

דו"ח מיני פרויקט בסיסי נתוני

10/08/2020



אביתר רבינו
203148564

אליסף אלבן
308478098

שלב איחוד הטבלאות

בשלב זה נדרשנו לאחד את הטבלאות, בין אגף רפואי אנווש במשרד הבריאות לבין אגף גריאטריה.

אגף הגריאטריה במשרד הבריאות אחראי על תחום הגריאטריה והמחלות הממושכות במוסדות אישפוז גריאטריים, בבתי חולים הכלליים, ובקהילה.

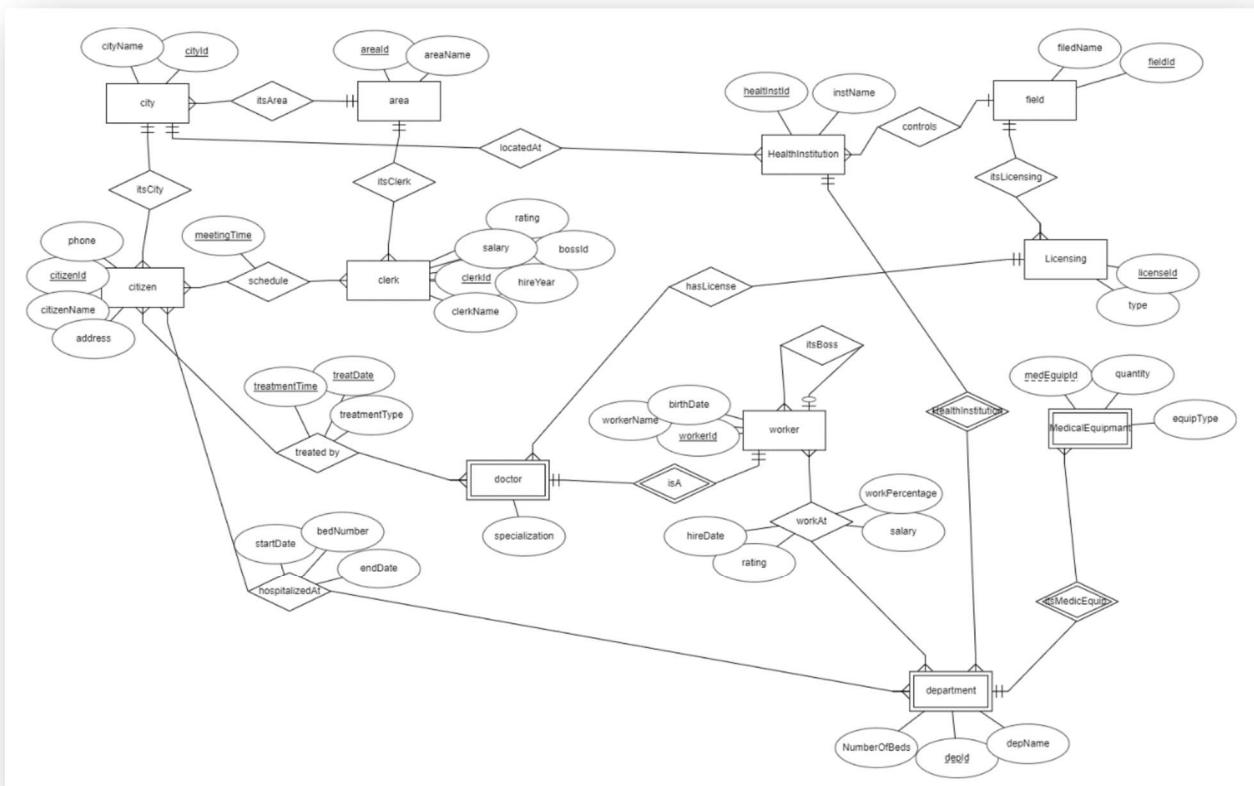
תיאור קבוצה B

אגף הגריאטריה מחולק למחולקות הבאות:

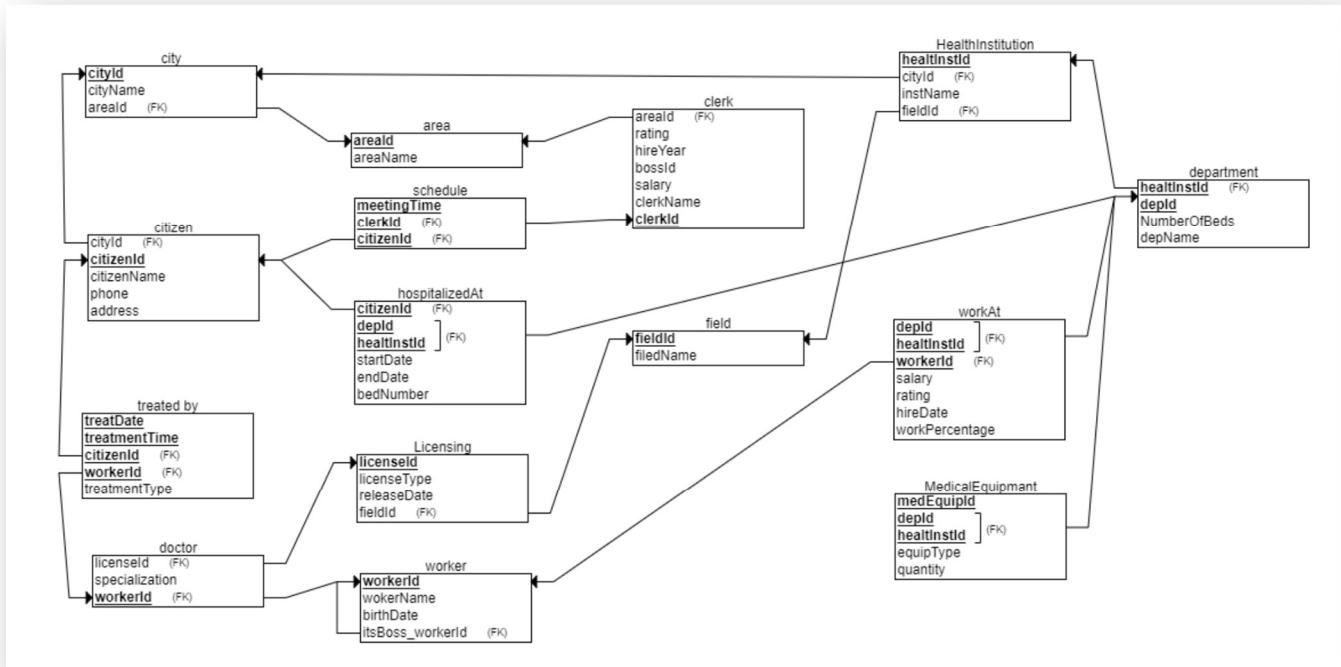
1. אגף התכנון
2. תכנון ומדיניות
3. פיתוח שירותי רפואיים כ"א
4. קביעת סטנדרטים ונחיות מקצועיים
5. רישוי
6. פיקוח
7. בקרה ופיתוח אמצעי אכיפה

התמקדות במימוש מאגר הנתונים של האגף היא באגף הגריאטריה, כאשר הוא יוצג ע"י מספר ישויות וקשרים השיכים לאותו אגף.

תרשים ERD-B



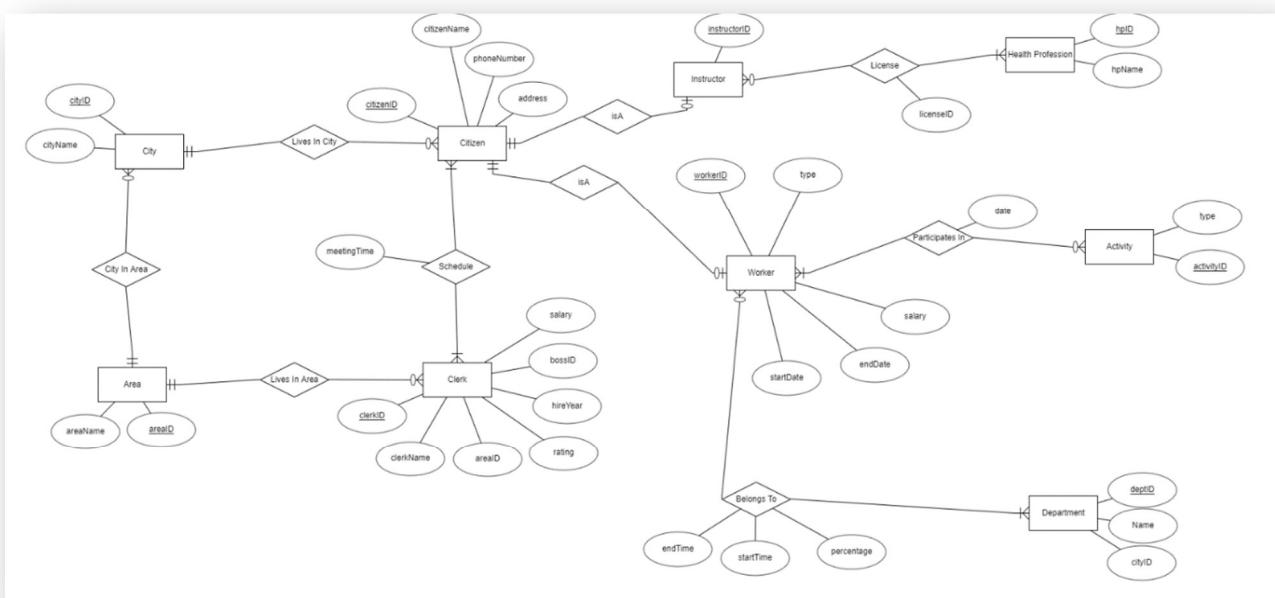
DSD-B



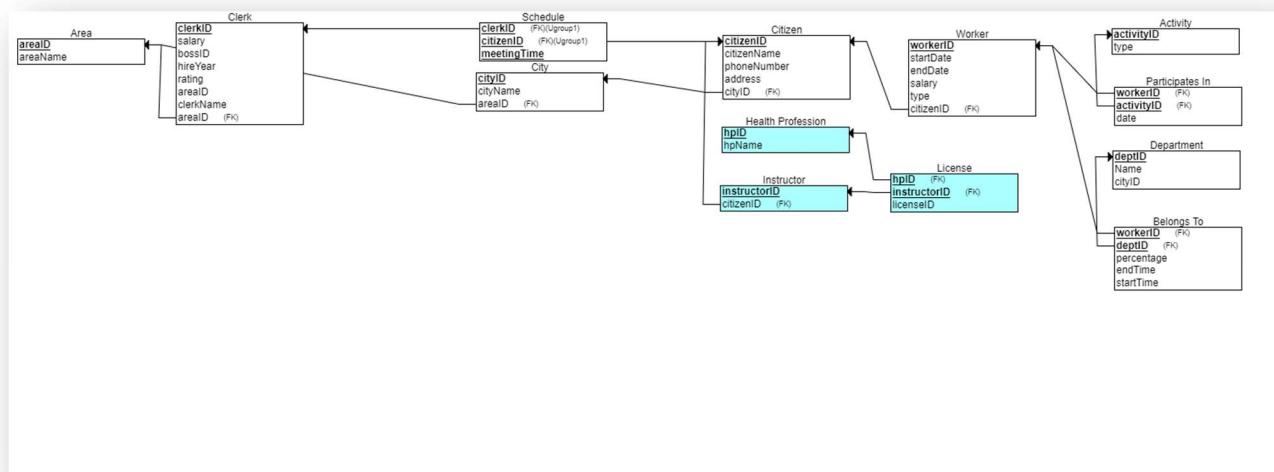
תיאור קבוצה E (אגף משאבי אנוש)

קבוצת E היא הקבוצה שאחראית על אגף משאבי אנוש במשרד הבריאות, היכול תכנון כוח אדם, גמלוות, ורווחת העובדים.

להלן ERD של קבוצה E:

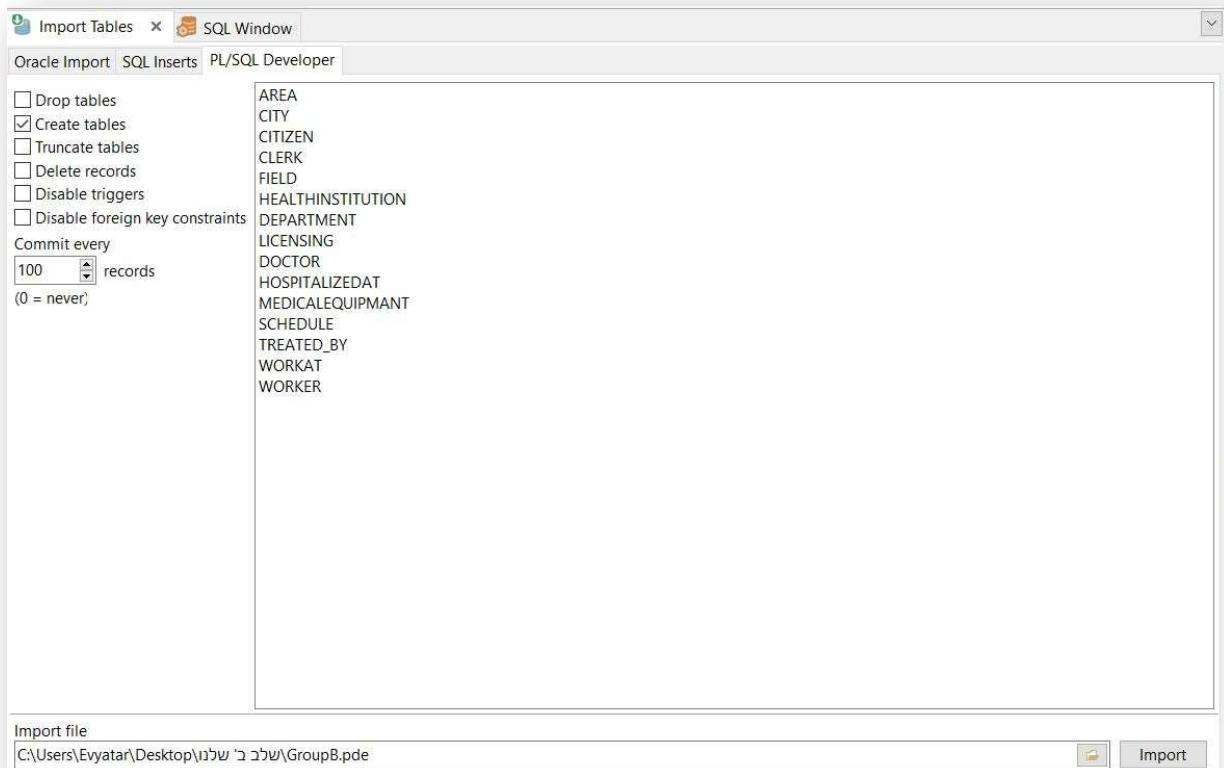


DSD:



יבוא הטבלאות מ2 הקבוצות:

יבוא טבלת ארג B (גריאטريا)

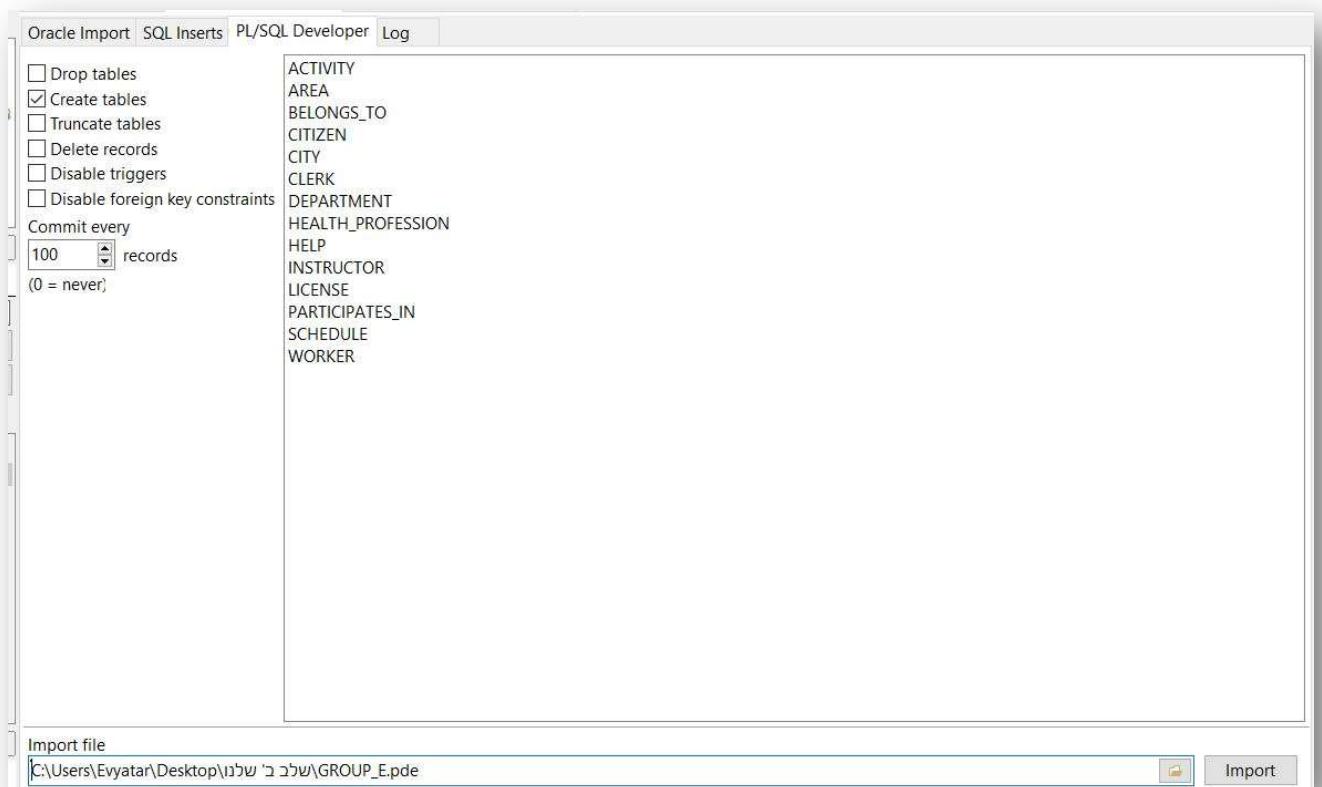


נדרשנו לשנות את השם לטבלאות המשותפות ולכון לכל טבלה משותפת, נסיף B
(area,cleck,city,citizen,schedule,worker,department)



```
Import Tables | alter TABLE CITIZEN rename ... ×
SQL Output Statistics
alter TABLE CITIZEN
rename to CITIZEN_B
```

יבוא טבלאות קבוצה E



Oracle Import | SQL Inserts | PL/SQL Developer | Log

Drop tables
 Create tables
 Truncate tables
 Delete records
 Disable triggers
 Disable foreign key constraints
Commit every records
(0 = never)

ACTIVITY
AREA
BELONGS_TO
CITIZEN
CITY
CLERK
DEPARTMENT
HEALTH_PROFESSION
HELP
INSTRUCTOR
LICENSE
PARTICIPATES_IN
SCHEDULE
WORKER

Import file: C:\Users\Evyatar\Desktop\שולחן ב' שלב ב'\GROUP_E.pde

Import

השוואות בין הטבלאות ותיקונים נדרשים:

ישנן טבלאות משותפות שנדרש לבצע התאמה ביניהן על מנת שהסכמה תהיה תואמת ונוכל לבצע ביניהן איחוד.

בין 2 הקבוצות ישנה טבלה אחת (department) משותפת המכילה עמודות נוספות. יש לבצע התאמת כנדרש.(הוספה עמודות ו שינוי השמות בהתאם)

	DEPTID	DEPNAME	CITYID	ROWID		DEPID	NUMBEROFBEDS	DEPTNAME	HEALTINSTID	ROWID
►	1	1 Admissions	18	AAAUOE0AABAAA邢xAAA		1	224	47 Admissions	435	AAAUOEBAABAAAACdBAAA
►	2	2 Cardiology	8	AAAUOE0AABAAA邢xJAAB		2	753	36 Anesthetics	861	AAAUOEBAABAAAACdBAAB
3	3 Pharmacy	20	AAAUOE0AABAAA邢xJAAC			3	621	30 Breast Screening	726	AAAUOEBAABAAAACdBAAC
4	4 Nephrology	15	AAAUOE0AABAAA邢xJAAD			4	265	39 Burn Center	758	AAAUOEBAABAAAACdBAAD
5	5 Admissions	15	AAAUOE0AABAAA邢xJAAE			5	540	38 Cardiology	224	AAAUOEBAABAAAACdBAAE
6	6 Critical Care	19	AAAUOE0AABAAA邢xJAAF			6	924	11 CSSD	42	AAAUOEBAABAAAACdBAAF
7	7 Human Resources	15	AAAUOE0AABAAA邢xJAAG			7	598	26 Chaplaincy	116	AAAUOEBAABAAAACdBAAG
8	8 Pharmacy	4	AAAUOE0AABAAA邢xJAAH			8	789	45 Coronary Care Unit	431	AAAUOEBAABAAAACdBAAH
9	9 General Surgery	15	AAAUOE0AABAAA邢xJAAI			9	993	13 Critical Care	380	AAAUOEBAABAAAACdBAAI
10	10 Pharmacy	6	AAAUOE0AABAAA邢xJAAJ			10	97	11 Diagnostic Imaging	426	AAAUOEBAABAAAACdBAAJ
11	11 Oncology	2	AAAUOE0AABAAA邢xJAAK			11	976	16 Discharge Lounge	546	AAAUOEBAABAAAACdBAAK
*						12	399	44 Elderly services	186	AAAUOEBAABAAAACdBAAL
						13	405	26 Finance Department	632	AAAUOEBAABAAAACdBAAM
						14	633	18 Gastroenterology	789	AAAUOEBAABAAAACdBAAN
						15	450	13 General Services	860	AAAUOEBAABAAAACdBAAO
						16	959	41 General Surgery	74	AAAUOEBAABAAAACdBAAP
						17	336	48 Gynecology	472	AAAUOEBAABAAAACdBAAQ
						18	890	38 Haematology	514	AAAUOEBAABAAAACdBAAR
						19	777	41 Health & Safety	680	AAAUOEBAABAAAACdBAAS
						20	179	30 Intensive Care Unit	213	AAAUOEBAABAAAACdBAAT
						21	365	38 Human Resources	51	AAAUOEBAABAAAACdBAU
						22	600	21 Infection Control	581	AAAUOEBAABAAAACdBAV

ניתן לראות כי בטבלה הימנית יש 2 תכונות נוספות מהטבלה השמאלית ולכן נוסיף אותן בהתאם. כמו כן, עמודת הDEI אינה זהה בשם ונדרש לבצע שינוי שם לעמודה זו מDEPTID לDEPID.

בנוסף בטבלה השמאלית יש תכונה שאינה מופיעה בטבלה הימנית ונוסיף אותה בטבלה הימנית.

הוספה עמודות:

```
SQL Output Statistics
ALTER TABLE DEPARTMENT
ADD NUMBEROFBEDS INTEGER;
```

שינוי שם העמודה:

```
SQL Output Statistics
alter table
DEPARTMENT
rename column
DEPTID
TO
DEPID;
```

```
SQL Output Statistics
ALTER TABLE DEPARTMENT
ADD HELTINSTID INTEGER;
```

```
SQL Output Statistics
ALTER TABLE DEPARTMENT_B
ADD CITYID INTEGER;
```

נתקן את שמות השדות ב 2 הטבלאות ל'althinstid

```
SQL Output Statistics
alter table
    DEPARTMENT
rename column
    HELTINSTID
TO
    HEALTHINSTID;|
```

```
SQL Output Statistics
alter table
    DEPARTMENT_B
rename column
    HELTINSTID
TO
    HEALTHINSTID ;|
```

ניצור טבלה חדשה לאינקלוס 2 העמודות החדשות

```
SQL Output Statistics
CREATE TABLE DEP_TEMP(
    DEPID INT,
    NUMBEROFBEDS INT,
    HEALTHINSTID INT,
    PRIMARY KEY (DEPID)
);
```

נאכלס את הטבלה הזמנית DEP_TEMP ע"י data-generator ולאחר מכן נאחד בין הטבלה הזמנית department

להלן התוצאה -(department)

	DEPID	NUMBEROFBEDS	HEALTHINSTID	ROWID
►	1	1	14	46 AAAUGUAABAAAFAxZAAA
	2	2	17	31 AAAUGUAABAAAFAxZAAB
	3	3	87	84 AAAUGUAABAAAFAxZAAC
	4	4	84	24 AAAUGUAABAAAFAxZAAD
	5	5	92	67 AAAUGUAABAAAFAxZAAE
	6	6	54	23 AAAUGUAABAAAFAxZAAF
	7	7	56	41 AAAUGUAABAAAFAxZAAG
	8	8	27	80 AAAUGUAABAAAFAxZAAH
	9	9	62	19 AAAUGUAABAAAFAxZAAI
	10	10	31	7 AAAUGUAABAAAFAxZAAJ
	11	11	16	28 AAAUGUAABAAAFAxZAAK
*				

בנוסף , נשנה את שם העמודה HEALTHINSTID ל HEALTHINSTITUTION מהטבלה HEALTHINSTITUTION

```
SQL Output Statistics
alter table
    HEALTHINSTITUTION
rename column
    HEALTHINSTID
TO
    HEALTHINSTITUTION
```

לא ניתן להשתמש ב命令 הקיימים המובנה להוספה תכמה אחת בשורות קיימות, לכן יצרנו טבלת עזר זמנית עם ID ומתוכה שלפננו את הIDs לטבלת המחלקות.

יצירת טבלת TEMP :HEALTHINSTID_TEMP

```
SQL Output Statistics
CREATE TABLE HEALTHINSTID_TEMP (
    HEALTHINSTID number(3) NOT NULL,
    PRIMARY KEY (HEALTHINSTID),
    FOREIGN KEY (HEALTHINSTID) REFERENCES HEALTHINSTITUTION (HEALTHINSTID)
);
```

הכנסת עמודת HEALTHINSTID הנמצאת בטבלה HEALTHINSTITUTION לעמודת
העמודה היחידה בטבלה HEALTHINSTID TEMP (העמודה היחידה בטבלה זו).

The screenshot shows the Oracle SQL Developer interface. At the top, there are tabs for 'd.sql', 'c.sql', 'b.sql', and 'd.sql'. Below them, another set of tabs shows 'SQL' (which is selected), 'Output', and 'Statistics'. In the main SQL editor area, the following query is written:

```
SELECT * FROM HEALTHINSTID_TEMP
```

Below the editor is a table with 12 rows of data, each containing a value in the 'HEALTHINSTID' column. The rows are numbered 1 through 12. The values are: 25, 31, 34, 42, 51, 74, 78, 107, 111, 116, 121, and 146. The rows are highlighted in green.

	HEALTHINSTID
1	25
2	31
3	34
4	42
5	51
6	74
7	78
8	107
9	111
10	116
11	121
12	146

כעת נאכלס את הטבלה לפי department-1 healthinstitution

	DEPID	DEPNAME	CITYID	NUMBEROFBEDS	HEALTHINSTID	ROWID
▶	1	1 Admissions	18	32	435	AAAUOE0AABAAAFAxJAAA
	2	2 Cardiology	8	29	427	AAAUOE0AABAAAFAxJAAB
	3	3 Pharmacy	20	11	861	AAAUOE0AABAAAFAxJAAC
	4	4 Nephrology	15	21	726	AAAUOE0AABAAAFAxJAAD
	5	5 Admissions	15	34	758	AAAUOE0AABAAAFAxJAAE
	6	6 Critical Care	19	23	224	AAAUOE0AABAAAFAxJAAF
	7	7 Human Resources	15	7	42	AAAUOE0AABAAAFAxJAAG
	8	8 Pharmacy	4	14	116	AAAUOE0AABAAAFAxJAAH
	9	9 General Surgery	15	17	431	AAAUOE0AABAAAFAxJAAI
	10	10 Pharmacy	6	9	380	AAAUOE0AABAAAFAxJAAU
	11	11 Oncology	2	25	426	AAAUOE0AABAAAFAxJAAK
*						...

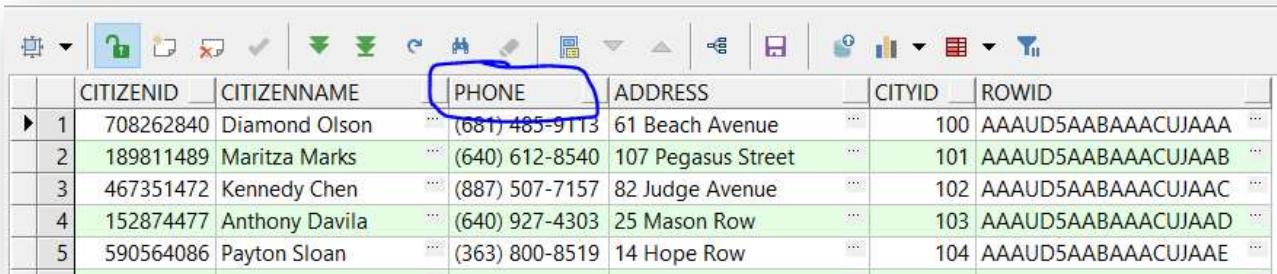
נمشיך לטבלאות הבאות -

בטבלה CITIZEN , תכונת מסטר הפליאפון שונה בשם שלה ולכן נדרש לשנותה.

טבלה :CITIZEN

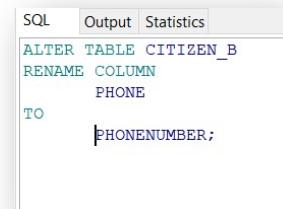
	CITIZENID	CITIZENNAME	PHONENUMBER	ADDRESS	CITYID	ROWID
▶	1	1 Clint David	00523206895	75 Badalucco Road	7	AAAUZEZAABAAAADPJAAA
	2	2 Brad Bruce	00534389353	63 Julia	28	AAAUZEZAABAAAADPJAAAB
	3	3 Edgar Bello	00547364264	895 Rubinek Road	5	AAAUZEZAABAAAADPJAAAC

טבלה :CITIZEN_B



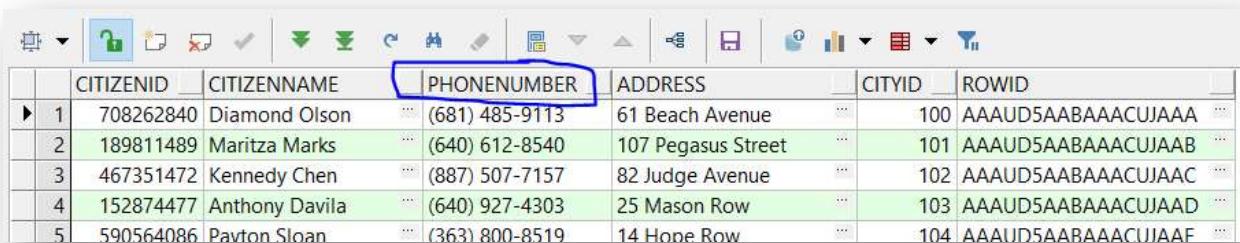
	CITIZENID	CITIZENNAME	PHONE	ADDRESS	CITYID	ROWID
► 1	708262840	Diamond Olson	(681) 485-9113	61 Beach Avenue	100	AAAUD5AABAAACUJAAA
2	189811489	Maritza Marks	(640) 612-8540	107 Pegasus Street	101	AAAUD5AABAAACUJAAB
3	467351472	Kennedy Chen	(887) 507-7157	82 Judge Avenue	102	AAAUD5AABAAACUJAAC
4	152874477	Anthony Davila	(640) 927-4303	25 Mason Row	103	AAAUD5AABAAACUJAAD
5	590564086	Pavton Sloan	(363) 800-8519	14 Hope Row	104	AAAUD5AABAAACUJAAE

בוצע שינוי:



```
SQL Output Statistics
ALTER TABLE CITIZEN_B
RENAME COLUMN
PHONE
TO
PHONENUMBER;
```

תוצאת השינוי:



	CITIZENID	CITIZENNAME	PHONENUMBER	ADDRESS	CITYID	ROWID
► 1	708262840	Diamond Olson	(681) 485-9113	61 Beach Avenue	100	AAAUD5AABAAACUJAAA
2	189811489	Maritza Marks	(640) 612-8540	107 Pegasus Street	101	AAAUD5AABAAACUJAAB
3	467351472	Kennedy Chen	(887) 507-7157	82 Judge Avenue	102	AAAUD5AABAAACUJAAC
4	152874477	Anthony Davila	(640) 927-4303	25 Mason Row	103	AAAUD5AABAAACUJAAD
5	590564086	Pavton Sloan	(363) 800-8519	14 Hope Row	104	AAAUD5AABAAACUJAAE

:WORKER טבלת

בטבלה המשותפת WORKER ישנן אי התאמות בשדות כפי שניתן לראות –

- WORKER

	WORKERID	STARTDATE	ENDDATE	SALARY	TYPE	CITIZENID	ROWID
1	5000	04/01/2020	19/10/2020	16769	1	166	AAAUEsAABAAAEJ5AAA
2	5001	08/04/2020	02/06/2020	6845	2	503	AAAUEsAABAAAEJ5AAB
3	5002	18/04/2009	03/04/2021	6350	2	627	AAAUEsAABAAAEJ5AAC
4	5003	16/04/2008	23/01/2025	6202	2	387	AAAUEsAABAAAEJ5AAD
5	5004	13/05/2017	13/01/2025	14382	2	920	AAAUEsAABAAAEJ5AAE
6	5005	16/12/2019	05/11/2025	21384	2	878	AAAUEsAABAAAEJ5AAF
7	5006	27/01/2013	03/08/2024	5463	1	404	AAAUEsAABAAAEJ5AAG
8	5007	25/07/2015	04/04/2025	18894	2	848	AAAUEsAABAAAEJ5AAH
9	5008	05/08/2016	09/04/2023	6122	2	316	AAAUEsAABAAAEJ5AAI
10	5009	30/12/2016	23/07/2024	19384	2	360	AAAUEsAABAAAEJ5AAJ
11	5010	04/01/2008	30/07/2020	8672	2	676	AAAUEsAABAAAEJ5AAK
12	5011	16/05/2015	25/12/2024	10591	2	731	AAAUEsAABAAAEJ5AAL
13	5012	20/10/2011	21/12/2024	20722	2	14	AAAUEsAABAAAEJ5AAM

- WORKER_B

	WORKERID	WOKERNAME	BIRTHDATE	ITSBOSS_WORKERID	ROWID
1	531238815	Diamond Olson	20/01/2000	531238815	AAAUERAABAAADOJAAA
2	648956315	Maritza Marks	25/08/1957	648956315	AAAUERAABAAADOJAAB
3	71932811	Kennedy Chen	09/09/1992	71932811	AAAUERAABAAADOJAAC
4	311466467	Anthony Davila	16/05/1976	311466467	AAAUERAABAAADOJAAD
5	214019947	Payton Sloan	02/01/1989	214019947	AAAUERAABAAADOJAAE
6	655611592	Jeramiah Yu	22/08/1971	655611592	AAAUERAABAAADOJAAF
7	267895569	Gloria Hoffman	22/08/1979	267895569	AAAUERAABAAADOJAAG
8	475822438	Abel Hansen	03/06/1960	475822438	AAAUERAABAAADOJAAH
9	608832283	Amiya Drake	02/09/1964	608832283	AAAUERAABAAADOJAAI
10	871947790	Anna Velez	31/01/1971	871947790	AAAUERAABAAADOJAAJ
11	156552498	Iyana Meza	16/10/1977	871947790	AAAUERAABAAADOJAAK
12	154508569	Inhnathon Barnes	07/06/1964	531238815	AAAUIFRAARAAADOIAAI

לכן נבצע תיקון ב 2 הtáבלאות ע"מ שהיו תואמות זו לזו.

SQL Output Statistics

```
ALTER TABLE WORKER_B
ADD STARTDATE DATE
ADD ENDDATE DATE
ADD TYPE INTEGER
ADD CITIZENID INTEGER
ADD SALARY FLOAT;
```

SQL Output Statistics

```
ALTER TABLE WORKER
ADD WOKERNAME VARCHAR2(50)
ADD BIRTHDATE DATE
ADD ITSBOSS_WORKERID NUMBER(9);
```

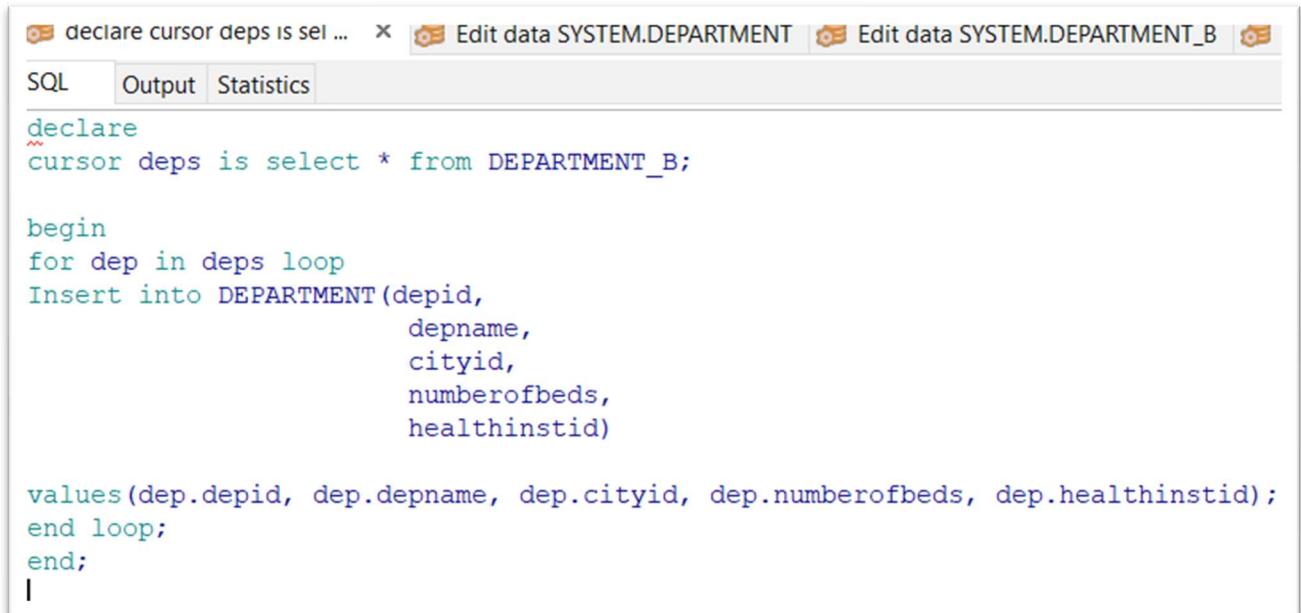
תוצאת האיחוד : (worker)

ביצוע איחוד הtables:

אחד בין tables אגף משאבי אנוש משרד הבריאות לבין tables אגף גראטריה

בצע איחוד בין טבלת DEPARTMENT המכילה 11 רשומות לבין DEPARTMENT_B המכילה 31

רשומות

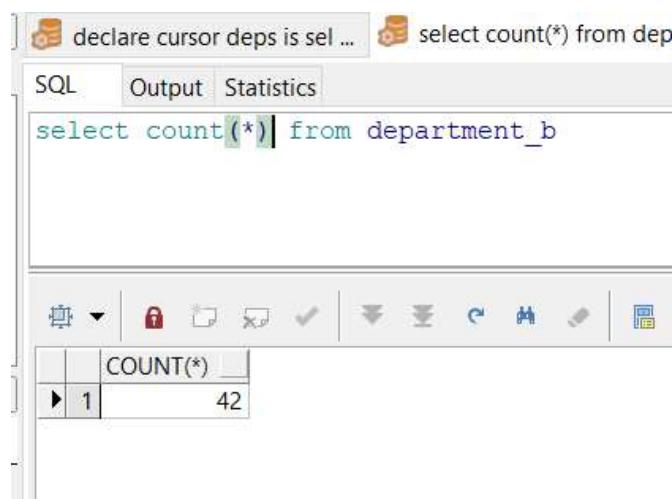


```
declare
cursor deps is select * from DEPARTMENT_B;

begin
for dep in deps loop
Insert into DEPARTMENT(depid,
                      depname,
                      cityid,
                      numberofbeds,
                      healthinstid)

values(dep.depid, dep.depname, dep.cityid, dep.numberofbeds, dep.healthinstid);
end loop;
end;
|
```

לאחר האיחוד להלן כמה רשומות בDEPARTMENT_B



```
declare cursor deps is select count(*) from department_b;
```

COUNT(*)
42

מכיוון שהכנסנו את הנתונים לתוכן DEPARTMENT_B נסנה את השם חזרה ל-DEPARTMENT (ואת department1 department)

```

declare cursor deps is sel ...
alter table DEPARTMENT ren...
SQL Output Statistics
alter table Department_b
rename to DEPARTMENT

```

להלן תוצאת האיחוד –

	DEPID	NUMBEROFBEDS	DEPNAME	HEALTHINSTID	CITYID	ROWID
22	790	47	Infection Control	501	2	AAAUEBAABAAACdCAAV
23	771	30	Occupational Therapy	883	20	AAAUEBAABAAACdCAAW
► 24	96	48	CSSD	170	9	AAAUEBAABAAACdCAAX
25	597	25	Rheumatology	996	2	AAAUEBAABAAACdCAAY
26	175	28	Diagnostic Imaging	427	17	AAAUEBAABAAACdCAAZ
27	772	10	Medical Records	74	12	AAAUEBAABAAACdCAAa
28	40	45	Otolaryngology	632	7	AAAUEBAABAAACdCAAab
29	654	44	Pharmacy	340	3	AAAUEBAABAAACdCAAc
30	110	30	Breast Screening	435	4	AAAUEBAABAAACdCAAad
31	562	17	Renal	170	7	AAAUEBAABAAACdCAAe
32	1	32	Admissions	435	18	AAAUEBAABAAACdCAAf
33	2	29	Cardiology	427	8	AAAUEBAABAAACdCAAg
34	3	11	Pharmacy	861	20	AAAUEBAABAAACdCAAh
35	4	21	Nephrology	726	15	AAAUEBAABAAACdCAAi
36	5	34	Admissions	758	15	AAAUEBAABAAACdCAAj
37	6	23	Critical Care	224	19	AAAUEBAABAAACdCAAk
38	7	7	Human Resources	42	15	AAAUEBAABAAACdCAAi
39	8	14	Pharmacy	116	4	AAAUEBAABAAACdCAAmm
40	9	17	General Surgery	431	15	AAAUEBAABAAACdCAAan
41	10	9	Pharmacy	380	6	AAAUEBAABAAACdCAAo
42	11	25	Oncology	426	2	AAAUEBAABAAACdCAAp
*						

כמו כן ביצעו איחודים על כלל הtabלאות שיובאו, השמננו את התיעוד מפהת חוסר רלוונטיות.

שאליות

תיאור המשימה

- יצירת שאלות על בסיס הנתונים לאחר איחוד האגפים.
- שאלות פשוטות ומורכבות, כולל שאלות השולפות נתונים מטבלאות הקשורות לאגפים שונים.
- יצירת אינדקסים לטבלאות והשוואת זמני הרצת השאלות לפני ואחרי האינדקס.

1. שליפת כל הפעולות שהתרחשו לאחר שנת 2012 במשרד הבריאות

```
select EXTRACT(YEAR FROM TO_DATE(participationdate, 'DD-MM-RR')) y from
participates_in
where EXTRACT(YEAR FROM TO_DATE(participationdate, 'DD-MM-RR')) > 2012
```

הטבלה המקורית:

The screenshot shows the Oracle SQL Developer interface. At the top, there are three tabs: SQL, Output, and Statistics. The SQL tab contains the following query:

```
select t.*, t.rowid from PARTICIPATES_IN t
```

Below the SQL tab is the Results tab, which displays the data from the query. The table has the following structure:

	PARTICIPATIONDATE	WORKERID	ACTIVITYID	ROWID
▶ 1	28/03/2008	50	1	AAAUEnAABAAAEG5AAA
2	04/05/2010	51	2	AAAUEnAABAAAEG5AAB
3	14/08/2016	52	3	AAAUEnAABAAAEG5AAC
4	22/07/2011	53	4	AAAUEnAABAAAEG5AAD
5	23/10/2017	54	5	AAAUEnAABAAAEG5AAE
6	05/11/2019	55	6	AAAUEnAABAAAEG5AAF
7	19/10/2018	56	7	AAAUEnAABAAAEG5AAG
*				...

תוצאת הריצת השאילתה:

The screenshot shows a SQL query window with the following content:

```
SQL Output Statistics
select EXTRACT(YEAR FROM TO_DATE(participationdate, 'DD-MM-RR')) y from participates_in
where EXTRACT(YEAR FROM TO_DATE(participationdate, 'DD-MM-RR')) > 2012
```

The results table contains one column labeled 'Y' with the following data:

Y
1 2016
2 2017
3 2019
4 2018

2. שאילתת השולפת את העובדים אשר גרים בברלין , וממיינת אותם לפי השכר

```
select * from worker
where citizenid in
    (select citizenid from citizen where cityid in
        (select cityid from city where cityname = 'Berlin'))
order by salary
```

הטבלה המקורית:

The screenshot shows a SQL query window with the following content:

```
SQL Output Statistics
select * from worker
```

The results table contains the following columns: WORKERID, WORKERNAME, CITIZENID, ITSSBOSS_WORKERID, SALARY, TYPE, STARTDATE, ENDDATE, BIRTHDATE. The data is as follows:

	WORKERID	WORKERNAME	CITIZENID	ITSSBOSS_WORKERID	SALARY	TYPE	STARTDATE	ENDDATE	BIRTHDATE
1	5000	Isaiah Moreno	166		16769	1	04/01/2020	04/01/2020	04/01/2020
2	5001	Russell Carradine	503	5000	6845	2	08/04/2020	08/04/2020	08/04/2020
3	5002	Todd Anderson	627	5000	6350	2	18/04/2009	18/04/2009	18/04/2009
4	5004	Domingo Hong	920	5000	14382	2	13/05/2017	13/05/2017	13/05/2017
5	5005	David Gyllenhaal	878	5000	21384	2	16/12/2019	16/12/2019	16/12/2019
6	5006	Roddy Cross	404	5000	5463	1	27/01/2013	27/01/2013	27/01/2013
7	5007	Kim Glover	848	5000	18894	2	25/07/2015	25/07/2015	25/07/2015
8	5008	Wendy Downey	316	5000	6122	2	05/08/2016	05/08/2016	05/08/2016
9	5010	Rick Jeter	676	5000	8672	2	04/01/2008	04/01/2008	04/01/2008

תוצאת הפעלת השאליתא:

```

select * from worker
where citizenid in
    (select citizenid from citizen where cityid in
        (select cityid from city where cityname = 'Berlin'))
order by salary;

```

	WORKERID	WORKERNAME	CITIZENID	ITSBOSS_WORKERID	SALARY	TYPE	STARTDATE	ENDDATE	BIRTHDATE
1	5119	Rowan Clark	825	5002	5448	1	08/06/2017	08/06/2017	08/06/2017
2	5093	Emerson Neuirth	29	5009	9479	1	14/11/2019	14/11/2019	14/11/2019
3	5068	Walter Rosas	660	5008	9540	2	02/10/2012	02/10/2012	02/10/2012
4	5044	Lena Sandler	955	5006	12189	2	21/05/2009	21/05/2009	21/05/2009
5	5128	Rick Harary	671	5009	15761	2	20/06/2019	20/06/2019	20/06/2019
6	5246	Clay Cartlidge	926	5003	15790	1	24/06/2017	24/06/2017	24/06/2017
7	5110	Julia De Almeida	26	5002	18686	1	19/11/2008	19/11/2008	19/11/2008
8	5009	Austin Bruce	360	5003	19384	2	30/12/2016	30/12/2016	30/12/2016
9	5056	Julia De Almeida	26	5008	21948	1	30/11/2010	30/11/2010	30/11/2010

3. שיליפת כל העובדים שנולדו 70 ומעלה, ושמזהה המנהל שלהם הוא 5001

```

SELECT WORKERNAME FROM WORKER
WHERE EXTRACT(YEAR FROM TO_DATE(BIRTHDATE, 'DD-MM-RR')) > 1950 AND
ITSBOSS_WORKERID = 5001;

```

הטבלה המקורית:

```

SELECT * FROM WORKER

```

	WORKERID	WORKERNAME	CITIZENID	ITSBOSS_WORKERID	SALARY	TYPE	STARTDATE	ENDDATE	BIRTHDATE
1	5000	Isaiah Moreno	166		16769	1	04/01/2020	04/01/2020	04/01/2020
2	5001	Russell Carradine	503	5000	6845	2	08/04/2020	08/04/2020	08/04/2020
3	5002	Todd Anderson	627	5000	6350	2	18/04/2009	18/04/2009	18/04/2009
4	5004	Domingo Hong	920	5000	14382	2	13/05/2017	13/05/2017	13/05/2017
5	5005	David Gyllenhaal	878	5000	21384	2	16/12/2019	16/12/2019	16/12/2019
6	5006	Roddy Cross	404	5000	5463	1	27/01/2013	27/01/2013	27/01/2013
7	5007	Kim Glover	848	5000	18894	2	25/07/2015	25/07/2015	25/07/2015
8	5008	Wendy Downey	316	5000	6122	2	05/08/2016	05/08/2016	05/08/2016
9	5010	Rick Jeter	676	5000	8672	2	04/01/2008	04/01/2008	04/01/2008
10	5011	Mae Cherry	731	5002	10591	2	16/05/2015	16/05/2015	16/05/2015
11	5013	Mia Strathairn	853	5004	18032	2	17/05/2015	17/05/2015	17/05/2015
12	5014	Rosanna Napolitano	642	5006	21995	1	29/03/2009	29/03/2009	29/03/2009
13	5016	Mykelti Berenger	325	5007	21494	2	14/04/2008	14/04/2008	14/04/2008
14	5017	Albertina Mellencamp	877	5005	4779	2	20/01/2013	20/01/2013	20/01/2013
15	5018	Ellen Kutcher	914	5009	11830	1	01/11/2011	01/11/2011	01/11/2011
16	5019	Sarah Turturro	578	5009	12855	1	10/07/2017	10/07/2017	10/07/2017
17	5020	Nikka Soul	175	5002	10439	1	05/04/2020	05/04/2020	05/04/2020
18	5022	Anna Rains	341	5006	16873	1	25/12/2016	25/12/2016	25/12/2016
19	5023	Jessica Dolenz	155	5010	9141	2	26/11/2013	26/11/2013	26/11/2013
20	5024	Joy Reeve	331	5006	20223	1	03/11/2013	03/11/2013	03/11/2013
21	5025	Donald Giraldo	732	5006	14283	2	20/08/2016	20/08/2016	20/08/2016

תוצאת הפעלת השאלה:

The screenshot shows a SQL query window with the following details:

SQL Output Statistics

```
SELECT WORKERNAME FROM WORKER
WHERE EXTRACT(YEAR FROM TO_DATE(BIRTHDATE, 'DD-MM-RR')) > 1950 AND ITSSBOSS_WORKERID = 5001;
```

The results are displayed in a table:

	WORKERNAME
1	Wendy Downey
2	Ellen Kutcher
3	Lydia Douglas
4	Larry Drive
5	Samuel Carlisle
6	Halle Imperioli
7	Vertical Goodall
8	Candice Gayle
9	Carla Stoltz
10	Maxine Bullock
11	Jeff Reynolds
12	Carlene Tate
13	Dwight Secada
14	Mitchell Himmelman
15	Morris Savage
16	Debi Russell
17	Naomi Lovitz

4. דירוג שכר העובדים –

שאילתא המדרגת את העובדים לפי גובה שכרם, ומציגה אותם בעמודה חדשה.

```
SELECT WORKERID, WORKERNAME, SALARY, RANK () OVER(ORDER BY salary DESC) AS
SalaryRank
FROM worker
```

הטבלה המקורית:

SQL Output Statistics

```
select * from worker
```

	WORKERID	WORKERNAME	BIRTHDATE	ITSSBOSS_WORKERID	STARTDATE	ENDDATE	TYPE	CITIZENID	SALARY
► 1	531238815	Diamond Olson	20/01/2000	531238815	02/11/2014	21/10/2034	2	708262840	7193.75963724547
2	648956315	Maritza Marks	25/08/1957	648956315	01/03/1990	20/09/2031	2	189811489	4547.24993700675
3	71932811	Kennedy Chen	09/09/1992	71932811	16/01/1986	16/06/2027	2	467351472	12245.8207812373
4	311466467	Anthony Davila	16/05/1976	311466467	06/07/1991	11/03/2032	1	152874477	10123.1044325927
5	214019947	Payton Sloan	02/01/1989	214019947	14/03/2005	28/08/2039	2	590564086	18989.0556747607
6	655611592	Jeramiah Yu	22/08/1971	655611592	22/09/2000	17/11/2029	2	945582077	39596.0854809824
7	267895569	Gloria Hoffman	22/08/1979	267895569	25/08/2015	29/12/2038	2	79504732	6487.43178045151
8	475822438	Abel Hansen	03/06/1960	475822438	29/10/2014	03/03/2039	2	780946586	18051.5059995375
9	608832283	Amiya Drake	02/09/1964	608832283	10/08/1991	30/08/2035	2	375972455	10593.4708076844
10	871947790	Anna Velez	31/01/1971	871947790	21/09/2013	29/11/2022	1	971633137	21502.6343397589
11	156552498	Iyana Meza	16/10/1977	871947790	26/02/1994	19/11/2034	1	202710130	22521.8000957567
12	154508569	Johnathon Barnes	07/06/1964	531238815	02/09/2004	21/10/2040	1	936814527	18683.0983801041
13	918926951	Shaniya Dominguez	04/06/1987	531238815	19/08/1990	12/08/2026	1	618144212	5527.24725320139
14	867688554	Bentley Hunter	28/12/1956	648956315	30/11/2001	30/07/2040	1	330927664	12411.5715489087
15	684228936	Madyson Bradley	30/01/1969	648956315	08/03/1995	20/12/2035	1	850965499	31812.1152128244
16	518625103	Aiyana Hahn	10/06/1961	71932811	03/09/2008	02/08/2021	2	121670810	34166.3572185492
17	950758028	Zechariah Moran	30/11/1983	71932811	23/07/1980	07/06/2038	1	591829232	19755.5064944343
18	520553314	Eliza Smith	18/06/1963	311466467	23/07/2013	18/06/2027	2	523479830	4631.47187212603
19	505111071	Janae Nicholson	27/03/1996	311466467	07/08/2019	05/03/2027	2	972999281	6023.04506649502
20	65914345	Sarahi Wagner	22/05/1961	214019947	30/05/2008	18/12/2020	2	869593414	3847.8553907397
21	102975751	Fatima Livingston	30/04/1985	214019947	01/06/2006	27/01/2024	1	364323076	24579.4832145873
22	97370635	Ashleigh Winters	08/12/1989	655611592	14/03/1994	28/11/2032	1	456295284	12236.7589724102

תוצאת הפעלת השאלה:

```
SELECT WORKERID, WORKERNAME, SALARY, RANK () OVER (ORDER BY salary DESC) AS SalaryRank
FROM worker
```

	WORKERID	WORKERNAME	SALARY	SALARYRANK
► 1	702948713	Emilia Bautista	39621.8893206703	1
2	655611592	Jeramiah Yu	39596.0854809824	2
3	663022089	Tiara Wilkinson	39167.8894288436	3
4	371691541	Miracle Gould	37217.5225379819	4
5	475432614	Mayra Mcgee	36955.2907586969	5
6	869554266	Esteban Frederick	36653.010788536	6
7	904309366	Marshall Barton	36590.5759389101	7
8	777271072	Valery Leach	35912.8667544661	8
9	227081707	James Nichols	35837.1563656288	9
10	927420065	Declan Wilson	34185.9291114334	10
11	518625103	Aiyana Hahn	34166.3572185492	11
12	772049123	Alfredo Cline	34132.2697006833	12
13	675443623	Noelle Butler	33803.698220835	13
14	36653768	Taryn Bridges	33656.3991450506	14
15	881549786	Lia Michael	33353.7970245461	15
16	833381050	Kolten Clarke	33313.3185103067	16
17	67162927	Daniella Ballard	33188.2630867643	17
18	163199704	Tamia Mercado	32962.4789950104	18
19	726182643	Bridger Nicholson	32517.830645086	19
20	684228936	Madyson Bradley	31812.1152128244	20

5. שאלתה חוצה אגפים בין `healthinstitution` של אגף היררכיה לבין `belongs_to` האגף
שלנו (משאבי אנוש)

שליפת עובדים השוכנים מחלקת הנמצאת בטבלה `healthinstitution` השיכת לאגף
היררכיה

```
select * from worker
  where workerid in (select workerid from belongs_to
    where depid in (select depid from department
      where healthinstid in (select healthinstid from
        healthinstitution)))
```

הטבלה המקורית:

The screenshot shows a SQL query being run in a database client. The query is:

```
select * from worker
```

The results are displayed in a grid table with the following columns:

	WORKERID	WORKERNAME	BIRTHDATE	ITSBOSS_WORKERID	STARTDATE	ENDDATE	TYPE	CITIZENID	SALARY
1	531238815	Diamond Olson	20/01/2000	531238815	02/11/2014	21/10/2034	2	708262840	7193.75963724547
2	648956315	Maritza Marks	25/08/1957	648956315	01/03/1990	20/09/2031	2	189811489	4547.24993700675
3	71932811	Kennedy Chen	09/09/1992	71932811	16/01/1986	16/06/2027	2	467351472	12245.8207812373
4	311466467	Anthony Davila	16/05/1976	311466467	06/07/1991	11/03/2032	1	152874477	10123.1044325927
5	214019947	Peyton Sloan	02/01/1989	214019947	14/03/2005	28/08/2039	2	590564086	18989.0556747607
6	655611592	Jeramiah Yu	22/08/1971	655611592	22/09/2000	17/11/2029	2	945582077	39596.0854809824
7	267895569	Gloria Hoffman	22/08/1979	267895569	25/08/2015	29/12/2038	2	79504732	6487.43178045151
8	475822438	Abel Hansen	03/06/1960	475822438	29/10/2014	03/03/2039	2	780946586	18051.5059995375
9	608832283	Amiya Drake	02/09/1964	608832283	10/08/1991	30/08/2035	2	375972455	10593.4708076844
10	871947790	Anna Velez	31/01/1971	871947790	21/09/2013	29/11/2022	1	971633137	21502.6343397589
11	156552498	Iyana Meza	16/10/1977	871947790	26/02/1994	19/11/2034	1	202710130	22521.8000957567
12	154508569	Johnathon Barnes	07/06/1964	531238815	02/09/2004	21/10/2040	1	936814527	18683.0983801041
13	918926951	Shaniya Dominguez	04/06/1987	531238815	19/08/1990	12/08/2026	1	618144212	5527.24725320139
14	867688554	Bentley Hunter	28/12/1956	648956315	30/11/2001	30/07/2040	1	330927664	12411.5715489087
15	684228936	Madyson Bradley	30/01/1969	648956315	08/03/1995	20/12/2035	1	850965499	31812.1152128244
16	518625103	Aiyana Hahn	10/06/1961	71932811	03/09/2008	02/08/2021	2	121670810	34166.3572185492
17	950758028	Zechariah Moran	30/11/1983	71932811	23/07/1980	07/06/2038	1	591829232	19755.5064944343
18	520553314	Eliza Smith	18/06/1963	311466467	23/07/2013	18/06/2027	2	523479830	4631.47187212603
19	505111071	Janae Nicholson	27/03/1996	311466467	07/08/2019	05/03/2027	2	972999281	6023.04506649502
20	65914345	Sarahi Wagner	22/05/1961	214019947	30/05/2009	18/12/2020	2	869593414	3847.85539907397
21	102975751	Fatima Livingston	30/04/1985	214019947	01/06/2006	27/01/2024	1	364323076	24579.4832145873
22	97370635	Ashleigh Winters	08/12/1989	655611592	14/03/1994	28/11/2032	1	456295284	12236.7589724102

תוצאת הפעלת השאלתה:

SQL Output Statistics

```
select * from worker
  where workerid in (select workerid from belongs_to
    where depid in (select depid from department
      where healthinstid in (select healthinstid from healthinstitution)))
```

	WORKERID	WORKERNAME	BIRTHDATE	ITSBOSS_WORKERID	STARTDATE	ENDDATE	TYPE	CITIZENID	SALARY
1	5001	Russell Carradine	21/02/1958	5008	08/04/2020	02/06/2020	2	503	6845
2	5003	Rachel Cummings	27/05/1952	5005	16/04/2008	23/01/2025	2	387	6202
3	5006	Roddy Cross	15/01/1955	5007	27/01/2013	03/08/2024	1	404	5463
4	5009	Austin Bruce	29/08/1950	5008	30/12/2016	23/07/2024	2	360	19384
5	5000	Isaiah Moreno	18/12/1954	5004	04/01/2020	19/10/2020	1	166	16769
6	5002	Todd Anderson	04/11/1960	5008	18/04/2009	03/04/2021	2	627	6350
7	5004	Domingo Hong	03/11/1957	5007	13/05/2017	13/01/2025	2	920	14382

6. חישוב ממוצע השכר בכל אחת מהמחלקות

```

select tmp1.depид, tmp1.depname, tmp2.average_salary
from
(SELECT belongs_to.workerid, belongs_to.depид, department.depname
FROM belongs_to
inner join department on belongs_to.depид = department.depид) tmp1
inner join
(select depид, to_char(avg(salary),'$999,999,990.00') as Average_Salary
from
(select belongs_to.depид, worker.salary, worker.workerid
from belongs_to
inner join worker on belongs_to.workerid = worker.workerid) tmp
group by depид) tmp2
on tmp1.depид = tmp2.depид

```

SQL Output Statistics

```

select tmp1.depид, tmp1.depname, tmp2.average_salary
from
(SELECT belongs_to.workerid, belongs_to.depид, department.depname
FROM belongs_to
inner join department on belongs_to.depид = department.depид) tmp1
inner join
(select depид, to_char(avg(salary),'$999,999,990.00') as Average_Salary
from
(select belongs_to.depид, worker.salary, worker.workerid
from belongs_to
inner join worker on belongs_to.workerid = worker.workerid) tmp
group by depид) tmp2
on tmp1.depид = tmp2.depид

```

	DEPID	DEPNAME	AVERAGE_SALARY
▶	1	Admissions	\$16,769.00
	2	Human Resources	\$6,845.00
	3	Pharmacy	\$6,350.00
	4	Nephrology	\$6,202.00
	5	Admissions	\$14,382.00
	6	Human Resources	\$5,463.00
	7	Pharmacy	\$19,384.00

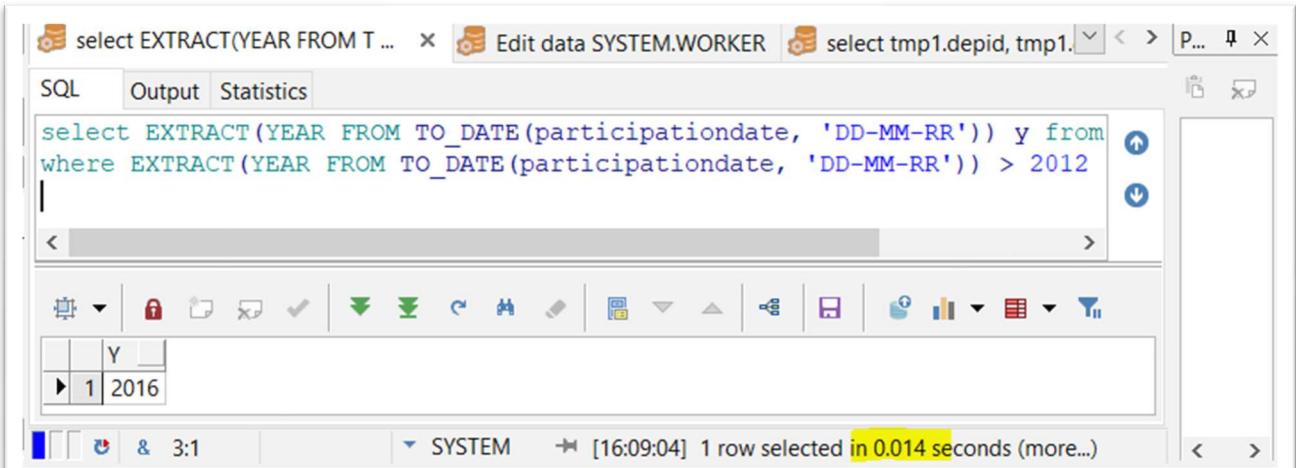
יצירת אינדקסים

השאלות מבוססות על קישורים בין טבלאות באמצעות foreign keys . הנחנו כי יצירת אינדקסים עם העמודות המשמשות כ- foreign keys יהו האפקטיביים ביותר על זמני ריצת השאלות. יוצרים אינדקס עבור כל מפתח.

שאילה 1 – אינדקס ללא השפעה על זמן השליפה ממסד הנתונים.

לא אינדקס -

לאחר אינדקס –



```
select EXTRACT(YEAR FROM TO_DATE(participationdate, 'DD-MM-RR')) y from
where EXTRACT(YEAR FROM TO_DATE(participationdate, 'DD-MM-RR')) > 2012
```

Y
2016

[16:09:04] 1 row selected in 0.014 seconds (more...)

שאילתה 2

לפני ביצוע אינדוקס –

```

select EXTRACT(YEAR FROM T ...
   from SYSTEM.WORKER
  select * from worker
  where citizenid in
    (select citizenid from citizen where cityid in
      (select cityid from city where cityname = 'Berlin'
      order by salary

```

WORKERID	WORKERNAME	CITIZENID	ITSBOSS_WORKERID	SALARY	TYPE	START
1	5119 Rowan Clark	825	5002	5448	1	08/06,
2	5093 Emerson Newirth	29	5009	9479	1	14/11,
3	5068 Walter Rosas	660	5008	9540	2	02/10,
4	5044 Lena Sandler	955	5006	12189	2	21/05,
5	5128 Rick Harary	671	5009	15761	2	20/06,
6	5246 Clay Cartlidge	926	5003	15790	1	24/06,
7	5110 Julia De Almeida	26	5002	18686	1	19/11,
8	5009 Austin Bruce	360	5003	19384	2	30/12,
9	5056 Julia De Almeida	26	5008	21948	1	30/11,

3:39 SYSTEM [16:21:34] 9 rows selected in 0.057 seconds

לאחר ביצוע אינדוקס

```

select EXTRACT(YEAR FROM T ...
   from SYSTEM.WORKER
  select * from worker
  where citizenid in
    (select citizenid from citizen where cityid in
      (select cityid from city where cityname = 'Berlin'
      order by salary

```

WORKERID	WORKERNAME	CITIZENID	ITSBOSS_WORKERID	SALARY	TYPE	START
1	5119 Rowan Clark	825	5002	5448	1	08/06,
2	5093 Emerson Newirth	29	5009	9479	1	14/11,
3	5068 Walter Rosas	660	5008	9540	2	02/10,
4	5044 Lena Sandler	955	5006	12189	2	21/05,
5	5128 Rick Harary	671	5009	15761	2	20/06,
6	5246 Clay Cartlidge	926	5003	15790	1	24/06,
7	5110 Julia De Almeida	26	5002	18686	1	19/11,
8	5009 Austin Bruce	360	5003	19384	2	30/12,
9	5056 Julia De Almeida	26	5008	21948	1	30/11,

3:39 SYSTEM [16:24:46] 9 rows selected in 0.019 seconds

שאילתה 3 – ללא שינוי בזמן (לאחר הריצה מס' פעמים קיבלנו שינוי מזערי של 2/0.001 שניות)

לפni ביצוע -

The screenshot shows the Oracle SQL Developer interface. The top bar displays the query: "SELECT WORKERNAME FROM WORKER WHERE EXTRACT(YEAR FROM TO_DATE(BIRTHDATE, 'DD-MM-RR')) > 1989 AND ITSB". The results pane shows a table with 11 rows, each containing a worker's name and a number (1 through 11). The names listed are Christian Finn, Dan Botti, Carlene Tate, Freda Van Der Beek, Ethan Sinatra, Caroline Huston, Ruth McGovern, Rhona Connick, Jake Aaron, Nina Bassett, and Karon Leachman. The bottom status bar indicates the execution time was 0.014 seconds.

	WORKERNAME
1	Christian Finn
2	Dan Botti
3	Carlene Tate
4	Freda Van Der Beek
5	Ethan Sinatra
6	Caroline Huston
7	Ruth McGovern
8	Rhona Connick
9	Jake Aaron
10	Nina Bassett
11	Karon Leachman

לאחר ביצוע אינדקס על השדות

This screenshot is identical to the one above, showing the same query and results. The only difference is the timestamp in the bottom status bar, which now shows [16:32:27], indicating the execution time has increased to 0.014 seconds due to the newly created index.

	WORKERNAME
1	Christian Finn
2	Dan Botti
3	Carlene Tate
4	Freda Van Der Beek
5	Ethan Sinatra
6	Caroline Huston
7	Ruth McGovern
8	Rhona Connick
9	Jake Aaron
10	Nina Bassett
11	Karon Leachman

שאילתה 4

לפנוי

SELECT WORKERID,WORKERNAME, SALARY, RANK () OVER (ORDER BY salary DESC) AS SALARYRANK
FROM worker

	WORKERID	WORKERNAME	SALARY	SALARYRANK
► 1	520553314	Eliza Smith	2111719247	1
2	62842027	Rohan Patel	2107348838	2
3	918926951	Shaniya Dominguez	2103486127	3
4	154508569	Johnnathon Barnes	2077833150	4
5	156552498	Iyana Meza	2068426770	5
6	531238815	Diamond Olson	2026544134	6
7	813408967	Zaniyah Reese	2016752423	7
8	69683187	Teagan Fritz	1955630506	8
9	41216358	Alonso Washington	1945524861	9
10	930997789	Leonel Joseph	1932110514	10
11	264181465	Koen Finley	1894743960	11
12	291975656	Haley Howe	1891381656	12
13	660108450	Lilyana Lamb	1884742497	13
14	869554266	Esteban Frederick	1832519043	14
15	334482803	Nolan Orozco	1763979938	15

SYSTEM [16:41:14] 15 rows selected in 0.024 seconds (more...)

אחרי

SELECT WORKERID,WORKERNAME, SALARY, RANK () OVER (ORDER BY salary DESC) AS SALARYRANK
FROM worker

	WORKERID	WORKERNAME	SALARY	SALARYRANK
► 1	520553314	Eliza Smith	2111719247	1
2	62842027	Rohan Patel	2107348838	2
3	918926951	Shaniya Dominguez	2103486127	3
4	154508569	Johnnathon Barnes	2077833150	4
5	156552498	Iyana Meza	2068426770	5
6	531238815	Diamond Olson	2026544134	6
7	813408967	Zaniyah Reese	2016752423	7
8	69683187	Teagan Fritz	1955630506	8
9	41216358	Alonso Washington	1945524861	9
10	930997789	Leonel Joseph	1932110514	10
11	264181465	Koen Finley	1894743960	11
12	291975656	Haley Howe	1891381656	12
13	660108450	Lilyana Lamb	1884742497	13
14	869554266	Esteban Frederick	1832519043	14
15	334482803	Nolan Orozco	1763979938	15

SYSTEM [16:41:35] 15 rows selected in 0.016 seconds (more...)

שאילתת 5

לפנינו

The screenshot shows a database interface with a query window containing the following SQL code:

```
select * from worker where ...  
      where depid in (select depid from department  
                      where healthinstid in (select healthinstid from he...  
|
```

Below the code is a grid-based table viewer displaying the results of the query. The columns are labeled: WORKERID, WORKERNAME, CITIZENID, ITSSBOSS_WORKERID, SALARY, TYPE, and START. The data is as follows:

	WORKERID	WORKERNAME	CITIZENID	ITSSBOSS_WORKERID	SALARY	TYPE	START
▶	1	5000 Isaiah Moreno	166		16769	1	04/01/
	2	5001 Russell Carradine	503	5000	6845	2	08/04/
	3	5002 Todd Anderson	627	5000	6350	2	18/04/
	4	5004 Domingo Hong	920	5000	14382	2	13/05/
	5	5006 Roddy Cross	404	5000	5463	1	27/01/
	6	5008 Wendy Downey	316	5000	6122	2	05/08/
	7	5003 Rachel Cummings	387	5003	6202	2	16/04/
	8	5009 Austin Bruce	360	5003	19384	2	30/12/

At the bottom of the interface, it says "SYSTEM [16:43:19] 8 rows selected in 0.041 seconds".

אחריו

The screenshot shows a database interface with a query window containing the same SQL code as the previous screenshot:

```
select * from worker where ...  
      where depid in (select depid from department  
                      where healthinstid in (select healthinstid from he...  
|
```

Below the code is a grid-based table viewer displaying the results of the query. The columns are labeled: WORKERID, WORKERNAME, CITIZENID, ITSSBOSS_WORKERID, SALARY, TYPE, and START. The data is identical to the first screenshot:

	WORKERID	WORKERNAME	CITIZENID	ITSSBOSS_WORKERID	SALARY	TYPE	START
▶	1	5000 Isaiah Moreno	166		16769	1	04/01/
	2	5001 Russell Carradine	503	5000	6845	2	08/04/
	3	5002 Todd Anderson	627	5000	6350	2	18/04/
	4	5004 Domingo Hong	920	5000	14382	2	13/05/
	5	5006 Roddy Cross	404	5000	5463	1	27/01/
	6	5008 Wendy Downey	316	5000	6122	2	05/08/
	7	5003 Rachel Cummings	387	5003	6202	2	16/04/
	8	5009 Austin Bruce	360	5003	19384	2	30/12/

At the bottom of the interface, it says "SYSTEM [16:44:38] 8 rows selected in 0.018 seconds".

שאילתה 6

לפני ביצוע אינדקס על השדות -

```

SQL Output Statistics
select tmp1.depид, tmp1.depназвание, tmp2.средняя_зарплата
from
(SELECT belongs_to.workerid, belongs_to.depид, department.depназвание
FROM belongs_to
inner join department on belongs_to.depид = department.depид) tmp1
inner join
(select depид, to_char(avg(зарплата),'$999,999,990.00') as Average_Salary
from
(select belongs_to.depид, worker.зарплата, worker.workerid
from belongs_to
inner join worker on belongs_to.workerid = worker.workerid) tmp
group by depид) tmp2
on tmp1.depид = tmp2.depид
|
```

DEPID	DEPNAME	AVERAGE_SALARY
1	Admissions	\$16,769.00
2	Cardiology	\$6,845.00
3	Pharmacy	\$6,350.00
4	Nephrology	\$6,202.00
5	Admissions	\$14,382.00
6	Human Resources	\$5,463.00
7	General Surgery	\$6,122.00
8	Pharmacy	\$19,384.00

SYSTEM [17:07:55] 8 rows selected in 0.034 seconds

לאחר ביצוע אינדקס על השדות -

```

SQL Output Statistics
select tmp1.depид, tmp1.depназвание, tmp2.средняя_зарплата
from
(SELECT belongs_to.workerid, belongs_to.depид, department.depназвание
FROM belongs_to
inner join department on belongs_to.depид = department.depид) tmp1
inner join
(select depид, to_char(avg(зарплата),'$999,999,990.00') as Average_Salary
from
(select belongs_to.depид, worker.зарплата, worker.workerid
from belongs_to
inner join worker on belongs_to.workerid = worker.workerid) tmp
group by depид) tmp2
on tmp1.depид = tmp2.depид
|
```

DEPID	DEPNAME	AVERAGE_SALARY
1	Admissions	\$16,769.00
2	Cardiology	\$6,845.00
3	Pharmacy	\$6,350.00
4	Nephrology	\$6,202.00
5	Admissions	\$14,382.00
6	Human Resources	\$5,463.00
7	General Surgery	\$6,122.00
8	Pharmacy	\$19,384.00

SYSTEM [17:09:00] 8 rows selected in 0.008 seconds

טבלת סיכון ביצועים

מספר שאלתא	זמן ביצוע לפניו אינדקס	זמן ביצוע לאחר אינדקס	הירות
1	0.014	0.014	לא שינוי
2	0.019	0.057	מהיר יותר פי 3
3	0.014	0.014	לא שינוי
4	0.016	0.024	מהיר יותר פי 1.5
5	0.18	0.041	מהיר יותר פי 2.27
6	0.008	0.034	מהיר יותר פי 14.25!

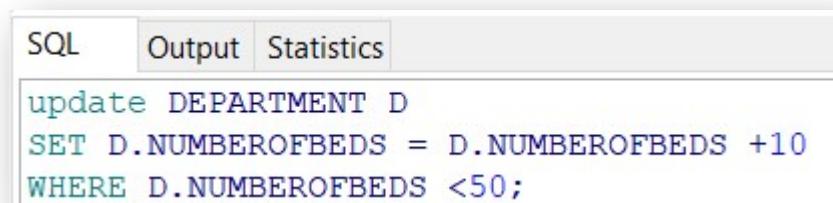
שימוש בפקודות Alter

בשלב איחוד הטבלאות ביצענו כמה וכמה פקודות Alter . (עמ' 6)

- שינוי שם טבלה
- הוספה עמודה לטבלה

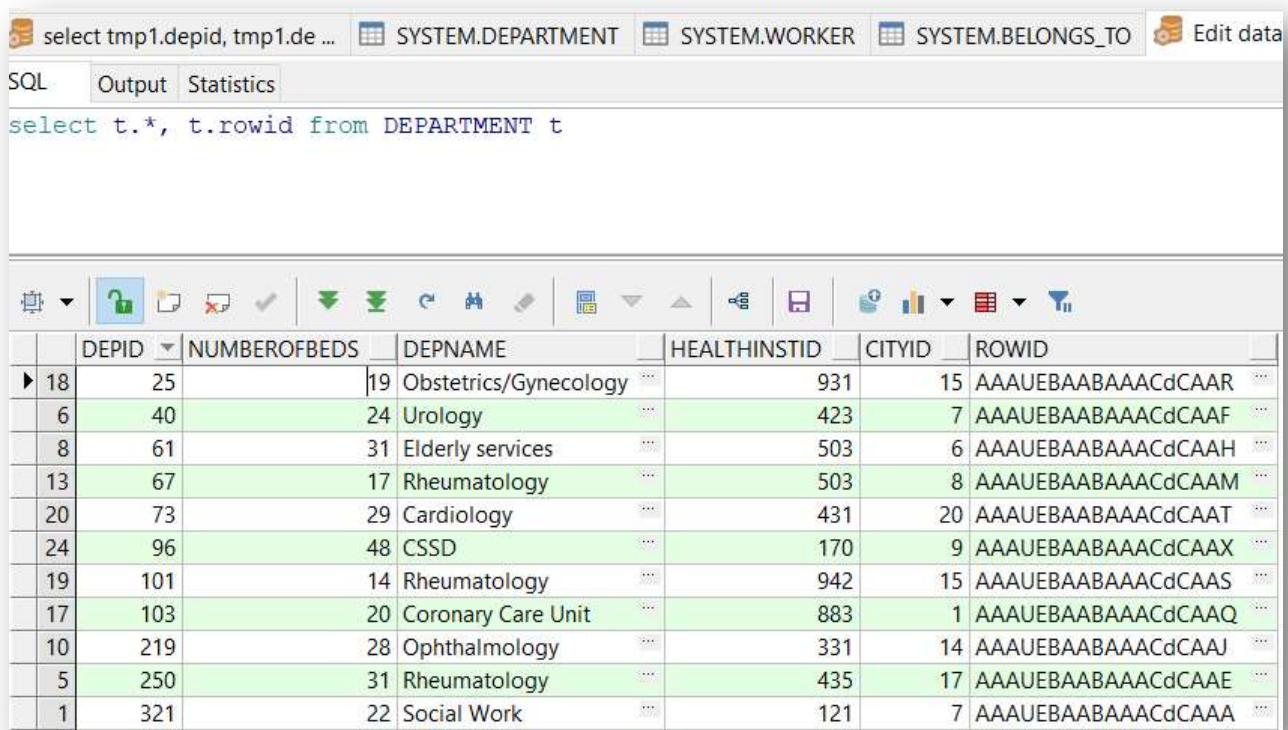
פעולות UPDATE/DELETE

1. לאור המצב המחייב בbatis החולים, כל מחלקה אשר מכילה מס' מיטות קטן מ-50 קיבל 10 מיטות נוספות:



```
SQL Output Statistics
update DEPARTMENT D
SET D.NUMBEROFBEDS = D.NUMBEROFBEDS +10
WHERE D.NUMBEROFBEDS <50;
```

הטבלה לפני העדכון:



SQL Output Statistics

```
select t.* , t.rowid from DEPARTMENT t
```

The screenshot shows the DEPARTMENT table in Oracle SQL Developer. The table has columns: DEPID, NUMBEROFBEDS, DEPNAME, HEALTHINSTID, CITYID, and ROWID. The data is as follows:

	DEPID	NUMBEROFBEDS	DEPNAME	HEALTHINSTID	CITYID	ROWID
►	18	25	19 Obstetrics/Gynecology	931	15	AAAUUEBAABAAAACdCAAR
	6	40	24 Urology	423	7	AAAUUEBAABAAAACdCAAFF
	8	61	31 Elderly services	503	6	AAAUUEBAABAAAACdCAAH
	13	67	17 Rheumatology	503	8	AAAUUEBAABAAAACdCAAM
	20	73	29 Cardiology	431	20	AAAUUEBAABAAAACdCAAT
	24	96	48 CSSD	170	9	AAAUUEBAABAAAACdCAAX
	19	101	14 Rheumatology	942	15	AAAUUEBAABAAAACdCAAS
	17	103	20 Coronary Care Unit	883	1	AAAUUEBAABAAAACdCAAQ
	10	219	28 Ophthalmology	331	14	AAAUUEBAABAAAACdCAAJ
	5	250	31 Rheumatology	435	17	AAAUUEBAABAAAACdCAAЕ
	1	321	22 Social Work	121	7	AAAUUEBAABAAAACdCAA

הטבלה לאחר העדכון:

The screenshot shows the Oracle SQL Developer interface. The title bar says "ADD.sql" and "Edit data SYSTEM.DEPARTMENT". The tabs at the top are "SQL", "Output", and "Statistics". The SQL tab contains the query: "select t.*, t.rowid from DEPARTMENT t". Below the query is a table view of the DEPARTMENT data. The table has columns: DEPID, NUMBEROFBEDS, DEPNAME, HEALTHINSTID, CITYID, and ROWID. The data is as follows:

	DEPID	NUMBEROFBEDS	DEPNAME	HEALTHINSTID	CITYID	ROWID
	18	25	29 Obstetrics/Gynecology	931	15	AAAUUEBAABAAACdCAAR
	6	40	34 Urology	423	7	AAAUUEBAABAAACdCAAF
	8	61	41 Elderly services	503	6	AAAUUEBAABAAACdCAAH
	13	67	27 Rheumatology	503	8	AAAUUEBAABAAACdCAAM
	20	73	39 Cardiology	431	20	AAAUUEBAABAAACdCAAT
	24	96	58 CSSD	170	9	AAAUUEBAABAAACdCAAX
	19	101	24 Rheumatology	942	15	AAAUUEBAABAAACdCAAS
	17	103	30 Coronary Care Unit	883	1	AAAUUEBAABAAACdCAAQ
	10	219	38 Ophthalmology	331	14	AAAUUEBAABAAACdCAAJ
	5	250	41 Rheumatology	435	17	AAAUUEBAABAAACdCAAE
▶	1	321	32 Social Work	121	7	AAAUUEBAABAAACdCAA
	16	359	47 Human Resources	34	18	AAAUUEBAABAAACdCAAP
	7	425	28 Breast Screening	42	19	AAAUUEBAABAAACdCAAG
	3	431	50 Pharmacy	360	7	AAAUUEBAABAAACdCAAC

2. עדכון המשכורות של העובדים אשר לא השתתפו באף פעילות. **UPDATE**

The screenshot shows the Oracle SQL Developer interface. The title bar says "ADD.sql" and "Edit data SYSTEM.DEPARTMENT". The tabs at the top are "SQL", "Output", and "Statistics". The SQL tab contains the following UPDATE query:

```
UPDATE worker
SET salary = salary*1.2
WHERE workerid not in (select workerid from participates_in)
```

הטבלה לפני הערך-UPDATE****

	WORKERID	WORKERNAME	CITIZENID	ITSSBOSS_WORKERID	SALARY	TYPE	STARTDATE	ENDDATE	BIRTHDATE
1	5000	Isaiah Moreno	166		16769	1	04/01/2020	04/01/2020	04/01/2020
2	5001	Russell Carradine	503	5000	6845	2	08/04/2020	08/04/2020	08/04/2020
3	5002	Todd Anderson	627	5000	6350	2	18/04/2009	18/04/2009	18/04/2009
4	5004	Domingo Hong	920	5000	14382	2	13/05/2017	13/05/2017	13/05/2017
5	5005	David Gyllenhaal	878	5000	21384	2	16/12/2019	16/12/2019	16/12/2019
6	5006	Roddy Cross	404	5000	5463	1	27/01/2013	27/01/2013	27/01/2013
7	5007	Kim Glover	848	5000	18894	2	25/07/2015	25/07/2015	25/07/2015
8	5008	Wendy Downey	316	5000	6122	2	05/08/2016	05/08/2016	05/08/2016
9	5010	Rick Jeter	676	5000	8672	2	04/01/2008	04/01/2008	04/01/2008
10	5011	Mae Cherry	731	5002	10591	2	16/05/2015	16/05/2015	16/05/2015
11	5013	Mia Strathairn	853	5004	18032	2	17/05/2015	17/05/2015	17/05/2015
12	5014	Rosanna Napolitano	642	5006	21995	1	29/03/2009	29/03/2009	29/03/2009
13	5016	Mykelti Berenger	325	5007	21494	2	14/04/2008	14/04/2008	14/04/2008
14	5017	Albertina Mellencamp	877	5005	4779	2	20/01/2013	20/01/2013	20/01/2013
15	5018	Ellen Kutcher	914	5009	11830	1	01/11/2011	01/11/2011	01/11/2011
16	5019	Sarah Turturro	578	5009	12855	1	10/07/2017	10/07/2017	10/07/2017
17	5020	Nikka Soul	175	5002	10439	1	05/04/2020	05/04/2020	05/04/2020
18	5022	A. B.	244	5005	16872	1	25/12/2016	25/12/2016	25/12/2016

הטבלה לאחר הערך-UPDATE****

	WORKERID	WORKERNAME	CITIZENID	ITSSBOSS_WORKERID	SALARY	TYPE	STARTDATE	ENDDATE	BIRTHDATE	ROWID
1	5000	Isaiah Moreno	166		16769	1	04/01/2020	04/01/2020	04/01/2020	AAAUldAABAAAaSRAAA ...
2	5001	Russell Carradine	503	5000	6845	2	08/04/2020	08/04/2020	08/04/2020	AAAUldAABAAAaSRAAB ...
3	5002	Todd Anderson	627	5000	7620	2	18/04/2009	18/04/2009	18/04/2009	AAAUldAABAAAaSRAAC ...
4	5004	Domingo Hong	920	5000	14382	2	13/05/2017	13/05/2017	13/05/2017	AAAUldAABAAAaSRAAD ...
5	5005	David Gyllenhaal	878	5000	21384	2	16/12/2019	16/12/2019	16/12/2019	AAAUldAABAAAaSRAAE ...
6	5006	Roddy Cross	404	5000	5463	1	27/01/2013	27/01/2013	27/01/2013	AAAUldAABAAAaSRAAF ...
7	5007	Kim Glover	848	5000	22672.8	2	25/07/2015	25/07/2015	25/07/2015	AAAUldAABAAAaSRAAG ...
8	5008	Wendy Downey	316	5000	6122	2	05/08/2016	05/08/2016	05/08/2016	AAAUldAABAAAaSRAAH ...
9	5010	Rick Jeter	676	5000	8672	2	04/01/2008	04/01/2008	04/01/2008	AAAUldAABAAAaSRAAI ...
10	5011	Mae Cherry	731	5002	10591	2	16/05/2015	16/05/2015	16/05/2015	AAAUldAABAAAaSRAAJ ...
11	5013	Mia Strathairn	853	5004	21638.4	2	17/05/2015	17/05/2015	17/05/2015	AAAUldAABAAAaSRAAK ...
12	5014	Rosanna Napolitano	642	5006	26394	1	29/03/2009	29/03/2009	29/03/2009	AAAUldAABAAAaSRAAL ...
13	5016	Mykelti Berenger	325	5007	25792.8	2	14/04/2008	14/04/2008	14/04/2008	AAAUldAABAAAaSRAAM ...
14	5017	Albertina Mellencamp	877	5005	5734.8	2	20/01/2013	20/01/2013	20/01/2013	AAAUldAABAAAaSRAAN ...
15	5018	Ellen Kutcher	914	5009	11830	1	01/11/2011	01/11/2011	01/11/2011	AAAUldAABAAAaSRAAO ...
16	5019	Sarah Turturro	578	5009	15426	1	10/07/2017	10/07/2017	10/07/2017	AAAUldAABAAAaSRAAP ...
17	5020	Nikka Soul	175	5002	10439	1	05/04/2020	05/04/2020	05/04/2020	AAAUldAABAAAaSRAAQ ...

ניתן לראות כי עובד מס' 5002 שלא השתתף באירוע פעלות קיבל את הعلاה. **UPDATE**

– DELETE

מחיקת כל הפגישות שהתקיימו עד שנת 2012 לא כולל

```
delete from schedule
where EXTRACT(YEAR FROM TO_DATE(MEETINGTIME, 'DD-MM-RR')) < 2012
```

	MEETINGTIME	CLERKID	CITIZENID	ROWID
► 1	24/06/2009 07:03:21	7	355	AAAUEpA...
2	27/10/2009 13:42:05	8	376	AAAUEpA...
3	05/04/2010 22:16:53	6	779	AAAUEpA...
4	04/11/2010 19:16:10	9	453	AAAUEpA...
5	06/06/2012 07:04:13	5	840	AAAUEpA...
6	17/09/2012 13:14:44	9	298	AAAUEpA...
7	16/10/2012 18:56:18	8	708	AAAUEpA...
8	02/02/2014 21:33:33	6	902	AAAUEpA...
9	09/05/2014 21:47:39	12	857	AAAUEpA...
10	16/04/2015 06:05:45	3	613	AAAUEpA...

לאחר השינוי, ניתן לראות שהרשימה ממוקינת לפי השנים ואכן המפגשים מהשנים < 2012 לא קיימים בטבלה

	MEETINGTIME	CLERKID	CITIZENID	ROWID
► 1	06/06/2012 07:04:13	5	840	AAAUEpAABAAAEEIBAAE ...
2	17/09/2012 13:14:44	9	298	AAAUEpAABAAAEEIBAAF ...
3	16/10/2012 18:56:18	8	708	AAAUEpAABAAAEEIBAAAG ...
4	02/02/2014 21:33:33	6	902	AAAUEpAABAAAEEIBAAH ...
5	09/05/2014 21:47:39	12	857	AAAUEpAABAAAEEIBAAI ...
6	16/04/2015 06:05:45	3	613	AAAUEpAABAAAEEIBAAJ ...
7	18/04/2016 10:16:01	7	67	AAAUEpAABAAAEEIBAAK ...
8	28/04/2016 18:57:18	1	438	AAAUEpAABAAAEEIBAAL ...
9	25/11/2016 10:12:17	3	43	AAAUEpAABAAAEEIBAAM ...
10	01/04/2017 16:42:48	12	966	AAAUEpAABAAAEEIBAAN ...
11	02/01/2020 04:39:47	742868808	618144212	AAAUEpAABAAAEEIBAAO ...
12	08/01/2020 15:56:26	413518592	55937608	AAAUEpAABAAAEEIBAAP ...
13	12/01/2020 18:58:45	797503856	121670810	AAAUEpAABAAAEEIBAAQ ...
14	14/01/2020 09:14:49	744958679	709915279	AAAUEpAABAAAEEIBAAR ...
15	16/01/2020 03:28:04	230298738	49629406	AAAUEpAABAAAEEIBAAS ...
16	18/01/2020 15:22:53	89160074	434940113	AAAUEpAABAAAEEIBAAT ...
17	20/01/2020 09:18:00	462438254	79504732	AAAUEpAABAAAEEIBAAU ...
18	28/01/2020 10:30:51	675975458	784600813	AAAUEpAABAAAEEIBAAV ...
19	01/02/2020 04:09:50	358888404	365963339	AAAUEpAABAAAEEIBAAW ...
20	02/02/2020 00:30:31	377845907	189811489	AAAUEpAABAAAEEIBAAZ ...
21	02/02/2020 13:22:48	97748603	156171593	AAAUEpAABAAAEEIBAAY ...
22	05/02/2020 08:41:16	50070763	120107973	AAAUEpAABAAAEEIBAAZ ...

פעולות DELETE

לאור סגירתה של מחלקת הבריאות הוחלט לפטר את עובדי המחלקה, לשם כך נאלץ להסירם ממשך הנתונים

```
select * from worker
  where workerid in (select workerid from belongs_to
    where depid in (select depid from department
      where healthinstid in (select healthinstid from healthinstitution)))
```

	WORKERID	WORKERNAME	CITIZENID	ITSSBOSS_WORKERID	SALARY	TYPE	STARTDATE	ENDDATE	BIRTHDATE
1	5000	Isaiah Moreno	166		16769	1	04/01/2020	04/01/2020	04/01/2020
2	5001	Russell Carradine	503	5000	6845	2	08/04/2020	08/04/2020	08/04/2020
3	5002	Todd Anderson	627	5000	7620	2	18/04/2009	18/04/2009	18/04/2009
4	5003	Rachel Cummings	387	5003	6202	2	16/04/2008	16/04/2008	16/04/2008
5	5004	Domingo Hong	920	5000	14382	2	13/05/2017	13/05/2017	13/05/2017
6	5006	Roddy Cross	404	5000	5463	1	27/01/2013	27/01/2013	27/01/2013
7	5008	Wendy Downey	316	5000	6122	2	05/08/2016	05/08/2016	05/08/2016
8	5009	Austin Bruce	360	5003	19384	2	30/12/2016	30/12/2016	30/12/2016

נבצע נאום COMMIT ללא פקודה DELETE על מנת שנוכל להחזיר חזרה את המידע

```
SQL Output Statistics
delete from worker
  where workerid in (select workerid from belongs_to
    where depid in (select depid from department
      where healthinstid in (select healthinstid from healthinstitution)))
```

SYSTEM [21:41:15] 8 rows deleted in 0.013 seconds

ניתן לראות שהטבלה לא עודכנה במחיקה (העובדים שהוצגו לעיל עדין נמצאים)

SQL Output Statistics

```
select * from worker
    where workerid in (select workerid from belongs_to
        where depid in (select depid from department
            where healthinstid in (select healthinstid from healthinstitution)))
```

	WORKERID	WORKERNAME	CITIZENID	ITSBOSS_WORKERID	SALARY	TYPE	STARTDATE	ENDDATE
▶	1	5000 Isaiah Moreno	166		16769	1	04/01/2020	04/01/2020
	2	5001 Russell Carradine	503	5000	6845	2	08/04/2020	08/04/2020
	3	5002 Todd Anderson	627	5000	7620	2	18/04/2009	18/04/2009
	4	5003 Rachel Cummings	387	5003	6202	2	16/04/2008	16/04/2008
	5	5004 Domingo Hong	920	5000	14382	2	13/05/2017	13/05/2017
	6	5006 Roddy Cross	404	5000	5463	1	27/01/2013	27/01/2013
	7	5008 Wendy Downey	316	5000	6122	2	05/08/2016	05/08/2016

SYSTEM [21:45:17] 8 rows selected in 0.018 seconds

SQL Output Statistics

```
select count(*) from worker
```

	COUNT(*)
▶	1
	350

SYSTEM [21:51:38] 1 row selected in 0.015 seconds

נבצע לפקודה האחורונה ולאחר מכן SELECT שוב ונקבל:

```
SQL Output Statistics
delete from worker
  where workerid in (select workerid from belongs_to
    where depid in (select depid from department
      where healthinstid in (select healthinstid from healthinstitution)));
rollback;
```

```
SQL Output Statistics
select count(*) from worker
```

COUNT(*)
1 350

1 28 SYSTEM [21:52:52] 1 row selected in 0.010 seconds

כעת נחזיר על הפעולה הפעם עם הפקודה **COMMIT**, וננסה לבצע rollback, נצפה לקבל טבלה שכבר נמחקו בה הרשומות ואין אפשרות לחזור חזרה אחרת

The screenshot shows an Oracle SQL Developer interface. The top tab bar has three tabs: 'Edit data SYSTEM.DEPARTMENT', 'select count(*) from worker', and 'delete from worker where w...'. Below the tabs, there are three tabs: 'SQL', 'Output', and 'Statistics'. The SQL tab contains the following code:

```
delete from worker
  where workerid in (select workerid from belongs_to
                      where depid in (select depid from department
                                      where healthinstid in (select healthinstid from healthinstitution)));
commit;
```

The Output tab shows the result of the query: '(no result set)'. The Statistics tab shows the execution details: 'SYSTEM [21:53:55] Done in 0.001 seconds'.

ניתן לראות שהשינויי בוצעו, כעת ננסה לבצע **ROLLBACK**

The screenshot shows an Oracle SQL Developer interface. The top tab bar has three tabs: 'SQL', 'Output', and 'Statistics'. The SQL tab contains the following code:

```
select count(*) from worker
```

The Output tab shows the result of the query: '1 342'. The Statistics tab shows the execution details: 'SYSTEM [21:54:21] 1 row selected in 0.010 seconds'.

The screenshot shows the Oracle SQL Developer interface. The SQL tab contains the following code:

```
SQL Output Statistics
delete from worker
  where workerid in (select workerid from belongs_to
    where depid in (select depid from department
      where healthinstid in (select healthinstid from healthinstitution)));
ROLLBACK;
```

The Output tab shows the result: (no result set). The status bar at the bottom indicates "SYSTEM" and "[21:55:37] Done in 0.000 seconds".

כעת נשלוף את כל הרשומות וגם את כמות העובדים ונקבל:

The screenshot shows the Oracle SQL Developer interface. The SQL tab contains the following code:

```
SQL Output Statistics
select count(*) from worker
```

The Output tab displays the results of the COUNT(*) query:

COUNT(*)
342

The status bar at the bottom indicates "SYSTEM" and "[21:56:13] 1 row selected in 0.010 seconds".

ביצוע SELECT

SQL Output Statistics

```
select * from worker
```

The screenshot shows a database interface with a toolbar at the top and a table below. The table has 14 rows, each representing a worker with columns: WORKERID, WORKERNAME, CITIZENID, ITSBOSS_WORKERID, SALARY, TYPE, STARTDATE, and ENDDATE. The data includes names like David Gyllenhaal, Kim Glover, Rick Jeter, etc., and various salary and start/end dates.

	WORKERID	WORKERNAME	CITIZENID	ITSBOSS_WORKERID	SALARY	TYPE	STARTDATE	ENDDATE
▶	1	5005 David Gyllenhaal	878	5000	21384	2	16/12/2019	16/12/
	2	5007 Kim Glover	848	5000	22672.8	2	25/07/2015	25/07/
	3	5010 Rick Jeter	676	5000	8672	2	04/01/2008	04/01/
	4	5011 Mae Cherry	731	5002	10591	2	16/05/2015	16/05/
	5	5013 Mia Strathairn	853	5004	21638.4	2	17/05/2015	17/05/
	6	5014 Rosanna Napolitano	642	5006	26394	1	29/03/2009	29/03/
	7	5016 Mykelti Berenger	325	5007	25792.8	2	14/04/2008	14/04/
	8	5017 Albertina Mellencamp	877	5005	5734.8	2	20/01/2013	20/01/
	9	5018 Ellen Kutcher	914	5009	11830	1	01/11/2011	01/11/
	10	5019 Sarah Turturro	578	5009	15426	1	10/07/2017	10/07/
	11	5020 Nikka Soul	175	5002	10439	1	05/04/2020	05/04/
	12	5022 Anna Rains	341	5006	16873	1	25/12/2016	25/12/
	13	5023 Jessica Dolenz	155	5010	9141	2	26/11/2013	26/11/
	14	5024 Iov Reeve	331	5006	20223	1	03/11/2013	03/11/

ניתן לראות שעת הנעשה אין להшиб במקרה שכזה, (כנראה בשחזר מידע מקטועי ניתן)

-VIEWS

1. ייצרת VIEW המציג את העובדים שהגיעו לגיל הפנסיה

SQL Output Statistics

```
CREATE VIEW PENSION_WORKER AS
SELECT workerid, workername, birthdate
FROM WORKER
WHERE EXTRACT(YEAR FROM TO_DATE(birthdate, 'DD-MM-RR')) < 1953;
```

SQL Output Statistics

```
select * from PENSION_WORKER
```

	WORKERID	WORKERNAME	BIRTHDATE
▶ 1	90523324	Rowan Walters	15/04/1952
2	599701445	Peyton Griffith	22/10/1951
3	69683187	Teagan Fritz	22/09/1951
4	163199704	Tamia Mercado	03/11/1951

נבדק את שמות העובדים ע"י שרשור_P המסמל את הותם פנסיונרים של המשרד

SQL Output Statistics

```
UPDATE PENSION_WORKER
SET WORKERNAME = CONCAT(WORKERNAME, '_P');
```

להלן התוצאה:

SQL Output Statistics

```
select * from PENSION_WORKER
```

	WORKERID	WORKERNAME	BIRTHDATE
▶ 1	90523324	Rowan Walters_P	15/04/1952
2	599701445	Peyton Griffith_P	22/10/1951
3	69683187	Teagan Fritz_P	22/09/1951
4	163199704	Tamia Mercado_P	03/11/1951

2. יצרת VIEW המציג את האזרחים הגרים בעיר הנמצאת באזורי 9

```
create view area_9 as
select * from citizen where cityid in
(select cityid from city where areaid = 9)
```

SQL Output Statistics

```
select * from area_9
```

	CITIZENID	CITIZENNAME	PHONE NUMBER	ADDRESS	CITYID
▶	1	6 Nastassja Rollins	00524253197	63 O'Keefe Street	8
	2	11 Joaquim Flemyngh	0092380230	51 Sedgwick Road	15
	3	14 Rick Sizemore	0042712645	80 Cliff Street	8
	4	20 Rich Rourke	00526188579	36 Fehr Street	22
	5	30 Jim Streep	00542233386	47 Bautzen	22
	6	36 Shirley Kennedy	0041306397	24 Magnuson	15
	7	40 Belinda Reeves	00546449823	221 Chirignago Street	8
	8	73 Cevin Plummer	00521748329	68 Zooey Street	15
	9	77 Adina Cartlidge	0039318552	259 Patty Blvd	8
	10	112 Beth Cheadle	0'055'0505077614	796 MacLachlan Street	22
	11	118 Merillee Hughes	0085681993	7 Saxon Blvd	22
	12	121 Jackson Kravitz	0037094481	62 Narrows	18
	13	122 Val Trejo	0094271759	83 Chur Drive	18
	14	131 Karon Leachman	0097640526	8 Nikki Street	18
	15	132 Julia Jones	00544920083	7 Malmö Street	22
	16	137 Maury Landau	00534310018	9 Mitra Road	18
	17	140 Kelli Gryner	00533718897	47 Butner Street	18
	18	145 Madeleine Dickinson	0'055'0507311052	81 Plummer Road	18
	19	147 Kevn Eckhart	00533897373	22 Cleodus Drive	8
	20	148 Seann Stanton	00535477247	66 Adelaide Ave	22
	21	153 Carol Spader	00526028416	403 Macht Road	8
	22	154 Marlon Rowlands	0'055'0505300324	91 Santa Clarita Street	22
	23	160 Beverley Nivola	0031817774	4 Holbrook Drive	22
	24	189 Karon Zeta-Jones	0034232142	81 Jonze Road	8
	25	190 Daryl Cube	00547855094	32 Clinton Drive	8

2:1 SYSTEM [23:51:21] 161 rows selected in 0.080 seconds

נמצע עדכון של אזרח הגר ב 126 ו עבר דירה ל 115

	CITIZENID	CITIZENNAME	PHONE NUMBER	ADDRESS	CITYID
105	747	Hector Pleasence	00525266202	838 Yaphet Street	22
106	767	Temuera Berkoff	0087622219	43rd Street	22
98	705	Jack Purefoy	0046320573	92 Taryn Drive	22
102	734	Garth DeVita	0'055'0508273812	96 Detmer Drive	22
58	429	Jaime Marie	00528656052	37 Alfred	22
59	439	Keith Withers	00539311360	73rd Street	22
53	377	Corey Brown	0082665687	82 Roberts Road	22
54	387	Rachel Cummings	00546655102	91st Street	22
72	512	Lesley Mathis	0036230411	32 Shorter Road	22
75	534	Geoffrey Streep	00546032601	85 Hirsch Drive	22
65	480	Rosie Finn	0027761861	76 Todd Road	22
66	490	Juliana MacDowell	0036846770	531 Highlands Ranch Blvd	22
150	375972455	Amiya Drake	(915) 878-9537	47 Hazelnut Avenue	108
155	70822249	Peyton Griffith	(809) 797-1096	48 Harbor Avenue	115
▶ 151	121670810	Aiyana Hahn	(874) 698-3483	57 Storm Lane	115
156	365963339	Miracle Gould	(658) 950-6485	21 Old Lane	118
159	55937608	Ariel Little	(286) 596-0144	5 Paradise Way	118
152	972999281	Janae Nicholson	(446) 871-4078	44 Nightingale Avenue	118
153	49629406	Mayra Mcgee	(465) 501-2208	29 Archer Lane	126
161	742852779	Noelle Butler	(207) 369-5153	61 Temple Lane	143
160	434932129	Valery Leach	(599) 541-6077	9 Green Route	143
154	908000615	Alma Benson	(468) 917-8598	82 Spring Avenue	143
157	710935253	Olivia Duncan	(841) 486-2290	111 Barley Avenue	143
158	360147273	Kiley Compton	(399) 339-4007	74 Anchor Route	143

```
update area_9
set CITYID = 115 where CITYID=126;|
```

```
select * from area_9
```

	CITIZENID	CITIZENNAME	PHONE NUMBER	ADDRESS	CITYID
158	360147273	Kiley Compton	(399) 339-4007	74 Anchor Route	143
157	710935253	Olivia Duncan	(841) 486-2290	111 Barley Avenue	143
154	908000615	Alma Benson	(468) 917-8598	82 Spring Avenue	143
161	742852779	Noelle Butler	(207) 369-5153	61 Temple Lane	143
160	434932129	Valery Leach	(599) 541-6077	9 Green Route	143
152	972999281	Janae Nicholson	(446) 871-4078	44 Nightingale Avenue	118
159	55937608	Ariel Little	(286) 596-0144	5 Paradise Way	118
156	365963339	Miracle Gould	(658) 950-6485	21 Old Lane	118
151	121670810	Aiyana Hahn	(874) 698-3483	57 Storm Lane	115
155	70822249	Peyton Griffith	(809) 797-1096	48 Harbor Avenue	115
153	49629406	Mayra Mcgee	(465) 501-2208	29 Archer Lane	115
150	375972455	Amiya Drake	(915) 878-9537	47 Hazelnut Avenue	108
66	490	Juliana MacDowell	0036846770	531 Highlands Ranch Blvd	22
65	480	Rosie Finn	0027761861	76 Todd Road	22
59	439	Keith Withers	00539311360	73rd Street	22
72	512	Lesley Mathis	0036230411	32 Shorter Road	22
90	643	Cyndi Harry	0084957478	57 Jude	22
81	581	Vincent Peniston	0024412736	63 Cash Ave	22
75	534	Geoffrey Streep	00546032601	85 Hirsch Drive	22
46	309	Mira Dukakis	0091227264	323 Thora Road	22
44	301	Gladys Hackman	00548296789	1 Colleen	22
43	284	Frances Pryce	0'055'0507991021	45 Robinson Road	22
50	350	Nicholas Diggs	00528731955	8 Belinda Street	22
58	429	Jaime Marie	00528656052	37 Alfred	22
54	387	Rachel Cummings	00546655102	91st Street	22

– נבצע מחיקה על האזרכחים הגרים ב-115

כמובן שלא נצליח, לא ניתן למחוק, יש רפרנס בטבלה אחרת.

שלב הפרויקציות והפונקציות

שלב הפרויקציות ותהליכי מתזמנים

תיאור המשימה

נדרשו לנתח פ羅צדרות או טריגרים בקוד PLSQL לביצוע פעולות שלא ניתן לבצע לביצוע באמצעות שאילותות SQL רגילות, כדוגמת אירועים או במעבר איטרטיבי על הטבלאות. נציין כי השתמשנו ב- cursor . בשלב איחוד האגפים בדו"ח זה. (עמוד 13).

1. נציג פ羅צדרה המתקבלת את משכורת העובד ומבצעת לו הعلاה בשכר

```
create procedure raise_salary(x in out float) is
begin
    x := x*1.1;
end;
```

לדוגמא,

```
DECLARE
    a number;
BEGIN
    a:= 1;
    raise_salary(a);
    dbms_output.put_line('new salary: ' || a);
END; |
```

לאחר ההרצה הפלט שהתקבל:

Output

new salary: 1.1

2. נגידר פונקציה מקבלת מס' עיר ומחזירה את מס' העובדים אשר גרים באותו העיר

```
CREATE OR REPLACE FUNCTION totalWorkers(city_id in number)
RETURN number IS
    total number := 0;
BEGIN
    SELECT count(*) into total
    FROM worker
    WHERE citizenid IN (
        SELECT citizenid
        FROM citizen
        WHERE cityid = city_id
    );
    RETURN total;
END;
```

- נפעיל את הפונקציה -

```
DECLARE
    a number;
    c number;
BEGIN
    a := 1;
    c := totalWorkers(a);
    dbms_output.put_line('Total no. of Workers: ' || c);
END;
```

- להלן התוצאה -

Output

Total no. of Workers: 10

טריגר –

נכטוב טריגר שמופעל בכל פעם שמבצע שינוי בזמן הפגישה.

```
create or replace noneditionable trigger changeSchedule
  AFTER INSERT OR UPDATE ON SCHEDULE
  FOR EACH ROW
begin
  dbms_output.put_line('CLERCKID - ' || :new.CLERKID);
  dbms_output.put_line('CITIZENID - ' || :new.CITIZENID);
  dbms_output.put_line('OLD MEETING TIME WAS - ' || :old.MEETINGTIME);
  dbms_output.put_line('THE NEW MEETINGTIME IS - ' || :new.MEETINGTIME);
  dbms_output.put_line('-----');
end changeSchedule;
/
update schedule
set meetingtime = TO_DATE('01/05/2020', 'DD-MM-RR')
where clerkid = 43
```

לצערי בחלון Output לא הופיע דבר. אך לא התקבלה שגיאה בעת הרצת הטריגר.

The screenshot shows the Oracle SQL Developer interface. The top menu bar has tabs for 'SQL', 'Output' (which is selected), and 'Statistics'. The main area contains the PL/SQL code for the trigger:

```
create or replace noneditionable trigger changeSchedule
  AFTER INSERT OR UPDATE ON SCHEDULE
  FOR EACH ROW
begin
  dbms_output.put_line('CLERCKID - ' || :new.CLERKID);
  dbms_output.put_line('CITIZENID - ' || :new.CITIZENID);
  dbms_output.put_line('OLD MEETING TIME WAS - ' || :old.MEETINGTIME);
  dbms_output.put_line('THE NEW MEETINGTIME IS - ' || :new.MEETINGTIME);
  dbms_output.put_line('-----');
end changeSchedule;
/
update schedule s
set s.meetingtime = TO_DATE('22/05/2020', 'DD-MM-RR')
where s.clerkid = 43
```

At the bottom of the interface, there is a status bar showing the time '13:32', the session name 'SYSTEM', and the message '[19:09:13] Done in 0.014 seconds'.