלב ב

שאילתות בחירה.....19

שאילתות עידכון.....23

שאילתות מחיקה.....25

שאילתות עם פרמטרים.....27

אילוצים.....31

שלב ג

Procedures.....32

Functions.....36

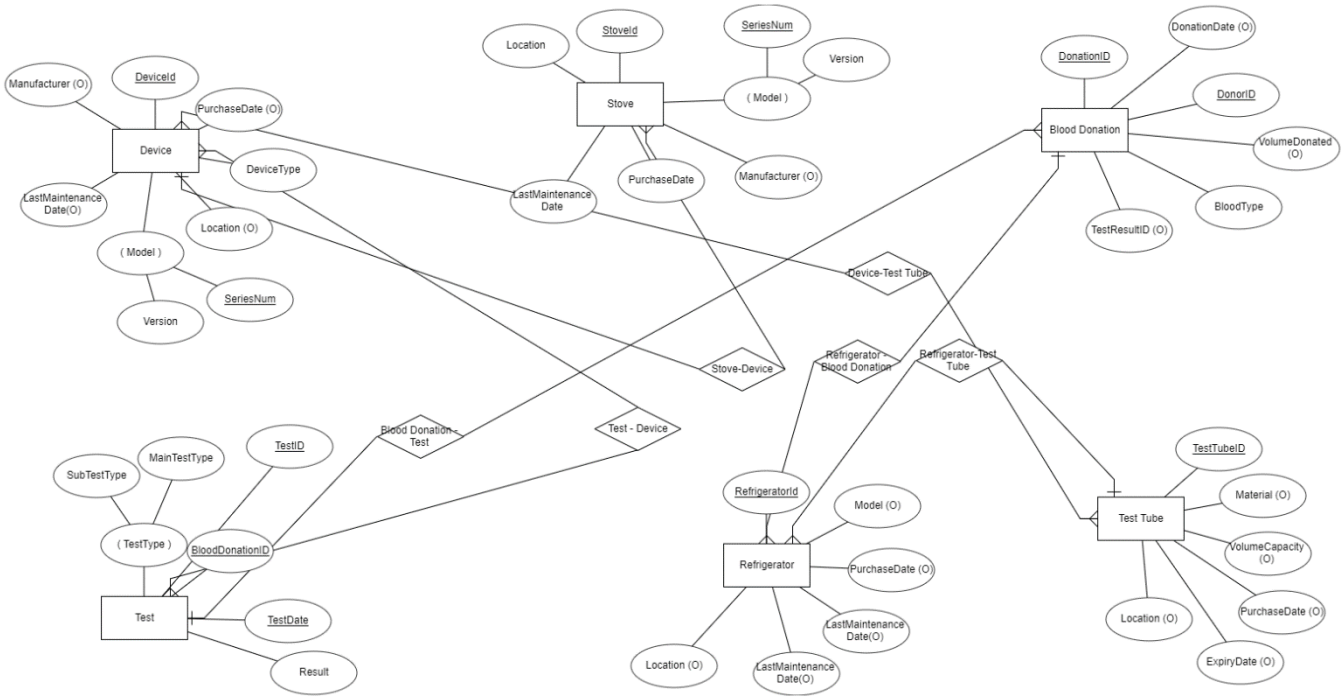
Mains.....38

תיאור מילולי:

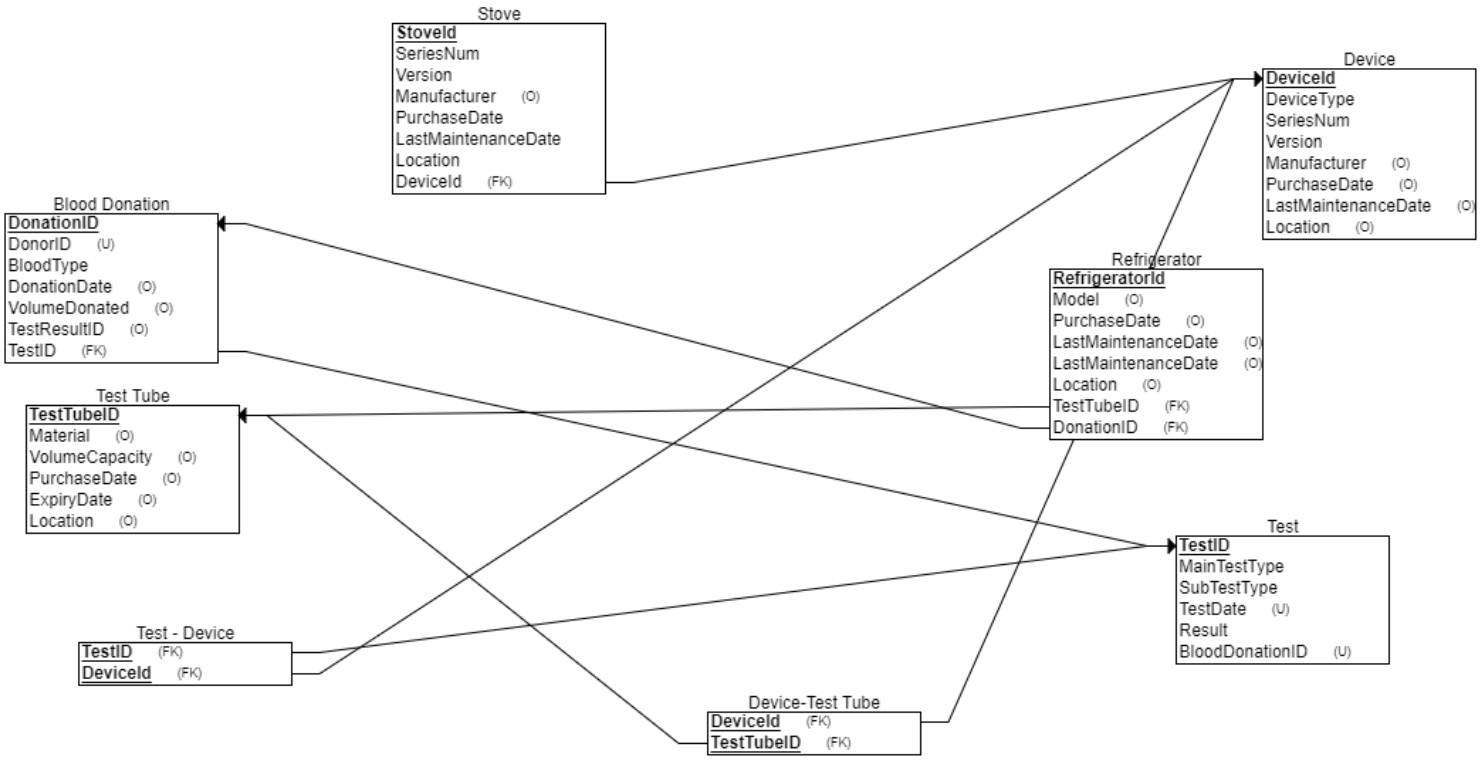
שם המערכת: מעבדת תרומות דם.

תיאור המערכת: המערכת היא מערכת לניהול מידע על מכשירים, בדיקות רפואיות, תרומות דם וציוד רפואי. הנתונים המרכזיים במערכת כוללים מידע על מכשירים רפואיים (כמו מספר סידורי, סוג, יצרן ותאריכי רכישה ותחזוקה אחרונה), בדיקות רפואיות (כולל סוג בדיקה, תאריך ותוצאות), תרומות דם (כולל סוג דם, תאריך התרומה וכמות דם) וציוד רפואי נלווה (כולל תאריכי רכישה ותחזוקה, דגם ומיקום). המערכת מטרתה לאפשר ניהול יעיל ומדויק של כלל המידע הרלוונטי, כולל הקשרים בין הנתונים, לצורך תמיכה בתהליכי רפואיים, ניהול מלאי וציוד, וניטור וניהול תרומות דם.

ERDשל המערכת:



DSD של המערכת



CreateTable

```
CREATE TABLE Device1
(
 DeviceId varchar2(50) NOT NULL,
 DeviceType INT NOT NULL,
 SeriesNum INT NOT NULL,
 VersionD INT NOT NULL,
 Manufacturer varchar2(50),
 PurchaseDate DATE,
 LastMaintenanceDate DATE,
 LocationD varchar2(50),
 PRIMARY KEY (DeviceId)
);

CREATE TABLE Test_Tube1—
(
 TestTubeID varchar2(50) NOT NULL,
 Material INT,
 VolumeCapacity INT,
 PurchaseDate DATE,
 ExpiryDate DATE,
 LocationTestTube varchar2(50),
 PRIMARY KEY (TestTubeID)
);

CREATE TABLE Test_1—
(
 TestID varchar2(50) NOT NULL,
```

```
 MainTestType INT NOT NULL,
 SubTestType INT NOT NULL,
 TestDate DATE NOT NULL,
 ResultT varchar2(50) NOT NULL,
 BloodDonationID varchar2(50) NOT NULL,
 PRIMARY KEY (TestID),
 UNIQUE (TestDate),
 UNIQUE (BloodDonationID)
);

CREATE TABLE Test_Device1—
(
 TestID varchar2(50) NOT NULL,
 DeviceId varchar2(50) NOT NULL,
 PRIMARY KEY (TestID, DeviceId),
 FOREIGN KEY (TestID) REFERENCES Test_1(TestID),
 FOREIGN KEY (DeviceId) REFERENCES Device1(DeviceId)) ;

CREATE TABLE DeviceTest_Tube1—
(
 DeviceId varchar2(50) NOT NULL,
 TestTubeID varchar2(50) NOT NULL,
 PRIMARY KEY (DeviceId, TestTubeID),
 FOREIGN KEY (DeviceId) REFERENCES Device1(DeviceId),
 FOREIGN KEY (TestTubeID) REFERENCES Test_Tube1(TestTubeID)
);

CREATE TABLE Blood_Donation1
```

```
(
 DonationID varchar2(50) NOT NULL,
 DonorID varchar2(50) NOT NULL,
 BloodType varchar2(50) NOT NULL,
 DonationDate DATE,
 VolumeDonated INT,
 TestResultID varchar2(50),
 TestID varchar2(50) NOT NULL,
 PRIMARY KEY (DonationID),
 FOREIGN KEY (TestID) REFERENCES Test_1(TestID),
 UNIQUE (DonorID)
);

CREATE TABLE Stove1—
(
 StoveId varchar2(50) NOT NULL,
 SeriesNum INT NOT NULL,
 VersionStove INT NOT NULL,
 Manufacturer INT,
 PurchaseDate DATE NOT NULL,
 LastMaintenanceDate DATE NOT NULL,
 LocationStove varchar2(50) NOT NULL,
 DeviceId varchar2(50) NOT NULL,
 PRIMARY KEY (StoveId),
 FOREIGN KEY (DeviceId) REFERENCES Device1(DeviceId)
);

CREATE TABLE Refrigerator1—
```

```
(
 RefrigeratorId varchar2(50) NOT NULL,
 ModelR INT,
 PurchaseDate DATE,
 LastMaintenanceDate DATE,
 LocationR varchar2(50),
 TestTubeID varchar2(50) NOT NULL,
 DonationID varchar2(50) NOT NULL,
 PRIMARY KEY (RefrigeratorId),
 FOREIGN KEY (TestTubeID) REFERENCES Test_Tube1(TestTubeID),
 FOREIGN KEY (DonationID) REFERENCES Blood_Donation1(DonationID)
);
```

DropTable

```
;DROP TABLE Refrigerator1

;DROP TABLE Stove1

;DROP TABLE Blood_Donation1

;DROP TABLE DeviceTest_Tube1

;DROP TABLE Test_Device1

;DROP TABLE Test_1

;DROP TABLE Test_Tube1

;DROP TABLE Device1
```

Insert

זה כמות אדירה ולכן נרשום רק כמה שורות...

```
INSERT INTO Device1 (DeviceId, DeviceType, SeriesNum, VersionD,
Manufacturer, PurchaseDate, LastMaintenanceDate, LocationD) VALUES
('YvSGkO6l6fRwXlaf5But', 31, 760, 9, 'PvsL2vp1kgjRPSYTZaTE', TO_DATE('2003-
09-16', 'YYYY-MM-DD'), TO_DATE('2010-04-13', 'YYYY-MM-DD'),
'evqI5CvnJlWT5sjpFOr8');

INSERT INTO Device1 (DeviceId, DeviceType, SeriesNum, VersionD,
Manufacturer, PurchaseDate, LastMaintenanceDate, LocationD) VALUES
('eR4LgsUjk1PKOmGQkmDp', 46, 436, 2, 'WiFxVJLbwrIcYzZdpL5G',
TO_DATE('2010-04-04', 'YYYY-MM-DD'), TO_DATE('2010-09-25', 'YYYY-MM-DD'),
'mFjXIEDHUPMHzDIvApsT');

INSERT INTO Device1 (DeviceId, DeviceType, SeriesNum, VersionD,
Manufacturer, PurchaseDate, LastMaintenanceDate, LocationD) VALUES
('3h5ggjXUeEB2Gr8WzzWa', 73, 748, 9, 'sApvxdDVio2a9G4AMJ3C',
TO_DATE('2020-03-12', 'YYYY-MM-DD'), TO_DATE('2000-04-20', 'YYYY-MM-DD'),
'r964gYNL8H8739jrYgrf');
```

SelectAll

```
SELECT* from Device1;

SELECT* from Test_Tube1;

SELECT* from Test_1;

SELECT* from Test_Device1;

SELECT* from DeviceTest_Tube1;

SELECT* from Blood_Donation1;

SELECT* from Stove1;

SELECT* from Refrigerator1;
```

Desc

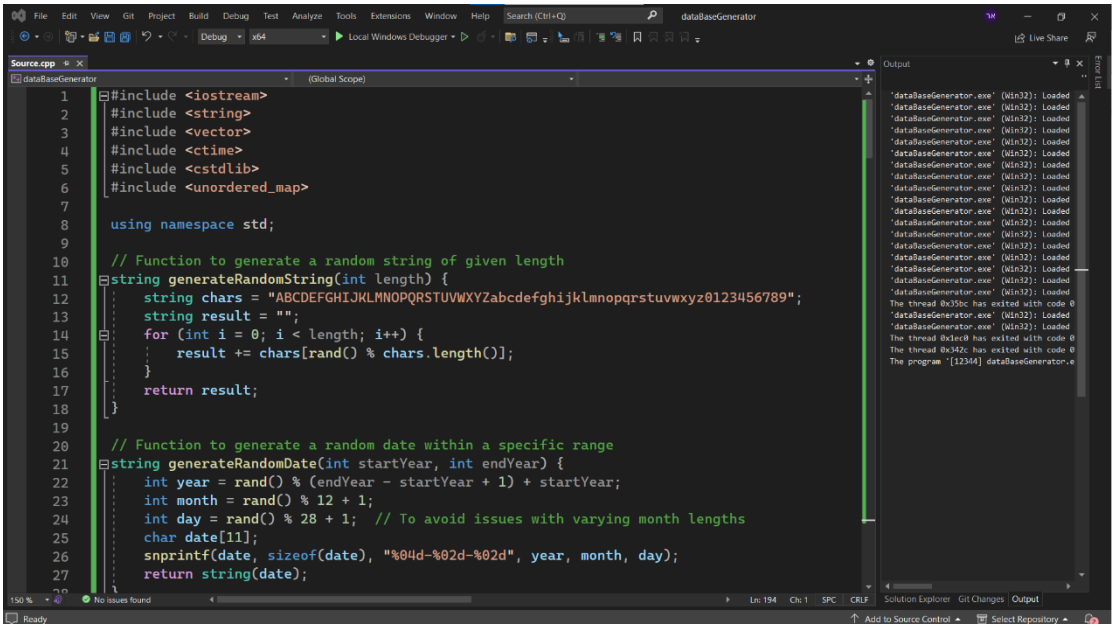
```
VOLUMEDONATED  INTEGER      Y
TESTRESULTID   VARCHAR2(50) Y
TESTID         VARCHAR2(50)

SQL> desc Stove1
Name                  Type         Nullable Default Comments
--------------------- ------------ -------- ------- --------
STOVEID               VARCHAR2(50)
SERIESNUM             INTEGER
VERSIONSTOVE          INTEGER
MANUFACTURER          INTEGER      Y
PURCHASEDATE          DATE
LASTMAINTENANCEDATE   DATE
LOCATIONSTOVE         VARCHAR2(50)
DEVICEID              VARCHAR2(50)

SQL> desc Refrigerator1
Name                  Type         Nullable Default Comments
--------------------- ------------ -------- ------- --------
REFRIGERATORID        VARCHAR2(50)
MODELR                INTEGER      Y
PURCHASEDATE          DATE         Y
LASTMAINTENANCEDATE   DATE         Y
LOCATIONR             VARCHAR2(50) Y
TESTTUBEID            VARCHAR2(50)
DONATIONID            VARCHAR2(50)

SQL>
```

```
SQL> desc Test_Device1
Name     Type         Nullable Default Comments
-------- ------------ -------- ------- --------
TESTID   VARCHAR2(50)
DEVICEID VARCHAR2(50)

SQL> desc DeviceTest_Tube1
Name       Type         Nullable Default Comments
---------- ------------ -------- ------- --------
DEVICEID   VARCHAR2(50)
TESTTUBEID VARCHAR2(50)

SQL> desc Blood_Donation1
Name           Type         Nullable Default Comments
-------------- ------------ -------- ------- --------
DONATIONID     VARCHAR2(50)
DONORID        VARCHAR2(50)
BLOODTYPE      VARCHAR2(50)
DONATIONDATE   DATE         Y
VOLUMEDONATED  INTEGER      Y
TESTRESULTID   VARCHAR2(50) Y
TESTID         VARCHAR2(50)

SQL> desc Stove1
Name                  Type         Nullable Default Comments
--------------------- ------------ -------- ------- --------
STOVEID               VARCHAR2(50)
SERIESNUM             INTEGER
VERSIONSTOVE          INTEGER
MANUFACTURER          INTEGER      Y
```

```
SQL> desc device1
Name                 Type         Nullable Default Comments
-------------------- ------------ -------- ------- --------
DEVICEID             VARCHAR2(50)
DEVICETYPE           INTEGER
SERIESNUM            INTEGER
VERSIOND             INTEGER
MANUFACTURER         VARCHAR2(50) Y
PURCHASEDATE         DATE         Y
LASTMAINTENANCEDATE DATE         Y
LOCATIOND            VARCHAR2(50) Y

SQL> desc Test_Tube1
Name              Type         Nullable Default Comments
----------------- ------------ -------- ------- --------
TESTTUBEID        VARCHAR2(50)
MATERIAL          INTEGER      Y
VOLUMECAPACITY    INTEGER      Y
PURCHASEDATE      DATE         Y
EXPIRYDATE        DATE         Y
LOCATIONTESTTUBE VARCHAR2(50) Y

SQL> desc Test_1
Name              Type         Nullable Default Comments
----------------- ------------ -------- ------- --------
TESTID           VARCHAR2(50)
MAINTESTTYPE     INTEGER
SUBTESTTYPE      INTEGER
TESTDATE         DATE
```

Data Generators

*על ידי תוכנית בc++

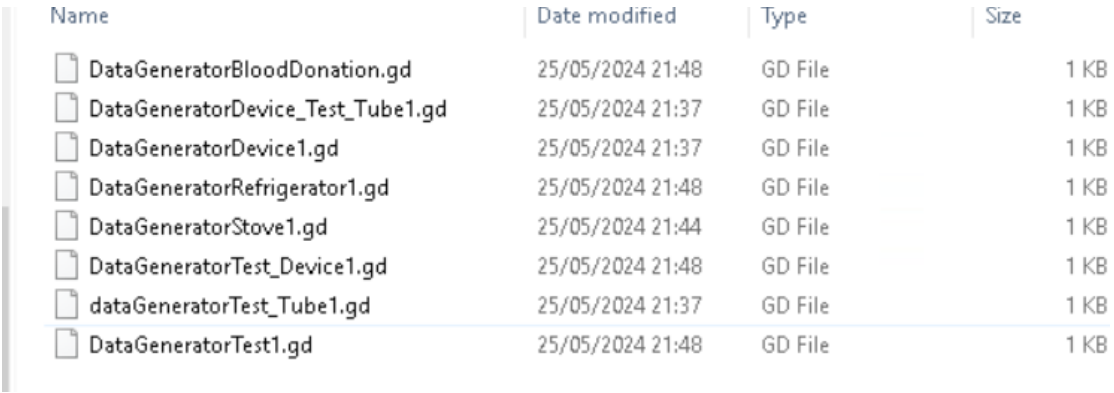


```cpp
#include <iostream>
#include <string>
#include <vector>
#include <ctime>
#include <cstdlib>
#include <unordered_map>

using namespace std;

// Function to generate a random string of given length
string generateRandomString(int length) {
    string chars = "ABCDEFGHIJKLMNOPQRSTUVWXYZabcdefghijklmnopqrstuvwxyz0123456789";
    string result = "";
    for (int i = 0; i < length; i++) {
        result += chars[rand() % chars.length()];
    }
    return result;
}

// Function to generate a random date within a specific range
string generateRandomDate(int startYear, int endYear) {
    int year = rand() % (endYear - startYear + 1) + startYear;
    int month = rand() % 12 + 1;
    int day = rand() % 28 + 1;  // To avoid issues with varying month lengths
    char date[11];
    snprintf(date, sizeof(date), "%04d-%02d-%02d", year, month, day);
    return string(date);
}
```

*על ידי קצבי exel

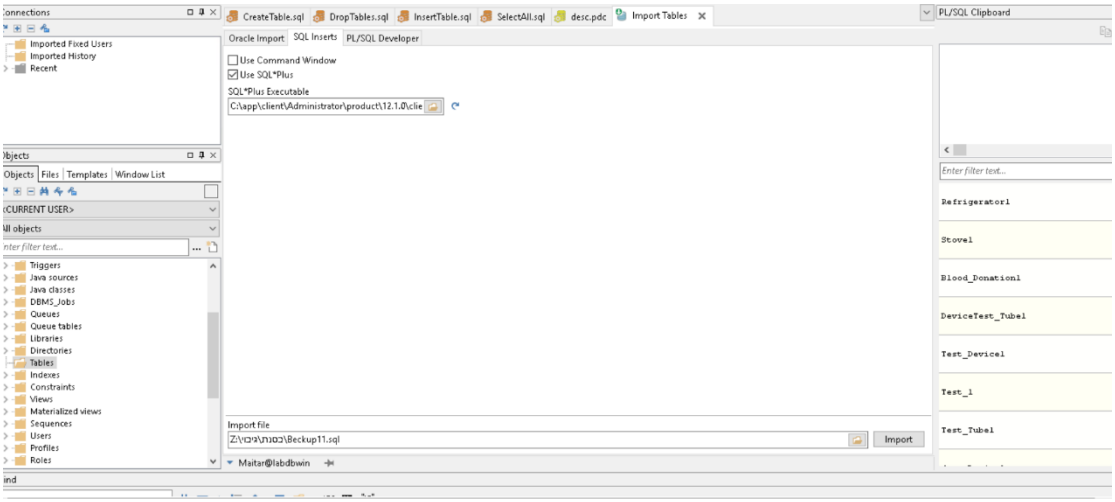
	A	B	C	D	E	F	G	H
1	StoveId	SeriesNum	VersionStov	Manufacture	PurchaseDa	LastMainter	LocationSto	DeviceId
2	OJ8Wfwytgs	174	6	u61GURC3Q	18/05/2012	13/08/2011	BoPRzd0Wq	3JwIU9dGEK
3	PhjEe2RBjeZ	558	4	DrP9PLdrDE	11/03/2000	26/02/2017	VutQ1URAbg	GJuUmCFHC
4	ucv1cbpZpG	450	6	ixWGvNwzjV	09/08/2021	30/05/2008	JLVnsJ16iwT	VeaAlT3zZXY
5	OtW1RvJk2c	232	1	csnDyAO7cT	20/05/2014	18/03/2022	OGHZcYN8ey	c2S8bsiiL3b
6	qmbrzvsh75	619	6	bNMtNT0Hb	18/01/2009	30/11/2011	dVLRZGP62l	aG8voTCFXY
7	Eh2froCbIfP3	467	8	AdEhesNB2f	15/12/2008	17/12/2018	egFJsZF4KM	oXmV4VXME
8	geg5hj1XtJC	785	2	ohntDbJHMa	04/01/2015	03/11/2002	yvs03aKBXv	pOmuSefulv
9	cAmrtwNx9l	348	10	QtMFaAOaQ	20/10/2016	02/06/2004	43a7gSo2YC	6TZmHHpk2
10	xP7xvGst9Jz	964	8	xPEVVZB4M6	14/02/2017	30/06/2021	m8akuXm3u	TDrY6r5Ed1S
11	PqhxyYb34y	70	7	7rcgEJWFDX	18/10/2021	22/07/2005	dNOxhXQWJ	VvQmjJJqAG
12	loWYjCPkxzc	599	4	xPEVVZB4M6	07/07/2017	06/07/2001	kPJ6wn5HhE	iEvYsrJUPtxe
13	EB9ezF823d	79	2	mXOT9piWC	11/12/2009	08/11/2022	FxlaHGs01l4	6TZmHHpk2
14	fep9TtSfwdjS	660	4	x2PuvzbtSyC	24/02/2002	06/04/2005	59dIwta97K	VvQmjJJqAG
15	6ro8MKCOn	309	3	RoTCaXQL8E	08/07/2019	07/07/2022	dcCBE3VjI7n	zVz4eeNfme
16	UKHpG0XGv	604	7	CZtZyaszJn6	23/09/2011	04/07/2017	n4qlODAzP6	Dt7CfR13I5C
17	UdOKkkAQeI	99	2	u61GURC3Q	02/08/2021	31/10/2015	IreuSnbbyNb	Q9AlgKi2VQ
18	gecyR2hzoh	371	7	h6Qa6DmKc	06/06/2001	03/06/2017	UJdUtdHCl6	gcZRRWdAL8
19	6l7Ov4qMr7	437	7	zZ7AzXqFIt3I	18/08/2023	19/02/2003	rtJWWFXq3\	UpHsnKtDiV
20	FbKBuDvdM	310	8	RVi0pauvdW	18/06/2016	09/06/2005	zraIB27hQnp	MHRvIrODdE
21	pLBOWESXQ	310	2	CZtZyaszJn6	23/07/2020	29/03/2015	Zot8YWkgxc	YFvzR6EXWS
22	ten6PvTviRV	304	6	NxpuEbcI3gC	02/12/2012	18/08/2007	BcwsWb2Lw	eneDROYPYE
23	YCPYnvqT1FZ	894	9	rbCuTVjFSU5	07/01/2005	21/07/2013	JclUsbia4og	X7PaplqOlTk
24	lB0HfxfNSfgM	59	3	Y8f1XoK7d8	04/03/2014	13/12/2023	xG4dvyiqR5\	cD7b4H2mT
25	HPojJsjF6tVl	433	6	NxpuEbcI3gC	10/07/2005	22/02/2018	sRXlLJKockR	BYsYqbqkNlJ

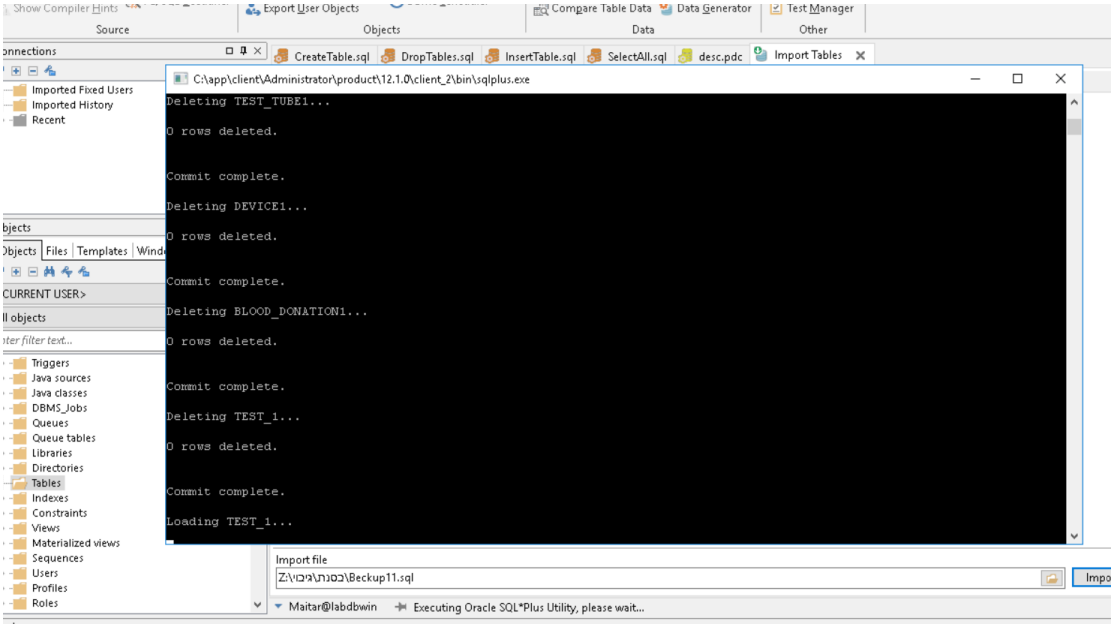
***על ידי Data Generaor**

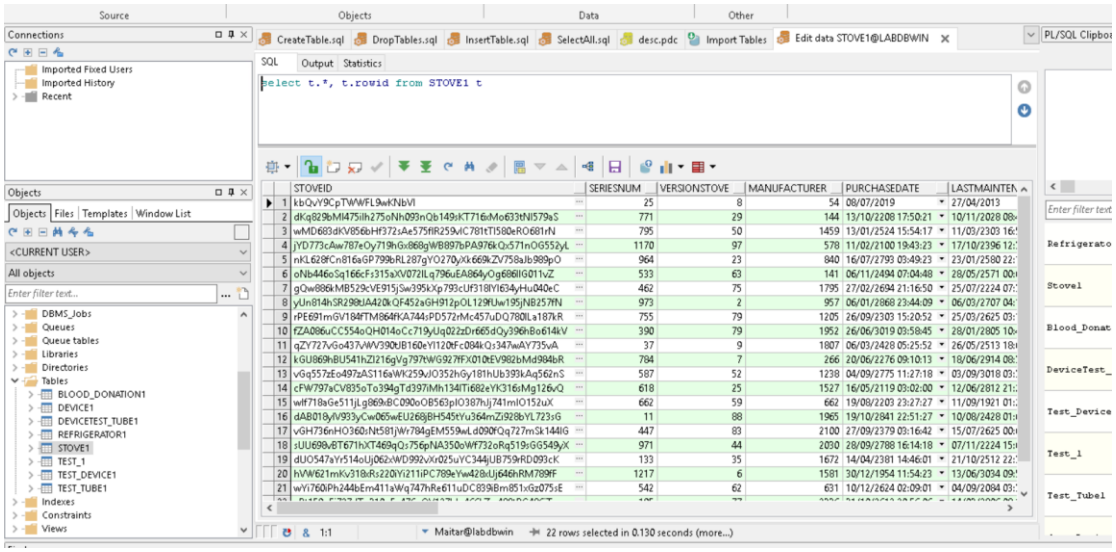


Name	Date modified	Type	Size
DataGeneratorBloodDonation.gd	25/05/2024 21:48	GD File	1 KB
DataGeneratorDevice_Test_Tube1.gd	25/05/2024 21:37	GD File	1 KB
DataGeneratorDevice1.gd	25/05/2024 21:37	GD File	1 KB
DataGeneratorRefrigerator1.gd	25/05/2024 21:48	GD File	1 KB
DataGeneratorStove1.gd	25/05/2024 21:44	GD File	1 KB
DataGeneratorTest_Device1.gd	25/05/2024 21:48	GD File	1 KB
dataGeneratorTest_Tube1.gd	25/05/2024 21:37	GD File	1 KB
DataGeneratorTest1.gd	25/05/2024 21:48	GD File	1 KB

גיבוי


CreateTable.sql
DropTables.sql
InsertTable.sql
SelectAll.sql
desc.pdc
Import Tables
Oracle Import
SQL Inserts
PL/SQL Developer
Use Command Window
Use SQL*Plus
SQL*Plus Executable
Import file
Import
PL/SQL Clipboard

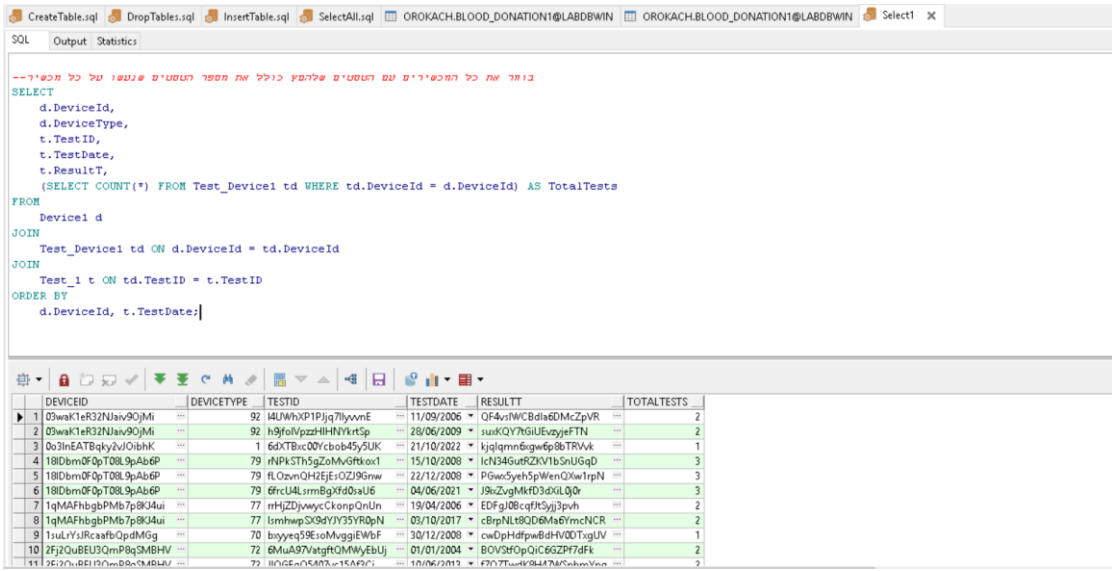

Export User Objects
Compare Table Data
Data Generator
Test Manager
Source
Objects
Data
Other
CreateTable.sql
DropTables.sql
InsertTable.sql
SelectAll.sql
desc.pdc
Import Tables
C:\app\client\Administrator\product\12.1.0\client_2\bin\sqlplus.exe
Deleting TEST_TUBE1...
0 rows deleted.
Commit complete.
Deleting DEVICE1...
0 rows deleted.
Commit complete.
Deleting BLOOD_DONATION1...
0 rows deleted.
Commit complete.
Deleting TEST_1...
0 rows deleted.
Commit complete.
Loading TEST_1...
Import file
Executing Oracle SQL*Plus Utility, please wait...


Source
Objects
Data
Other
Connections
Imported Fixed Users
Imported History
Recent
CreateTable.sql
DropTables.sql
InsertTable.sql
SelectAll.sql
desc.pdc
Import Tables
Edit data STOVE1@LABDBWIN
PL/SQL Clipbo
SQL
Output
Statistics
select t.*, t.rowid from STOVE1 t
Objects
Objects
Files
Templates
Window List
<CURRENT USER>
All objects
Enter filter text...
DBMS_Jobs
Queues
Queue tables
Libraries
Directories
Tables
BLOOD_DONATION1
DEVICE1
DEVICETEST_TUBE1
REFRIGERATOR1
STOVE1
TEST_1
TEST_DEVICE1
TEST_TUBE1
Indexes
Constraints
Views
STOVEID
SERIESNUM
VERSIONSTOVE
MANUFACTURER
PURCHASEDATE
LASTMAINTEN
1 kbQvY9CpTWWFL9wKNbVl 25 8 54 08/07/2019 27/04/2013
2 dKq829bMl475illh275oNh093nQb149rKT716sMo633tNl579aS 771 29 144 13/10/2208 17:50:21 10/11/2028 08:
3 wMD683dKV856bHf372sAe575fIR259vIC781tTl580eRO681rN 795 50 1459 13/01/2524 15:54:17 11/03/2303 16:
4 jYD773cAw787eOy719hGx868gWB897bPA976kQx571nOG552yL 1170 97 578 11/02/2100 19:43:23 17/10/2396 12:
5 nKL628fCn816aGP799bRL287gYO270yXk669kZV758aJb989pO 964 23 840 16/07/2793 03:49:23 23/01/2580 22:
6 oNb446oSq166cFz315aXV072ILq796uEA864yOg686lIG011vZ 533 63 141 06/11/2494 07:04:48 28/05/2571 00:
7 gQw886kMB529cVE915jSw395kXp793cUf318lYl634yHu040eC 462 75 1795 27/02/2694 21:16:50 25/07/2224 07:
8 yUn814hSR298tlA420kQF452aGH912pOL129fUw195jNB257fN 973 2 957 06/01/2868 23:44:09 06/03/2707 04:
9 rPE691mGV184fTM864fKA744sPD572rMc457uDQ780lLa187kR 755 79 1205 26/09/2303 15:20:52 25/03/2625 03:
10 fZA086uCC554oQH014oCc719yUq022zDr665dQy396hBo614kV 390 79 1952 26/06/3019 03:58:45 28/01/2805 10:
11 qZY727vGo437vWV390tJB160eYl120fFc084kQs347wAY735vA 37 9 1807 06/03/2428 05:25:52 26/05/2513 18:
12 kGU869hBU541hZI216gVg797tWG927fFX010fEV982bMd984bR 784 7 266 20/06/2276 09:10:13 18/06/2914 08:
13 vGq557zEo497zAS116aWk259vJO352hGy181hUb393kAq562nS 587 52 1238 04/09/2775 11:27:18 03/09/3018 03:
14 cFW797aCV835oTo394gTd397iMh134lTi682eYk316sMg126vQ 618 25 1527 16/05/2119 03:02:00 12/06/2812 21:
15 wlf718aGe511jLg869vBC090oOB563plO387hJj741mlO152uX 662 59 662 19/08/2203 23:27:27 11/09/1921 01:
16 dAB018yJV933yCw065wEU268jBH545tYu364mZi928bYL723zG 11 88 1965 19/10/2841 22:51:27 10/08/2428 01:
17 vGH736nHO360rNt581jWr784gEM559wLd090fOq727mSk144lG 447 83 2100 27/09/2379 03:16:42 15/07/2625 00:
18 sUU698vBT671hXT469qQz756pNA350oWf732oRq519rGG549yX 971 44 2030 28/09/2788 16:14:18 07/11/2224 15:
19 dUO547aYr514oUj062xWD992vXr025uYC344jUB759rRD093cK 133 35 1672 14/04/2381 14:46:01 21/10/2512 22:
20 hVW621mKv318sRs220iYi211iPC789eYw428xUj646hRM789fF 1217 6 1581 30/12/1954 11:54:23 13/06/3034 09:
21 wYi760lPh244bEm411aWq747hRe611uDC839lBm851vGz075sE 542 62 631 10/12/2624 02:09:01 04/09/2084 03:
1:1
Maitar@labdbwin
22 rows selected in 0.130 seconds (more...)
Enter filter text
Refrigerato
Stove1
Blood_Donat
DeviceTest_
Test_Device
Test_1
Test_Tube1

שאילתות בחירה

1. שאילתא שמחברת בין 3 טבלאות- מכשיר, טסט_מכשיר וטסט. בשביל להוציא את פרטי הטסט. זה כולל תת שאילתא שסופרת את הסך הטסטים שנעשו עבור כל מכשיר.

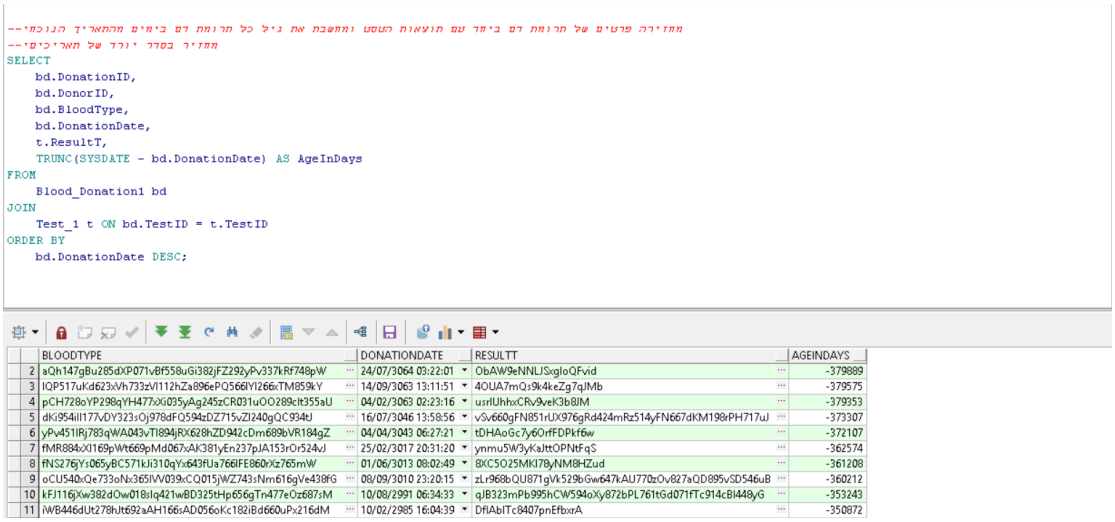
```
SELECT
    d.DeviceId,
    d.DeviceType,
    t.TestID,
    t.TestDate,
    t.ResultT,
    (SELECT COUNT(*) FROM Test_Device1 td WHERE td.DeviceId = d.DeviceId) AS
TotalTests
FROM
    Device1 d
JOIN
    Test_Device1 td ON d.DeviceId = td.DeviceId
JOIN
    Test_1 t ON td.TestID = t.TestID
ORDER BY
    d.DeviceId, t.TestDate;
```



	DEVICEID	DEVICETYPE	TESTID	TESTDATE	RESULTT	TOTALTESTS
1	03waK1eR32NJaiv9OjMi	92	l4UWhXP1Pjjq7IlyvvnE	11/09/2006	QF4vsfWCBdla6DMcZpVR	2
2	03waK1eR32NJaiv9OjMi	92	h9jfolVpzzHIHNYkrtSp	28/06/2009	suxKQY7tGiUEvzyjeFTN	2
3	0o3lnEATBqky2vJOibhK	1	6dXTBxc00Ycbob45y5UK	21/10/2022	kjqlqmn6xgw6p8bTRVvk	1
4	18IDbm0F0pT08L9pAb6P	79	rNPkSTh5gZoMvGftkox1	15/10/2008	IcN34GutRZKV1bSnUGqD	3
5	18IDbm0F0pT08L9pAb6P	79	fLOzvnQH2EjEsOZJ9Gnw	22/12/2008	PGwx5yeh5pWenQXw1rpN	3
6	18IDbm0F0pT08L9pAb6P	79	6frcU4LsrmBgXfd0saU6	04/06/2021	J9xZvgMkfD3dXiL0j0r	3
7	1qMAFhbgbPMb7p8KJ4ui	77	rrHjZDjvwycCkonpQnUn	19/04/2006	EDFgJ0BcqfJtSyjj3pvh	2
8	1qMAFhbgbPMb7p8KJ4ui	77	IsmhwpSX9dYJY35YR0pN	03/10/2017	cBrpNLt8QD6Ma6YmcNCR	2
9	1suLrYJJRcaafbQpdMGg	70	bxyyeq59EsoMvggiEWbF	30/12/2008	cwDpHdfpwBdHV0DTxgUV	1
10	2Fj2QuBEU3QmP8qSMBHV	72	6MuA97VatgftQMWyEbUj	01/01/2004	BOVStf0pQiC6GZPf7dFk	2

2. מחזירה את פרטי תרומת הדם יחד עם תוצאות הטסט ומחשבת את גיל תרומת הדם תוך שימוש בתאריך הנוכחי(כמה זמן עבר מאז שנתרם הדם).

```sql
SELECT
    bd.DonationID,
    bd.DonorID,
    bd.BloodType,
    bd.DonationDate,
    t.ResultT,
    TRUNC(SYSDATE - bd.DonationDate) AS AgeInDays
FROM
    Blood_Donation1 bd
JOIN
    Test_1 t ON bd.TestID = t.TestID
ORDER BY
    bd.DonationDate DESC;
```

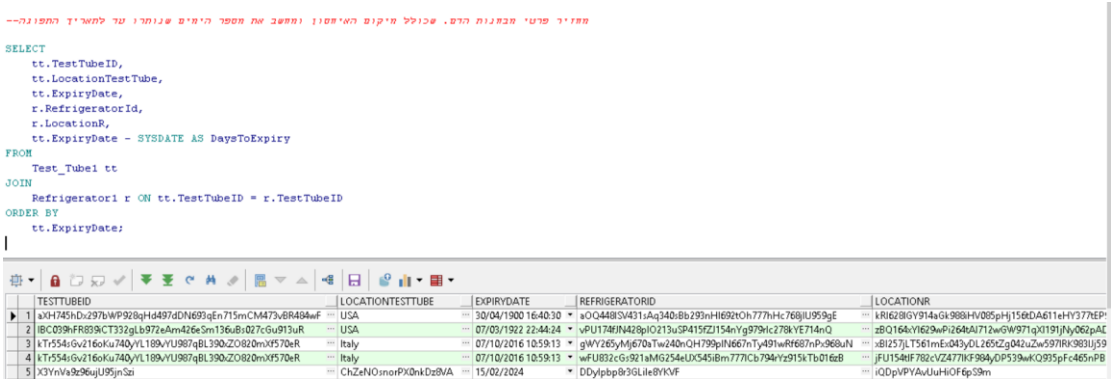


```sql
--מחזירה פרטים של תרומת דם ביחד עם תוצאות הטסט ומחשבת את גיל כל תרומת דם בימים מהתאריך הנוכחי--
--מחזיר בסדר יורד של תאריכים--
SELECT
    bd.DonationID,
    bd.DonorID,
    bd.BloodType,
    bd.DonationDate,
    t.ResultT,
    TRUNC(SYSDATE - bd.DonationDate) AS AgeInDays
FROM
    Blood_Donation1 bd
JOIN
    Test_1 t ON bd.TestID = t.TestID
ORDER BY
    bd.DonationDate DESC;
```

	BLOODTYPE	DONATIONDATE	RESULTT	AGEINDAYS
2	aQh147gBu285dXP071vBf558uGi38jFZ292yPv337kRf748pW	24/07/3064 03:22:01	ObAW9eNNLJSxgIoQFvid	-379989
3	IQP517uKd623xVh733zVI112hZa896ePQ566lYI266xTM859kY	14/09/3063 13:11:51	4OUA7mQs9k4keZg7qJMb	-379575
4	pCH728oYP298qVH477xXi035yAg245zCR031uOO289clt355aU	04/02/3063 02:23:16	usrlUhhxCRv9veK3b8JM	-379353
5	dKi954iiI177vDY323sOj978dFQ594zDZ715vZI240gQC934tJ	16/07/3046 13:58:56	v5v660gFN851rUX976gRd424mRz514yFN667dKM198rPH717uJ	-373307
6	yPv451lRj783qWA043vTI894jRX628hZD942cDm689bVR184gZ	04/04/3043 06:27:21	tDHAoGc7y6OrfFDPkf6w	-372107
7	fMR884xXI169pWt669pMd067xAK381yEn237pJA153rOr524vJ	25/02/3017 20:31:20	ynmu5W3yKaJttOPNtFqS	-362574
8	fNS276jYs065yBC571kJi310qYx643fUa766lFE860rXz765mW	01/06/3013 08:02:49	8XC5O25MKI78yNM8HZud	-361208
9	oCU540xQe733oNx365IVV039xCQ015jWZ743sNm616gVe438fG	08/09/3010 23:20:15	zLr968bQU871gVk529bGw647kAU770zOv827aQD895vSD546uB	-360212
10	kFJ116jXw382dOw018sIq421wBD325tHp656gTn477eOz687sM	10/08/2991 06:34:33	qJB323mPb995hCW594oXy872bPL761tGd071fTc914cBI448yG	-353243
11	iWB446dUt278hJt692aAH166sAD056oKc182iBd660uPx216dM	10/02/2985 16:04:39	DfIAbITc8407pnEfbxrA	-350872

3.מחזירה את פרטי מבחנת הטסט שכוללים את המיקום שלה ומחשבת את מספר הימים שנותרו לה עד לתאריך התפוגה.

```
SELECT
    tt.TestTubeID,
    tt.LocationTestTube,
    tt.ExpiryDate,
    r.RefrigeratorId,
    r.LocationR,
    tt.ExpiryDate - SYSDATE AS DaysToExpiry
FROM
    Test_Tube1 tt
JOIN
    Refrigerator1 r ON tt.TestTubeID = r.TestTubeID
ORDER BY
    tt.ExpiryDate;
```



4. מחברת בין כמה טבלאות כדי לקבל פרטי מכשיר ותאריך שימוש אחרון. גם מחשבת את המספר הכללי של הטסטים שנעשו והזמן הממוצע שעבר ביניהם.

```
WITH TestIntervals AS (
    SELECT
        d.DeviceId,
        d.DeviceType,
        d.LastMaintenanceDate,
        t.TestID,
        t.TestDate,
        LAG(t.TestDate) OVER (PARTITION BY d.DeviceId ORDER BY t.TestDate) AS
PrevTestDate
    FROM
        Device1 d
    LEFT JOIN
        Test_Device1 td ON d.DeviceId = td.DeviceId
    LEFT JOIN
        Test_1 t ON td.TestID = t.TestID
)
SELECT
    DeviceId,
    DeviceType,
    LastMaintenanceDate,
    COUNT(TestID) AS NumberOfTests,
    AVG(TestDate - PrevTestDate) AS AvgTimeBetweenTests
FROM
    TestIntervals
GROUP BY
    DeviceId,
    DeviceType,
    LastMaintenanceDate
ORDER BY
    NumberOfTests DESC;
```

```
WITH TestIntervals AS (
    SELECT
        d.DeviceId,
        d.DeviceType,
        d.LastMaintenanceDate,
        t.TestID,
        t.TestDate,
        LAG(t.TestDate) OVER (PARTITION BY d.DeviceId ORDER BY t.TestDate) AS PrevTestDate
    FROM
        Device1 d
    LEFT JOIN
        Test_Device1 td ON d.DeviceId = td.DeviceId
    LEFT JOIN
        Test_1 t ON td.TestID = t.TestID
)
SELECT
    DeviceId,
    DeviceType,
    LastMaintenanceDate,
    COUNT(TestID) AS NumberOfTests,
    AVG(TestDate - PrevTestDate) AS AvgTimeBetweenTests
FROM
    TestIntervals
GROUP BY
    DeviceId,
    DeviceType,
    LastMaintenanceDate
```

	DEVICEID	DEVICETYPE	LASTMAINTENANCEDATE	NUMBEROFTESTS	AVGTIMEBETWEENTESTS
1	DXLoCQIDwQZOAHUFC86C	26	16/10/2017	5	82696.2433738426
2	JivykJE9vWlpRA6FnVTh	19	05/05/2005	5	95382.7063744213
3	dk7GxRPa0lLsAi7kzNw4	49	05/11/2009	5	94483.7163975694
4	VSGNUhHSO7qfifaHAcTZ	96	27/03/2009	4	2602.66666666667

שאילתות עידכון

4. מעדכן מיקום למכשיר מסוג 83 שלא השתמשו בו למעלה משנה

```
5.  UPDATE
6.      Device1
7.  SET
8.      LocationD = 'Israel'
9.  WHERE
10.     DeviceType = 83
11.     AND LastMaintenanceDate < ADD_MONTHS(SYSDATE, -12);
12.
```

לפני:

```
SELECT* from Device1;
SELECT* from Test_Tube1;
SELECT* from Test_1;
SELECT* from Test_Device1;
SELECT* from DeviceTest_Tube1;
SELECT* from Blood_Donation1;
SELECT* from Stove1;
SELECT* from Refrigerator1;
```

	DEVICETYPE	SERIESNUM	VERSIOND	MANUFACTURER	PURCHASEDATE	LASTMAINTENANCEDATE	LOCATIOND
1	83	193	0	9E6uEKfOsINXIZIR2VZm	17/06/2017	05/12/2012	d7GvEsWylpnT6ns3vXBo
2	31	760	9	PvsL2vp1kgjRPSYTZaTE	16/09/2003	13/04/2010	evql5CvnJlWT5sjpFOr8
3	46	436	2	WiFxVJLbwrlcYzZdpL5G	04/04/2010	25/09/2010	mFjXlEDHUPMHzDlvApsT
4	73	748	9	sApvxdDVio2a9G4AMJ3C	12/03/2020	20/04/2000	r964gYNL8H8739jrYgrf
5	98	717	0	SU0VQmy59Rx11gmyE9UT	28/04/2015	17/09/2012	44IjMsMUowLILqKcQ3aF
6	28	78	5	kQoES3yVarvsNokKitoZ	21/07/2022	14/02/2022	ZDDolKOcPlJm38lj3TNS
7	97	566	0	4yz28rFKoMI3yOo5UkO	02/01/2017	07/06/2021	T2L8toQvB0V7uBCIBz4k
8	72	454	9	M6EtEDxlYBTeEBNJbNGI	15/12/2003	16/06/2009	nKJKSoHJ1Fl5l79woA8b
9	81	945	5	jqW204LWuG9yZOKJCldS	20/10/2014	17/06/2013	wzlwNQgCbvLVx5AshXz1
10	92	982	1	jozQvlMgtQWi1bPOF0Pe	24/08/2005	22/09/2000	Jr4ACbfnLDAmlea6aEx2
11	56	975	7	wunWFlkIlBfHR7K0QZMg	15/10/2013	15/03/2001	6XU6fYgyvPINP27U6XJQ
12	90	132	2	D5Ui763SK6sE6SvKAH4l	04/12/2002	06/11/2000	TY7m6wThJN67ZXx0MzqG
13	16	424	5	ZzGwKulUg7dQ72rrrdka	13/10/2015	28/04/2020	KzH7jthfIlUrnwz15LHu3

אחרי:

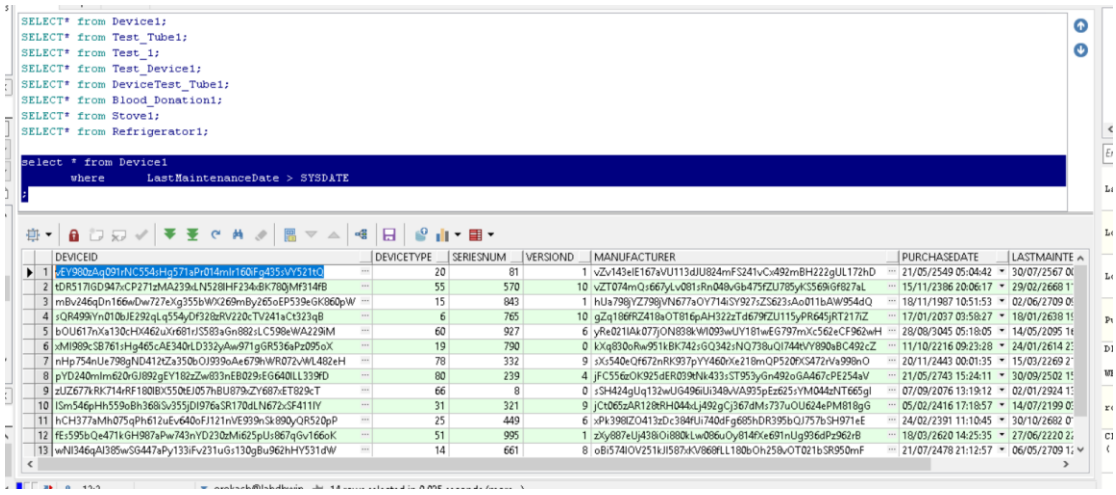
```
SELECT* from Device1;
SELECT* from Test_Tube1;
SELECT* from Test_1;
SELECT* from Test_Device1;
SELECT* from DeviceTest_Tube1;
SELECT* from Blood_Donation1;
SELECT* from Stove1;
SELECT* from Refrigerator1;
```

	DEVICEID	DEVICETYPE	SERIESNUM	VERSIOND	MANUFACTURER	PURCHASEDATE	LASTMAINTENANCEDATE	LOCATIOND
1	QKrcVPnPqqV670vhKDBW	83	193	0	9E6uEKfOsINXIZIR2VZm	17/06/2017	05/12/2012	Israel
2	YvSGkO6l6fRwXlaf5But	31	760	9	PvsL2vp1kgjRPSYTZaTE	16/09/2003	13/04/2010	evql5CvnJlWT5sjpFOr8
3	eR4LgsUjk1PKOmGQkmDp	46	436	2	WiFxVJLbwrlcYzZdpL5G	04/04/2010	25/09/2010	mFjXlEDHUPMHzDlvApsT
4	3h5ggjXUeEB2Gr8WzzWa	73	748	9	sApvxdDVio2a9G4AMJ3C	12/03/2020	20/04/2000	r964gYNL8H8739jrYgrf
5	pfZcR25Af1iWa27fat8	98	717	0	SU0VQmy59Rx11gmyE9UT	28/04/2015	17/09/2012	44IjMsMUowLILqKcQ3aF

2. מעדכן שימוש אחרון ומיקום למכשירים שנעשה בהם שימוש בשלוש השנים האחרונות.

```
4.  --update2
5.
6.  מעדכן שימוש אחרון ומיקום למכשירים שנעשה בהם שימוש בשלוש השנים האחרונות--
7.  commit
8.  UPDATE
9.      Device1
10. SET
11.     LastMaintenanceDate = SYSDATE,
12.     LocationD='USA'
13. WHERE
14.     DeviceId IN (
15.         SELECT td.DeviceId
16.         FROM Test_Device1 td
17.         JOIN Test_1 t ON td.TestID = t.TestID
18.         WHERE t.TestDate > SYSDATE
19.     );
```

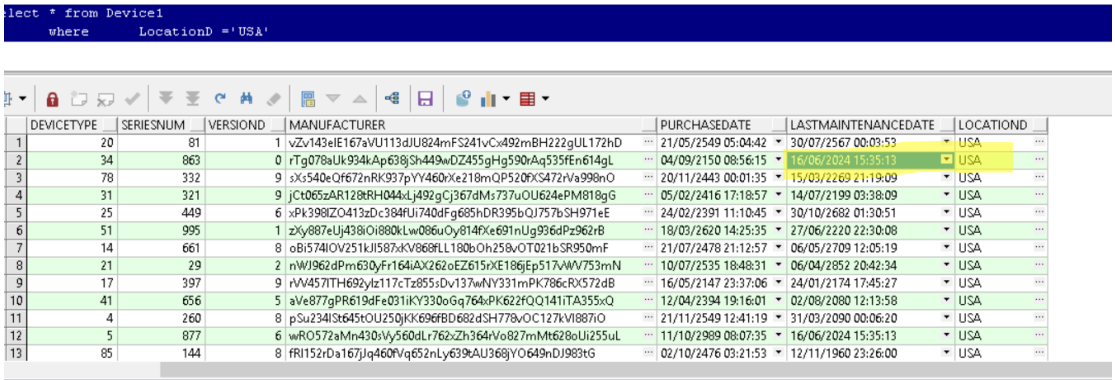
לפני:



```
SELECT* from Device1;
SELECT* from Test_Tube1;
SELECT* from Test_1;
SELECT* from Test_Device1;
SELECT* from DeviceTest_Tube1;
SELECT* from Blood_Donation1;
SELECT* from Stove1;
SELECT* from Refrigerator1;

select * from Device1
      where      LastMaintenanceDate > SYSDATE
;
```

	DEVICEID	DEVICETYPE	SERIESNUM	VERSIOND	MANUFACTURER	PURCHASEDATE	LASTMAINTE
1	vEY980zAq09TrNC554sHq571aPr014mlr160iFg435sVY521tQ	20	81	1	vZv143elE167aVU113dJU824mFS241vCx492mBH222gUL172hD	21/05/2549 05:04:42	30/07/2567 0
2	tDR517lGD947xCP271zMA239vLN528tHF234xBK780jMf314fB	55	570	10	vZT074mQ:667yLv081:Rn048vGb475fZU785yKS569lGf827aL	15/11/2386 20:06:17	29/02/2668 1
3	mBv246qDn166wDw727eXg355bWX269mByZ65oEP539eGK860pW	15	843	1	hUa798jYZ798jVN677aOY714iSY927:zZS623:Ao011bAW954dQ	18/11/1987 10:51:53	02/06/2709 0
4	zQR499iYn010bJE292qLq554yDf328zRV220cTV241aCt323qB	6	765	10	gZq186fRZ418aOT816pAH322zTd679fZU115yPR645jRT217iZ	17/01/2037 03:58:27	18/01/2638 1
5	bOU617nXa130cHX462uXr681rJS583aGn882:LC598eWA229iM	60	927	6	yRe021lAk077jON838kWl093wUY181wEG797mXc562eCF962wH	28/08/3045 05:18:05	14/05/2095 1
6	xMI989cSB761:Hg465cAE340rLD332yAw971gGR536aPz095oX	19	790	0	kXq830oRw951kBK742:GQ342:NQ738uQI744tVY890aBC492cZ	11/10/2216 09:23:28	24/01/2614 2
7	nHp754nUe798gND412tZa350bOJ939oAe679hWR072vWL482eH	78	332	9	sXr540eQf672nRK937pYY460rXe218mQP520fXS472rVa998nO	20/11/2443 00:01:35	15/03/2269 2
8	pYD240mlm620rGJ892gEY182zZw833nEB029:EG640lLL339fD	80	239	4	jFC556zOK925dER039tNk433:ST953yGn492oGA467cPE254aV	21/05/2743 15:24:11	30/09/2502 1
9	zUZ677kRK714rRF180lBX550tEJ057hBU879cZY687xET829cT	66	8	0	:SH424gUq132wUG496iUi348vVA935pEz625:YM044zNT665gl	07/09/2076 13:19:12	02/01/2924 1
10	lSm546pHh559oBh368iSv355jDI976aSR170dLN672rSF411lY	31	321	9	jCt065zAR128tRH044xLj492gCj367dMs737uOU624ePM818gG	05/02/2416 17:18:57	14/07/2199 0
11	hCH377aMh075qPh612uEv640oFJ121nVE939n5k890yQR520pP	25	449	6	xPk398IZO413zDc384fUi740dFg685hDR395bQJ757bSH971eE	24/02/2391 11:10:45	30/10/2682 0
12	fEr595bQe471kGH987aPw743nYD230zMi625pUs867qGv166oK	51	995	1	zXy887eUj438iOi880kLw086uOy814fXe691nUg936dPz962rB	18/03/2620 14:25:35	27/06/2220 2
13	wNl346qAl385wSG447aPy133iFv231uGs130gBu962hHY531dW	14	661	8	oBi574lOV251kJl587xKV868fLL180bOh258vOT021bSR950mF	21/07/2478 21:12:57	06/05/2709 1

אחרי:



```
elect * from Device1
      where      LocationD ='USA'
```

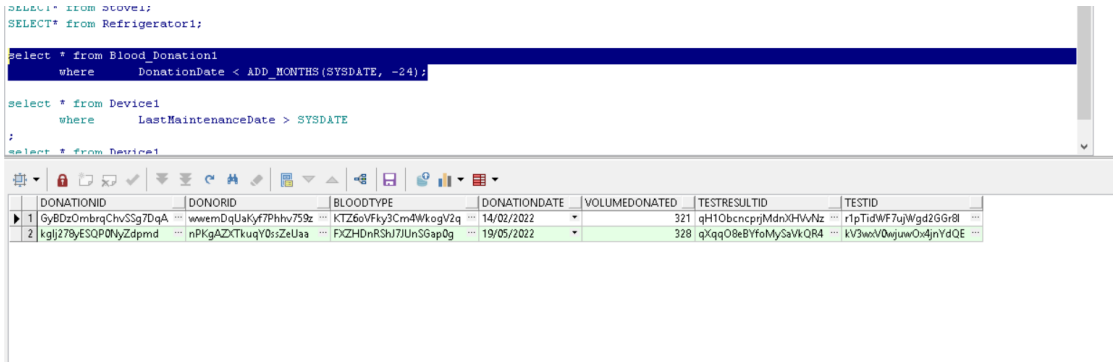
	DEVICETYPE	SERIESNUM	VERSIOND	MANUFACTURER	PURCHASEDATE	LASTMAINTENANCEDATE	LOCATIOND
1	20	81	1	vZv143elE167aVU113dJU824mFS241vCx492mBH222gUL172hD	21/05/2549 05:04:42	30/07/2567 00:03:53	USA
2	34	863	0	rTg078aUk934kAp638jSh449wDZ455gHg590rAq535fEn614gL	04/09/2150 08:56:15	16/06/2024 15:35:13	USA
3	78	332	9	sXr540eQf672nRK937pYY460rXe218mQP520fXS472rVa998nO	20/11/2443 00:01:35	15/03/2269 21:19:09	USA
4	31	321	9	jCt065zAR128tRH044xLj492gCj367dMs737uOU624ePM818gG	05/02/2416 17:18:57	14/07/2199 03:38:09	USA
5	25	449	6	xPk398IZO413zDc384fUi740dFg685hDR395bQJ757bSH971eE	24/02/2391 11:10:45	30/10/2682 01:30:51	USA
6	51	995	1	zXy887eUj438iOi880kLw086uOy814fXe691nUg936dPz962rB	18/03/2620 14:25:35	27/06/2220 22:30:08	USA
7	14	661	8	oBi574lOV251kJl587xKV868fLL180bOh258vOT021bSR950mF	21/07/2478 21:12:57	06/05/2709 12:05:19	USA
8	21	29	2	nWJ962dPm630yFr164iAX262oEZ615rXE186jEp517vWV753mN	10/07/2535 18:48:31	06/04/2852 20:42:34	USA
9	17	397	9	rVV457lTH692ylz117cTz855sDv137wNY331mPK786cRX572dB	16/05/2147 23:37:06	24/01/2174 17:45:27	USA
10	41	656	5	aVe877gPR619dFe031iKY330oGq764xPK622fQQ141iTA355xQ	12/04/2394 19:16:01	02/08/2080 12:13:58	USA
11	4	260	8	pSu234lSt645tOU250jKK696fBD682dSH778vOC127kVI887iO	21/11/2549 12:41:19	31/03/2090 00:06:20	USA
12	5	877	6	wRO572aMn430:Vy560dLr762xZh364rVo827mMt628oUi255uL	11/10/2989 08:07:35	16/06/2024 15:35:13	USA
13	85	144	8	fRI152rDa167jJq460fVq652nLy639tAU368jYO649nDJ983tG	02/10/2476 03:21:53	12/11/1960 23:26:00	USA

שאילתות מחיקה

4. מוחק תרומות דם שנעשו לפני יותר משנתיים. מוחק מכל הטבלאות הקשורות בזה.

```
BEGIN
    -- Delete related records in Refrigerator1
    DELETE FROM Refrigerator1
    WHERE DonationID IN (
        SELECT DonationID
        FROM Blood_Donation1
        WHERE DonationDate < ADD_MONTHS(SYSDATE, -24)
    );

    -- Delete related records in Test_Device1
    DELETE FROM Test_Device1
    WHERE TestID IN (
        SELECT TestID
        FROM Test_1
        WHERE BloodDonationID IN (
            SELECT DonationID
            FROM Blood_Donation1
            WHERE DonationDate < ADD_MONTHS(SYSDATE, -24)
        )
    );

    -- Delete related records in Blood_Donation1
    DELETE FROM Blood_Donation1
    WHERE DonationDate < ADD_MONTHS(SYSDATE, -24);

    -- Delete records in Test_1
    DELETE FROM Test_1
    WHERE BloodDonationID IN (
        SELECT DonationID
        FROM Blood_Donation1
        WHERE DonationDate < ADD_MONTHS(SYSDATE, -24)
    );

```

לפני:



אחרי:

```
SELECT * from Blood_Donation1
    WHERE DonationDate < ADD_MONTHS(SYSDATE, -24);
SELECT * from Device1
    WHERE VersionD =0;
```

DONATIONID	DONORID	BLOODTYPE	DONATIONDATE	VOLUMEDONATED	TESTRESULTID	TESTID

דוח פרויקט שלב א.pdf - אישי - Microsoft Edge

```
    WHERE DeviceId IN (
        SELECT DeviceId
        FROM Device1
        WHERE VersionD =0
    );

    -- Delete related records in Test_Device1
    DELETE FROM Test_Device1
    WHERE DeviceId IN (
        SELECT DeviceId
        FROM Device1
        WHERE VersionD =0
    );

    -- Delete related records in DeviceTest_Tube1
    DELETE FROM DeviceTest_Tube1
    WHERE DeviceId IN (
        SELECT DeviceId
        FROM Device1
        WHERE VersionD =0
    );

    -- Delete devices of type 83
    DELETE FROM Device1
    WHERE VersionD =0;
```

```
END;
```

לפני:

```
SELECT * from Device1
    WHERE VersionD =0;
```

DEVICEID	DEVICETYPE	SERIESNUM	VERSIOND	MANUFACTURER	PURCHASEDATE	LASTMAINTEN
3 GmrbtE8X9tGMY5T3LJ16	97	566	0	4yz28rFKoMl3yOo5LJkO	02/01/2017	07/06/2021
4 evFPXIaS50TNtcl3wQA6	81	356	0	gNLtYjAjraE1DbImaS0s	19/08/2007	11/09/2014
5 gritD2XQAJgTZPt6cgRn	49	975	0	iVe9yJsXh2PgSMQOkN4N	14/09/2004	17/02/2006
6 dYCqiwEngdq1XikHDdx4	52	252	0	OsRnDyYASoWcAJMmaFz	24/12/2006	16/06/2024 15:4
7 vssuOoN770YhOIlvsPVV	78	346	0	PwVjuX8ydI3oEpGRNBrl	21/04/2010	19/11/2007
8 aRq239bWc744iPX032vYt722mOK220mGs743jPz879bDi791rD	34	863	0	rTg078aUk934kAp638jSh449wDZ455gHg590rAq535fEn614gL	04/09/2150 08:56:15	16/06/2024 15:4
9 xMI989cSB761sHg465cAE340rLD332yAw971gGR536aPz095oX	19	790	0	kXq830oRw951kBK742sGQ342sNQ738uQI744tVY890aBC492cZ	11/10/2216 09:23:28	24/01/2614 23:2
10 zUZ677kRK714rRF180IBX550tEJ057hBU879xZY687xET829cT	66	8	0	sSH424gUq132wUG496iUi348vVA935pEz625sYM044zNT665gl	07/09/2076 13:19:12	02/01/2924 13:0
11 vFh171oTa222mWr244iSY389cKD418pHr169qWO076tZV082xT	75	457	0	tMb596yWf817kQW323kLO976oJb750pCP498IIN124tDs117vW	03/07/2786 10:56:38	16/06/2024 15:4
12 zBy324vQv417iNY039jYD886cVz156dER348wDx334zSZ994bX	67	815	0	kGX830vZD971jXs557oRc283dLi398sDE189cOo314nCV131rD	02/12/2013 08:02:41	09/03/2047 03:4
13 uIZ657sPN064sFp869wEL643nVr345vMH131vGI012rCS458pN	6	974	0	kZM931mUP572qZB190nlq178mLa824mFT264wNy245dWj287sW	15/10/2927 20:42:34	03/01/2657 11:1
14 vOQ374kKp447tSO261kCr298qQm140zVo017aYb179aDG870tS	25	598	0	uYJ128vSA335hHs482nZB658qNg627tVy913bLV546vAr763wL	01/05/2481 12:05:36	30/12/2873 09:3

אחרי:

```
SELECT * from Device1
    WHERE VersionD =0;
```

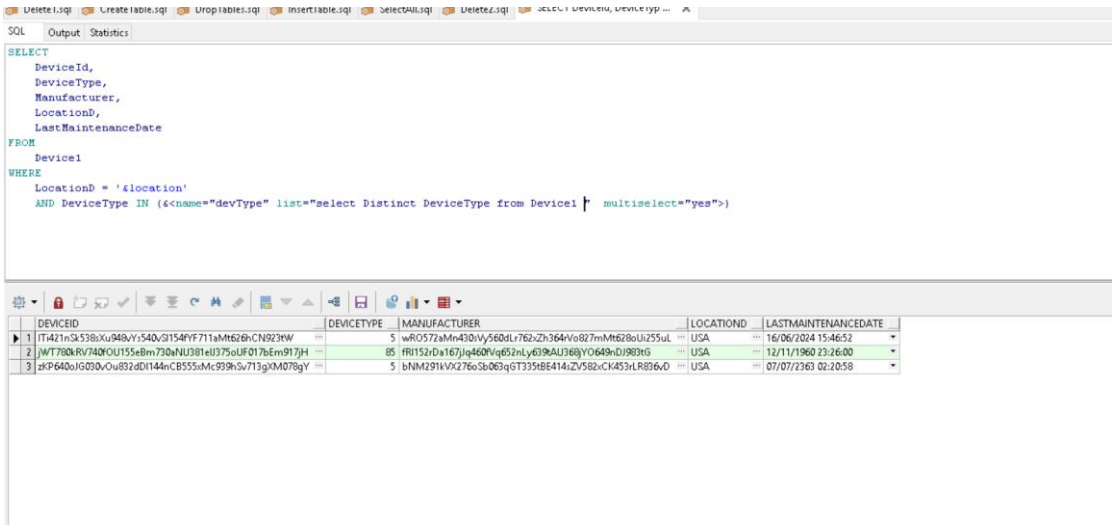
DEVICEID	DEVICETYPE	SERIESNUM	VERSIOND	MANUFACTURER	PURCHASEDATE	LASTMAINTENANCEDATE	LOCATIOND

שאילתות עם פרמטרים

(כל הצילומי מסך הנצרכים נמצאים באותו צילום מסך...)

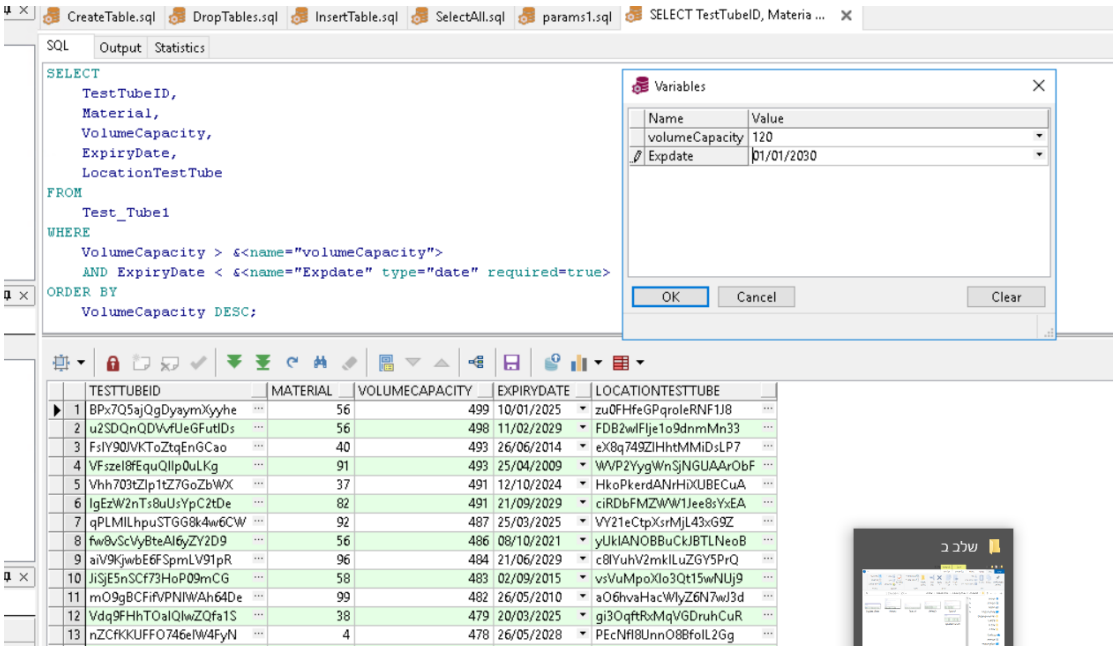
1.מחזיר פרטי מכשיר שנמצא במיקום מסוים וסוג המכשיר שלו נבחר מרשימת סוגי המכשירים האפשריים.

```
SELECT
    DeviceId,
    DeviceType,
    Manufacturer,
    LocationD,
    LastMaintenanceDate
FROM
    Device1
WHERE
    LocationD = '&location'
    AND DeviceType IN (&<name="devType" list="select Distinct DeviceType from
Device1 "  multiselect="yes">)
```



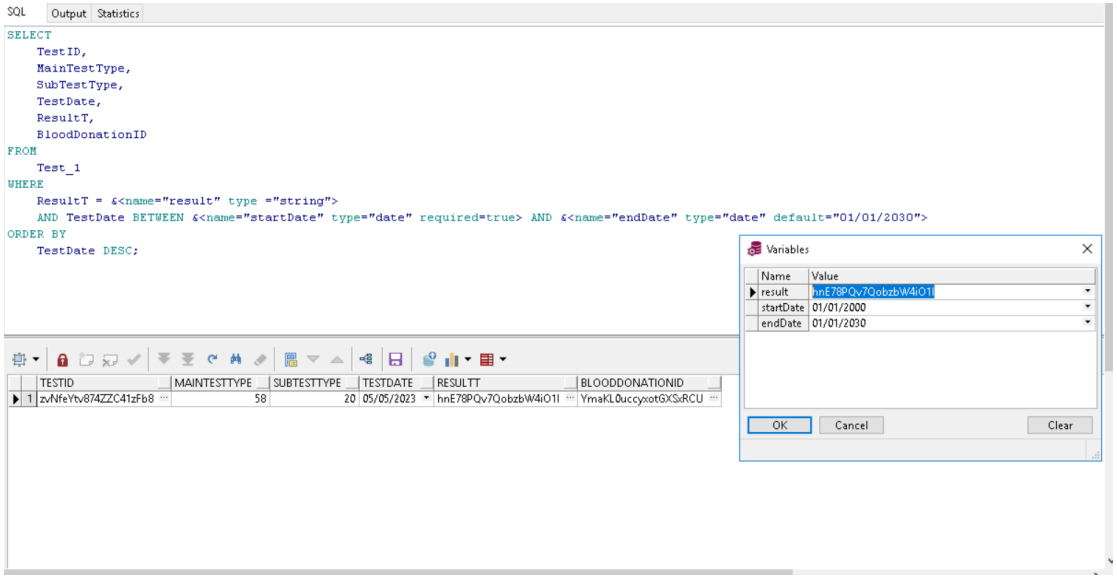
2.מחזיר פרטי מבחנת טסט שעומדת בקיבול שניתנה ובתאריך תפוגה שהוקש.

```
SELECT
    TestTubeID,
    Material,
    VolumeCapacity,
    ExpiryDate,
    LocationTestTube
FROM
    Test_Tube1
WHERE
    VolumeCapacity > &<name="volumeCapacity">
    AND ExpiryDate < &<name="Expdate" type="date" required=true>
ORDER BY
                                                VolumeCapacity DESC;
```



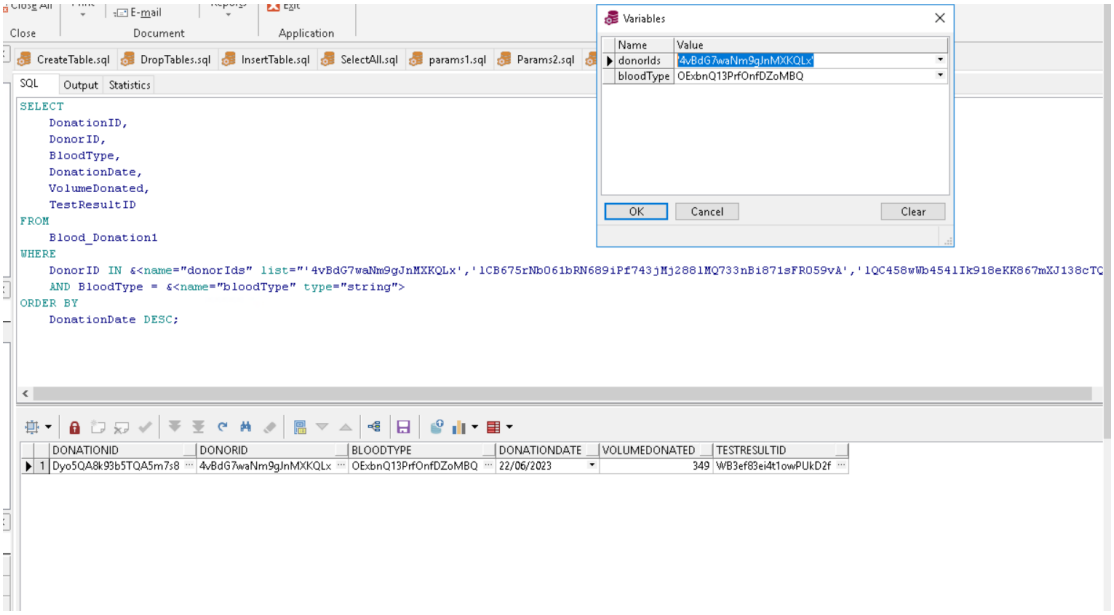
3.מחזיר פרטי טסט עבור תוצאה שהתקבלה ושנמצא בין 2 תאריכים שהוקשו. התאריך סיום הינו אופציונלי.

```
SELECT
    TestID,
    MainTestType,
    SubTestType,
    TestDate,
    ResultT,
    BloodDonationID
FROM
    Test_1
WHERE
    ResultT = &<name="result" type ="string">
    AND TestDate BETWEEN &<name="startDate" type="date" required=true> AND
&<name="endDate" type="date" default="01/01/2030">
ORDER BY
                                                    TestDate DESC;
```



4. מחזיר פרטי תרומת דם כאשר הID שלה נבחר מבין רשימת ID's וסוג הדם מוקש.

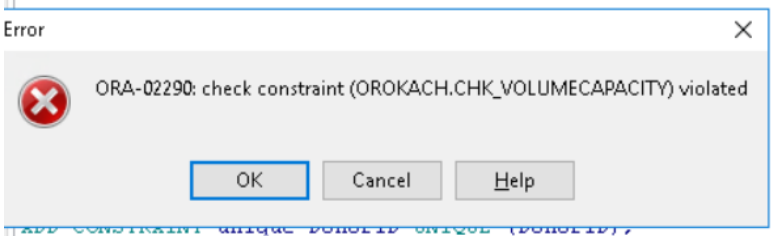
```
SELECT
    DonationID,
    DonorID,
    BloodType,
    DonationDate,
    VolumeDonated,
    TestResultID
FROM
    Blood_Donation1
WHERE
    DonorID IN &<name="donorIds"
list="'4vBdG7waNm9gJnMXKQLx','lCB675rNb061bRN689iPf743jMj288lMQ733nBi871sFR059v
A','lQC458wWb454lIk918eKK867mXJ138cTQ765yBq713qKp529eA'">
    AND BloodType = &<name="bloodType" type="string">
ORDER BY
    DonationDate DESC;
```



אילוצים

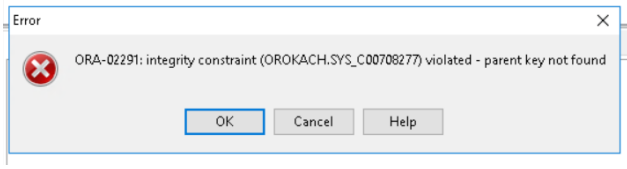
1. הוספת אילוץ check לTestTube שבודק שמוכנס רק ערך חיובי ל VolumeCapacity.

```
ALTER TABLE Test_Tube1
ADD CONSTRAINT chk_VolumeCapacity CHECK (VolumeCapacity > 0);

INSERT INTO Test_Tube1 (TestTubeID, Material, VolumeCapacity, PurchaseDate, ExpiryD
VALUES ('TT001', 1, -10, TO_DATE('2024-01-01', 'YYYY-MM-DD'), TO_DATE('2025-01-01',
```



2.הוספת אילוץ ל BLOOD DONATION שעבורו השדה DONORID יהיה ייחודי.

```
ALTER TABLE Blood_Donation1
ADD CONSTRAINT unique_DonorID UNIQUE (DonorID);

INSERT INTO Blood_Donation1 (DonationID, DonorID, BloodType, DonationDate, VolumeDonated, TestResultID, TestID)
VALUES ('BD001', 'DON001', 'A+', TO_DATE('2023-01-01', 'YYYY-MM-DD'), 500, 'TR001', 'T001');

-- Attempt to insert a duplicate DonorID
INSERT INTO Blood_Donation1 (DonationID, DonorID, BloodType, DonationDate, VolumeDonated, TestResultID, TestID)
VALUES ('BD002', 'DON001', 'B+', TO_DATE('2023-02-01', 'YYYY-MM-DD'), 450, 'TR002', 'T002');
```



3.הוספת ערך ברירת מחדל ל Device1 עבור Manufacture

```
ALTER TABLE Device1
MODIFY Manufacturer DEFAULT 'Unknown';

INSERT INTO Device1 (DeviceId, DeviceType, SeriesNum, VersionD, PurchaseDate, LastMaintenanceDate, LocationD)
VALUES ('D0001', 1, 100, 1, TO_DATE('2023-01-01', 'YYYY-MM-DD'), TO_DATE('2023-06-01', 'YYYY-MM-DD'), 'Lab1');
```

```
select * from Device1
      where      Manufacturer ='Unknown'
;
```

	DEVICEID	DEVICETYPE	SERIESNUM	VERSIOND	MANUFACTURER	PURCHASEDATE	LASTMAINTENANCEDATE	LOCATIOND
1	D0001	1	100	1	Unknown	01/01/2023	01/06/2023	Lab1

Procedures

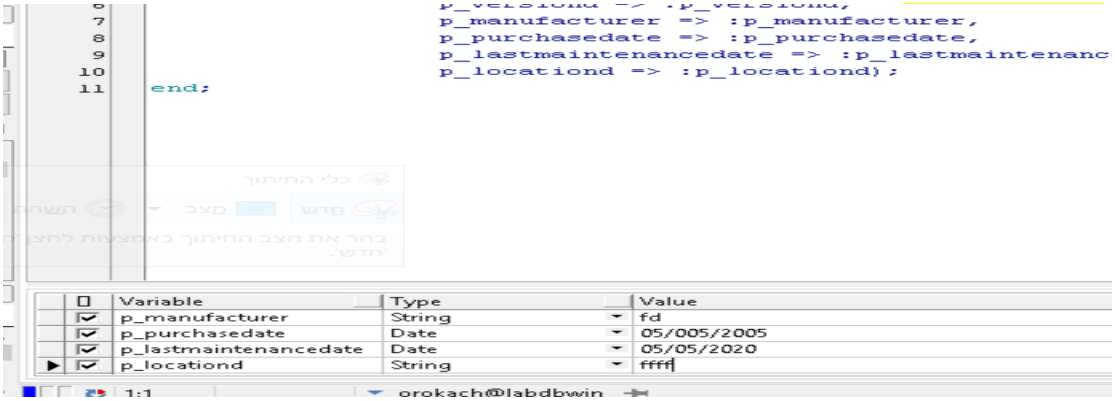
1.הוספת מכשיר חדש לבסיס הנתונים בכל מקרה שחסר נתון מסוים, זורקת חריגה שאומרת איזה נתון חסר.

```
) CREATE OR REPLACE FUNCTION mostDonations
,FromDate IN DATE
ToDate IN DATE
RETURN VARCHAR2 (
IS
;(100)FunctionResult VARCHAR2
;MostDonationCount NUMBER
;(50)MostDonorID VARCHAR2
BEGIN
BEGIN
SELECT DonorID, COUNT(DonationID) AS DonationCount
INTO MostDonorID, MostDonationCount
FROM Blood_Donation1
WHERE DonationDate BETWEEN FromDate AND ToDate
GROUP BY DonorID
ORDER BY DonationCount DESC
FETCH FIRST 1 ROWS ONLY; -- Use the correct Oracle syntax for fetching the
first row

;FunctionResult := MostDonorID || ', ' || MostDonationCount
EXCEPTION
WHEN NO_DATA_FOUND THEN
;'FunctionResult := 'No donations found in the given date range
WHEN OTHERS THEN
;FunctionResult := 'An error occurred: ' || SQLERRM
;END
;RETURN FunctionResult
;END mostDonations
```

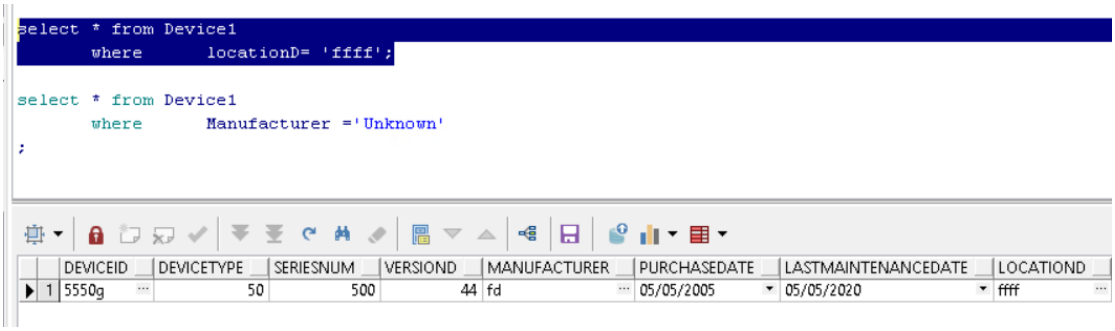
```
) CREATE OR REPLACE FUNCTION validateMaintenance
AllowedPeriod IN NUMBER
RETURN VARCHAR2 (
IS
CURSOR device_cursor IS
SELECT DeviceId, LastMaintenanceDate
;FROM Device1

device_rec device_cursor%ROWTYPE;--for calculating dates
;e_OverdueMaintenance EXCEPTION
;(200)v_error_message VARCHAR2
;overdue_days NUMBER

BEGIN
;OPEN device_cursor

LOOP
;FETCH device_cursor INTO device_rec
;EXIT WHEN device_cursor%NOTFOUND

overdue_days := TRUNC(SYSDATE) -
;TRUNC(device_rec.LastMaintenanceDate)

Check if the device's last maintenance date exceeds the allowed period --
AllowedPeriod THEN < IF overdue_days
v_error_message := 'Device ' || device_rec.DeviceId || ' is overdue for
;'.maintenance by ' || (overdue_days - AllowedPeriod) || ' days
;RAISE e_OverdueMaintenance
;END IF
;END LOOP

;CLOSE device_cursor

;'RETURN 'All devices are within the allowed maintenance period

EXCEPTION
WHEN e_OverdueMaintenance THEN
;RETURN v_error_message
WHEN OTHERS THEN
;RETURN 'An unexpected error occurred: ' || SQLERRM
;END validateMaintenance
```

```
)CREATE OR REPLACE PROCEDURE InsertNewDevice
,IN VARCHAR2          p_DeviceId
,IN NUMBER        p_DeviceType
,IN NUMBER         p_SeriesNum
,IN NUMBER          p_VersionD
,IN VARCHAR2      p_Manufacturer
,IN DATE      p_PurchaseDate
,p_LastMaintenanceDate IN DATE
IN VARCHAR2         p_LocationD
IS (
Define custom exception for missing values --
;e_MissingValue EXCEPTION
;(100)v_MissingField VARCHAR2
BEGIN
Check for missing values --
IF p_DeviceId IS NULL THEN
;'v_MissingField := 'DeviceId
;RAISE e_MissingValue
ELSIF p_DeviceType IS NULL THEN
;'v_MissingField := 'DeviceType
;RAISE e_MissingValue
ELSIF p_SeriesNum IS NULL THEN
;'v_MissingField := 'SeriesNum
;RAISE e_MissingValue
ELSIF p_VersionD IS NULL THEN
;'v_MissingField := 'VersionD
;RAISE e_MissingValue
ELSIF p_Manufacturer IS NULL THEN
;'v_MissingField := 'Manufacturer
;RAISE e_MissingValue
ELSIF p_PurchaseDate IS NULL THEN
;'v_MissingField := 'PurchaseDate
;RAISE e_MissingValue
ELSIF p_LastMaintenanceDate IS NULL THEN
;'v_MissingField := 'LastMaintenanceDate
;RAISE e_MissingValue
ELSIF p_LocationD IS NULL THEN
;'v_MissingField := 'LocationD
;RAISE e_MissingValue
;END IF

Insert the new device record --
INSERT INTO Device1 (DeviceId, DeviceType, SeriesNum, VersionD,
Manufacturer, PurchaseDate, LastMaintenanceDate, LocationD)
VALUES (p_DeviceId, p_DeviceType, p_SeriesNum, p_VersionD,
;p_Manufacturer, p_PurchaseDate, p_LastMaintenanceDate, p_LocationD)

;COMMIT
```

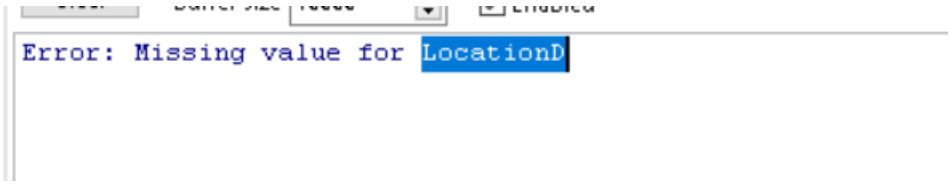
```
EXCEPTION
    WHEN e_MissingValue THEN
        DBMS_OUTPUT.PUT_LINE('Error: Missing value for ' || v_MissingField);
        ROLLBACK;
    WHEN OTHERS THEN
        DBMS_OUTPUT.PUT_LINE('An unexpected error occurred: ' || SQLERRM);
        ROLLBACK;
END InsertNewDevice;
```



לאחר הרצה:



חריגה:



2. עבור שני תז של מכשירים מחזיר רשימה לפי תאריכים עבור הימים שהיה להם את אותו מספר טסטים.

```
CREATE OR REPLACE PROCEDURE FindSameTestDate(
    p_DeviceId1 IN VARCHAR2,
    p_DeviceId2 IN VARCHAR2
```

```
IS (
    Variables to store test counts --
    ;v_Device1_TestCount INT := 0
    ;v_Device2_TestCount INT := 0
    ;v_TestDate DATE

    Cursor to fetch test counts for each device on each date --
    CURSOR test_cursor IS
    ,SELECT t.TestDate
    COUNT(CASE WHEN td.DeviceId = p_DeviceId1 THEN 1 END) AS
    ,Device1_TestCount
    COUNT(CASE WHEN td.DeviceId = p_DeviceId2 THEN 1 END) AS
    Device2_TestCount
    FROM Test_Device1 td
    JOIN Test_1 t ON td.TestID = t.TestID
    GROUP BY t.TestDate
    HAVING COUNT(CASE WHEN td.DeviceId = p_DeviceId1 THEN 1 END) =
    ;COUNT(CASE WHEN td.DeviceId = p_DeviceId2 THEN 1 END)

    BEGIN
    Open the cursor --
    ;OPEN test_cursor

    Loop through the cursor results --
    LOOP
    FETCH test_cursor INTO v_TestDate, v_Device1_TestCount,
    ;v_Device2_TestCount
    ;EXIT WHEN test_cursor%NOTFOUND

    Compare and print results when counts are equal --
DBMS_OUTPUT.PUT_LINE('On ' || TO_CHAR(v_TestDate, 'YYYY-MM-DD') || ', '
|| p_DeviceId1 || ' had ' || v_Device1_TestCount || ' tests and ' || p_DeviceId2 || ' had '
    ;|| v_Device2_TestCount || ' tests.')
    ;END LOOP

    Close the cursor --
    ;CLOSE test_cursor

    EXCEPTION
    WHEN NO_DATA_FOUND THEN
DBMS_OUTPUT.PUT_LINE('No common test dates found for ' || p_DeviceId1 || '
    ;and ' || p_DeviceId2)
    WHEN OTHERS THEN
    ;DBMS_OUTPUT.PUT_LINE('An error occurred: ' || SQLERRM)
    ;END FindSameTestDate
```

קלט:

	Variable	Type	Value
▶	p_deviceid1	String	jTV718uPr846wlB933gWx760fAu549tVl320kFQ477sYI616eB
	p_deviceid2	String	fEs595bQe471kGH987aPw743nYD230zMi625pUs867qGv166oK
*			

פלט ההרצה:

```
On 2221-04-26, jTV718uPr846wIB933gWx760fAu549tVI32OkFQ477sY1616eB had 0 tests and fEs595bQe471kGH987aPw743nYD230zMi625pUs867qGv166oK had 0 tests.
On 2005-06-03, jTV718uPr846wIB933gWx760fAu549tVI32OkFQ477sY1616eB had 0 tests and fEs595bQe471kGH987aPw743nYD230zMi625pUs867qGv166oK had 0 tests.
On 2008-04-25, jTV718uPr846wIB933gWx760fAu549tVI32OkFQ477sY1616eB had 0 tests and fEs595bQe471kGH987aPw743nYD230zMi625pUs867qGv166oK had 0 tests.
On 2009-06-28, jTV718uPr846wIB933gWx760fAu549tVI32OkFQ477sY1616eB had 0 tests and fEs595bQe471kGH987aPw743nYD230zMi625pUs867qGv166oK had 0 tests.
On 2022-07-10, jTV718uPr846wIB933gWx760fAu549tVI32OkFQ477sY1616eB had 0 tests and fEs595bQe471kGH987aPw743nYD230zMi625pUs867qGv166oK had 0 tests.
On 2010-12-01, jTV718uPr846wIB933gWx760fAu549tVI32OkFQ477sY1616eB had 0 tests and fEs595bQe471kGH987aPw743nYD230zMi625pUs867qGv166oK had 0 tests.
On 2013-03-19, jTV718uPr846wIB933gWx760fAu549tVI32OkFQ477sY1616eB had 0 tests and fEs595bQe471kGH987aPw743nYD230zMi625pUs867qGv166oK had 0 tests.
On 2008-04-16, jTV718uPr846wIB933gWx760fAu549tVI32OkFQ477sY1616eB had 0 tests and fEs595bQe471kGH987aPw743nYD230zMi625pUs867qGv166oK had 0 tests.
On 2020-11-14, jTV718uPr846wIB933gWx760fAu549tVI32OkFQ477sY1616eB had 0 tests and fEs595bQe471kGH987aPw743nYD230zMi625pUs867qGv166oK had 0 tests.
On 2003-03-10, jTV718uPr846wIB933gWx760fAu549tVI32OkFQ477sY1616eB had 0 tests and fEs595bQe471kGH987aPw743nYD230zMi625pUs867qGv166oK had 0 tests.
On 2002-09-04, jTV718uPr846wIB933gWx760fAu549tVI32OkFQ477sY1616eB had 0 tests and fEs595bQe471kGH987aPw743nYD230zMi625pUs867qGv166oK had 0 tests.
On 2003-04-21, jTV718uPr846wIB933gWx760fAu549tVI32OkFQ477sY1616eB had 0 tests and fEs595bQe471kGH987aPw743nYD230zMi625pUs867qGv166oK had 0 tests.
On 2006-12-07, jTV718uPr846wIB933gWx760fAu549tVI32OkFQ477sY1616eB had 0 tests and fEs595bQe471kGH987aPw743nYD230zMi625pUs867qGv166oK had 0 tests.
On 3022-04-25, jTV718uPr846wIB933gWx760fAu549tVI32OkFQ477sY1616eB had 0 tests and fEs595bQe471kGH987aPw743nYD230zMi625pUs867qGv166oK had 0 tests.
On 2017-07-21, jTV718uPr846wIB933gWx760fAu549tVI32OkFQ477sY1616eB had 0 tests and fEs595bQe471kGH987aPw743nYD230zMi625pUs867qGv166oK had 0 tests.
On 2012-06-01, jTV718uPr846wIB933gWx760fAu549tVI32OkFQ477sY1616eB had 0 tests and fEs595bQe471kGH987aPw743nYD230zMi625pUs867qGv166oK had 0 tests.
```

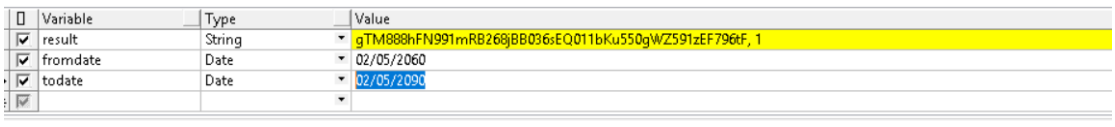
Functions

1.פונקציה שמחזירה תז וכמות תרומות של אדם שתרם הכי הרבה תרומות דם בין שני תאריכים שניתנו כפרמטרים.

הפונקציה:

```
) CREATE OR REPLACE FUNCTION mostDonations
,FromDate IN DATE
ToDate IN DATE
RETURN VARCHAR2 (
IS
;(100)FunctionResult VARCHAR2
;MostDonationCount NUMBER
;(50)MostDonorID VARCHAR2
BEGIN
BEGIN
SELECT DonorID, COUNT(DonationID) AS DonationCount
INTO MostDonorID, MostDonationCount
FROM Blood_Donation1
WHERE DonationDate BETWEEN FromDate AND ToDate
GROUP BY DonorID
ORDER BY DonationCount DESC
FETCH FIRST 1 ROWS ONLY; -- Use the correct Oracle syntax for fetching the
first row

;FunctionResult := MostDonorID || ', ' || MostDonationCount
EXCEPTION
WHEN NO_DATA_FOUND THEN
;'FunctionResult := 'No donations found in the given date range
WHEN OTHERS THEN
;FunctionResult := 'An error occurred: ' || SQLERRM
;END
;RETURN FunctionResult
;END mostDonations
```

התוצאה:



	Variable	Type	Value
☑	result	String	gTM888hFN991mRB268jBB036sEQ011bKu550gWZ591zEF796tF, 1
☑	fromdate	Date	02/05/2060
☑	todate	Date	02/05/2090
☑			

2.עבור מספר ימים שמתקבל, מחזירה את המכשיר הראשון שמאז תאריך התחזוקה האחרון שלו עברו יותר ימים.

הפונקציה:

```
) CREATE OR REPLACE FUNCTION validateMaintenance
    AllowedPeriod IN NUMBER
    RETURN VARCHAR2 (
IS
    CURSOR device_cursor IS
    SELECT DeviceId, LastMaintenanceDate
    ;FROM Device1

    device_rec device_cursor%ROWTYPE;--for calculating dates
    ;e_OverdueMaintenance EXCEPTION
    ;(200)v_error_message VARCHAR2
    ;overdue_days NUMBER

BEGIN
    ;OPEN device_cursor

    LOOP
        ;FETCH device_cursor INTO device_rec
        ;EXIT WHEN device_cursor%NOTFOUND

        overdue_days := TRUNC(SYSDATE) -
        ;TRUNC(device_rec.LastMaintenanceDate)

    Check if the device's last maintenance date exceeds the allowed period --
        AllowedPeriod THEN < IF overdue_days
    v_error_message := 'Device ' || device_rec.DeviceId || ' is overdue for
    ;'.maintenance by ' || (overdue_days - AllowedPeriod) || ' days
        ;RAISE e_OverdueMaintenance
        ;END IF
    ;END LOOP

    ;CLOSE device_cursor

    ;'RETURN 'All devices are within the allowed maintenance period

EXCEPTION
    WHEN e_OverdueMaintenance THEN
        ;RETURN v_error_message
    WHEN OTHERS THEN
    ;RETURN 'An unexpected error occurred: ' || SQLERRM
    ;END validateMaintenance
```

התוצאה:

	Variable	Type	Value
☑	result	String	Device ITi421nSk538sXu948vYs540vSl154fYF711aMt626hCN923tW is overdue for maintenance by 18 days.
☑	allowedperiod	Float	10
☑			

Mains

.1

התכנית:

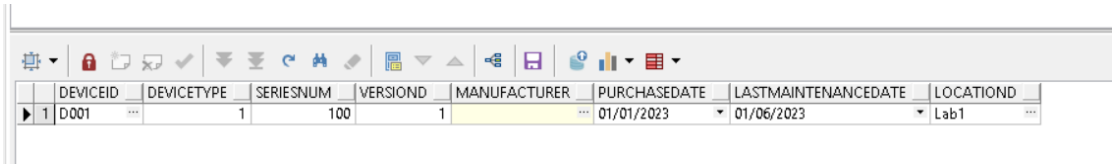
```
CREATE OR REPLACE PROCEDURE MainProcedure
IS
    Parameters for FindSameTestDate --
    ;'v_DeviceId1 VARCHAR2(50) := 'D001
    ;'v_DeviceId2 VARCHAR2(50) := 'D002

    Parameters for validateMaintenance --
v_AllowedPeriod NUMBER := 180; -- Example allowed period in days for
                                                    maintenance
    ;(200)v_ValidationResult VARCHAR2

                                                    BEGIN
    Call the FindSameTestDate procedure --
                                                    BEGIN
                                                )FindSameTestDate
                                        ,v_DeviceId1 <= p_DeviceId1
                                         v_DeviceId2 <= p_DeviceId2
                                                                ;(
                                                EXCEPTION
                                            WHEN OTHERS THEN
DBMS_OUTPUT.PUT_LINE('An error occurred while calling FindSameTestDate:
                                                        ;' || SQLERRM)
                                                    ;END

    Call the validateMaintenance function --
                                                    BEGIN
    ;v_ValidationResult := validateMaintenance(v_AllowedPeriod)
    DBMS_OUTPUT.PUT_LINE('Result of validateMaintenance: ' ||
                                                        ;v_ValidationResult)
                                                EXCEPTION
                                            WHEN OTHERS THEN
    DBMS_OUTPUT.PUT_LINE('An error occurred while calling
                                                    ;validateMaintenance: ' || SQLERRM)
                                                    ;END

                                                ;END MainProcedure
```

.2

התכנית:

```
CREATE OR REPLACE PROCEDURE MainProcedure
IS
  v_FromDate DATE := TO_DATE('2024-01-01', 'YYYY-MM-DD'); -- Example start
date
Example end date --   ;v_ToDate DATE := TO_DATE('2024-12-31', 'YYYY-MM-DD')
;(100)v_Result VARCHAR2

Parameters for InsertNewDevice procedure --
;'v_DeviceId VARCHAR2(50) := 'D001
;v_DeviceType NUMBER := 1
;v_SeriesNum NUMBER := 123
;v_VersionD NUMBER := 1
;'v_Manufacturer VARCHAR2(50) := 'ManufacturerA
;v_PurchaseDate DATE := TO_DATE('2024-07-01', 'YYYY-MM-DD')
;v_LastMaintenanceDate DATE := TO_DATE('2024-07-01', 'YYYY-MM-DD')
;'v_LocationD VARCHAR2(50) := 'LocationA
BEGIN
    Call the mostDonations function --
    BEGIN
        ;v_Result := mostDonations(v_FromDate, v_ToDate)
        ;DBMS_OUTPUT.PUT_LINE('Result of mostDonations: ' || v_Result)
    EXCEPTION
        WHEN OTHERS THEN
            DBMS_OUTPUT.PUT_LINE('An error occurred while calling mostDonations: ' ||
            ;SQLERRM)
    ;END

    Call the InsertNewDevice procedure --
    BEGIN
        )InsertNewDevice
            ,v_DeviceId <=          p_DeviceId
            ,v_DeviceType <=        p_DeviceType
            ,v_SeriesNum <=         p_SeriesNum
            ,v_VersionD <=          p_VersionD
            ,v_Manufacturer <=      p_Manufacturer
            ,v_PurchaseDate <=      p_PurchaseDate
            ,v_LastMaintenanceDate <= p_LastMaintenanceDate
            v_LocationD <=          p_LocationD
        ;(
    EXCEPTION
        WHEN OTHERS THEN
            DBMS_OUTPUT.PUT_LINE('An error occurred while calling InsertNewDevice: '
            ;|| SQLERRM)
    ;END
END MainProcedure
;
```

בסיס הנתונים לאחר הרצה:



	DEVICEID	DEVICETYPE	SERIESNUM	VERSIOND	MANUFACTURER	PURCHASEDATE	LASTMAINTENANCEDATE	LOCATIOND
▶ 1	D001	1	100	1		01/01/2023	01/06/2023	Lab1