

Homework 3

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Trigger1

```
create or replace trigger ACCENSIONESPEGNIMENTOTELEFONO
after insert on STATE_CHANGE
for each row
when (new.CHANGETYPE = 'O' OR new.CHANGETYPE = 'F')
declare
    CellaDiAppartenenza NUMBER;

begin
    --Ricavo cella a cui il telefono apparterrà/apparteneva (suppongo che esista e sia
    unica)
    SELECT CELLID into CellaDiAppartenenza
    FROM CELL
    WHERE X0<=:new.X AND :new.X<X1 AND
           Y0<=:new.Y AND :new.Y<Y1;

    if (:new.CHANGETYPE='O') then
        --Accensione telefono
        INSERT INTO TELEPHONE (PHONENO, X, Y, PHONESTATE)
        VALUES (:new.PHONENO, :new.X, :new.Y, 'On');

        UPDATE CELL
        SET CURRENTPHONE#=CURRENTPHONE#+1
        WHERE CELLID=CellaDiAppartenenza;

    else
        --Spegnimento telefono (:new.CHANGETYPE='F')
        DELETE FROM TELEPHONE
        WHERE PHONENO=:new.PHONENO;

        UPDATE CELL
        SET CURRENTPHONE#=CURRENTPHONE#-1
        WHERE CELLID=CellaDiAppartenenza;

    end if;

end;
```

DB BEFORE:

DB AFTER 1a:

DB AFTER1 b:

CELLID	X0	Y0	X1	Y1	CURRENTPHONE#	MAXCALLS
1	0.00	0.00	10.00	10.00	0.00	3
2	10.00	0.00	20.00	10.00	0.00	20
3	0.00	10.00	10.00	20.00	0.00	20
4	10.00	10.00	20.00	20.00	0.00	20

PHONENO	X	Y	PHONESTATE
333000010	3.00	3.00	ON
333000009	15.00	15.00	ON

CHANGEID	TIMESTAMP	PHONENO	X	Y	CHANGETYPE
1	2020-12-04 10:43:05	333000010	3.00	3.00	O
2	2020-12-04 10:43:09	333000009	15.00	15.00	O

CELLID	X0	Y0	X1	Y1	CURRENTPHONE#	MAXCALLS
1	0.00	0.00	10.00	10.00	1	3
2	10.00	0.00	20.00	10.00	0.00	20
3	0.00	10.00	10.00	20.00	0.00	20
4	10.00	10.00	20.00	20.00	1	20

PHONENO	X	Y	PHONESTATE
333000010	3.00	3.00	ON
333000009	15.00	15.00	ON

CHANGEID	TIMESTAMP	PHONENO	X	Y	CHANGETYPE
1	2020-12-04 10:43:05	333000010	3.00	3.00	O
2	2020-12-04 10:43:09	333000009	15.00	15.00	O

CELLID	X0	Y0	X1	Y1	CURRENTPHONE#	MAXCALLS
1	0.00	0.00	10.00	10.00	1	3
2	10.00	0.00	20.00	10.00	0.00	20
3	0.00	10.00	10.00	20.00	0.00	20
4	10.00	10.00	20.00	20.00	0.00	20

PHONENO	X	Y	PHONESTATE
333000010	3.00	3.00	ON

CHANGEID	TIMESTAMP	PHONENO	X	Y	CHANGETYPE
1	2020-12-04 10:43:05	333000010	3.00	3.00	O
2	2020-12-04 10:43:09	333000009	15.00	15.00	O
3	2020-12-04 10:47:58	333000009	15.00	15.00	F

Trigger2

```
create or replace trigger InizioTelefonata
after insert on STATE_CHANGE
for each row
when (new.CHANGETYPE = 'C')
declare
    CellaDiAppartenenza NUMBER;
    X0Cella NUMBER;
    X1Cella NUMBER;
    Y0Cella NUMBER;
    Y1Cella NUMBER;
    ChiamateGestibili NUMBER;
    ChiamateInCorso NUMBER;
    HighestExId NUMBER;

begin
    --Ricavo cella a cui il telefono appartiene (suppongo che esista e sia unica) e numero
    massimo di chiamate gestibili da quella cella
    SELECT CELLID, X0, X1, Y0, Y1, MAXCALLS into CellaDiAppartenenza, X0Cella, X1Cella,
    Y0Cella, Y1Cella, ChiamateGestibili
    FROM CELL
    WHERE X0<=:new.X AND :new.X<X1 AND
           Y0<=:new.Y AND :new.Y<Y1;

    --Ricavo numero di chiamate in corso su quella cella
    SELECT COUNT(*) into ChiamateInCorso
    FROM TELEPHONE
    WHERE PHONESTATE='Active' AND
           X0Cella<=X AND X<X1Cella AND
           Y0Cella<=Y AND Y<Y1Cella;

    if (ChiamateGestibili>ChiamateInCorso) then
        --Effettuo chiamata cambiando stato del telefono e diminuendo MaxCalls nella cella
        di appartenenza
        UPDATE TELEPHONE
        SET PHONESTATE='Active'
        WHERE PHONENO=:new.PHONENO;

    else
        --Numero massimo di chiamate raggiunto: inserisco nuova eccezione trovando l'exid
        successivo per la cella di appartenenza
        SELECT MAX(EXID) into HighestExId
        FROM EXCEPTION_LOG
        WHERE CELLID=CellaDiAppartenenza;

        if (HighestExId IS NULL) then
            --Non è ancora presente nessuna eccezione per la cella di appartenenza
            HighestExId:=0;
        end if;

        INSERT INTO EXCEPTION_LOG (EXID, CELLID, EXCEPTIONTYPE)
        VALUES (HighestExId+1, CellaDiAppartenenza, 'M');

    end if;

end;
/
```

DB AFTER 2:

Trigger1.sql

Trigger2.sql

Trigger3.sql

console_4

CELL

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4 rows

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Comma...d (CSV)

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CELL

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Q: <Filter Criteria>

	CELLID	X0	Y0	X1	Y1	CURRENTPHONE#	MAXCALLS
1	1	0.00	0.00	10.00	10.00	4	3
2	2	10.00	0.00	20.00	10.00	0.00	20
3	3	0.00	10.00	10.00	20.00	0.00	20
4	4	10.00	10.00	20.00	20.00	0.00	20

TELEPHONE

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4 rows

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Comma...d (CSV)

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TELEPHONE

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Q: <Filter Criteria>

	PHONENO	X	Y	PHONESTATE
1	333000010	3.00	3.00	Active
2	333000020	4.00	4.00	On
3	333000001	3.00	3.00	Active
4	333000004	5.00	5.00	Active

EXCEPTION_LOG

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1 row

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Comma...d (CSV)

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EXCEPTION_LOG

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Q: <Filter Criteria>

	EXID	CELLID	EXCEPTIONTYPE
1	1	1	M

STATE_CHANGE

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10 rows

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STATE_CHANGE

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Q: <Filter Criteria>

	CHANGEID	TIMESTAMP	PHONENO	X	Y	CHANGETYPE
1	1	2020-12-04 12:20:48	333000010	3.00	3.00	O
2	2	2020-12-04 12:20:49	333000009	15.00	15.00	O
3	3	2020-12-04 12:20:49	333000009	15.00	15.00	F
4	4	2020-12-04 12:20:49	333000001	3.00	3.00	O
5	5	2020-12-04 12:20:49	333000004	5.00	5.00	O
6	6	2020-12-04 12:20:49	333000004	5.00	5.00	C
7	7	2020-12-04 12:20:50	333000001	3.00	3.00	C
8	8	2020-12-04 12:20:50	333000010	3.00	3.00	C
9	9	2020-12-04 12:20:50	333000020	4.00	4.00	O
10	10	2020-12-04 12:21:03	333000020	4.00	4.00	C

Trigger3

```
create or replace trigger DiminuzioneMaxCalls
before update of MAXCALLS ON CELL
for each row
when (new.MAXCALLS < old.MAXCALLS)
declare
    ChiamateInCorso NUMBER;

begin
    --Ricavo numero di chiamate in corso sulla cella che si vuole modificare
    SELECT COUNT(*) into ChiamateInCorso
    FROM TELEPHONE
    WHERE PHONESTATE='Active' AND
           :old.X0<=X AND X<:old.X1 AND
           :old.Y0<=Y AND Y<:old.Y1;

    if (:new.MAXCALLS<ChiamateInCorso) then
        --Ci sono più chiamate in corso rispetto a quanto si vorrebbe mettere come
        capacità massima
        :new.MAXCALLS := ChiamateInCorso;
    end if;

end;
```

/

DB AFTER 3:

Trigger1.sqlTrigger2.sqlTrigger3.sqlconsole_4CELL

<4 rows>

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Tx Auto

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Comma...d (CSV)

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CELL

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Q: <Filter Criteria>

	CELLID	X0	Y0	X1	Y1	CURRENTPHONE#	MAXCALLS
1	1	0.00	0.00	10.00	10.00	4	3
2	2	10.00	0.00	20.00	10.00	0.00	18
3	3	0.00	10.00	10.00	20.00	0.00	18
4	4	10.00	10.00	20.00	20.00	0.00	18

TELEPHONE

<4 rows>

+

Tx Auto

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Comma...d (CSV)

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TELEPHONE

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Q: <Filter Criteria>

	PHONENO	X	Y	PHONESTATE
1	333000010	3.00	3.00	Active
2	333000020	4.00	4.00	On
3	333000001	3.00	3.00	Active
4	333000004	5.00	5.00	Active

EXCEPTION_LOG

<1 row>

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Comma...d (CSV)

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EXCEPTION_LOG

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Q: <Filter Criteria>

	EXID	CELLID	EXCEPTIONTYPE
1	1	1	M

STATE_CHANGE

<10 rows>

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Comma...d (CSV)

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STATE_CHANGE

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Q: <Filter Criteria>

	CHANGEID	TIMESTAMP	PHONENO	X	Y	CHANGETYPE
1	1	2020-12-04 13:58:20	333000010	3.00	3.00	O
2	2	2020-12-04 13:58:20	333000009	15.00	15.00	O
3	3	2020-12-04 13:58:20	333000009	15.00	15.00	F
4	4	2020-12-04 13:58:20	333000001	3.00	3.00	O
5	5	2020-12-04 13:58:21	333000004	5.00	5.00	O
6	6	2020-12-04 13:58:21	333000004	5.00	5.00	C
7	7	2020-12-04 13:58:21	333000001	3.00	3.00	C
8	8	2020-12-04 13:58:21	333000010	3.00	3.00	C
9	9	2020-12-04 13:58:21	333000020	4.00	4.00	O
10	10	2020-12-04 13:58:21	333000020	4.00	4.00	C

Trigger4

```
create or replace trigger GaranziaServizio
after update of MAXCALLS on CELL
--statement
declare
MaxCallsTot NUMBER;

begin
--MaxCallsTot non sarà NULL perchè il trigger si attiva solo in risposta ad un update,
quindi CELL non può essere vuota
SELECT SUM(MAXCALLS) into MaxCallsTot
FROM CELL;

if(MaxCallsTot < 30) then
    RAISE_APPLICATION_ERROR(-20000, 'Garanzia di Servizio non rispettata');
end if;
end;
/
DB AFTER 4:
```

The screenshot displays a database management interface with several tables and a console log. The tables shown are CELL, EXCEPTION_LOG, TELEPHONE, and STATE_CHANGE. The console log at the bottom shows the execution of a trigger named 'GaranziaServizio' which raised an application error.

CELLID	X0	Y0	X1	Y1	CURRENTPHONE#	MAXCALLS
1	0.00	0.00	10.00	10.00	4	3
2	10.00	0.00	20.00	10.00	0.00	17
3	0.00	10.00	10.00	20.00	0.00	17
4	10.00	10.00	20.00	20.00	0.00	17

EXID	CELLID	EXCEPTIONTYPE
1	1	1 M

PHONENO	X	Y	PHONESTATE
333000010	3.00	5.00	Active
333000020	4.00	4.00	On
333000001	3.00	3.00	Active
333000004	5.00	5.00	Active

CHANGEID	TIMESTAMP	PHONENO	X	Y	CHANGETYPE
1	2020-12-04 13:58:20	333000010	3.00	5.00	U
2	2020-12-04 13:58:20	333000009	15.00	15.00	0
3	2020-12-04 13:58:20	333000009	15.00	15.00	F
4	2020-12-04 13:58:20	333000001	3.00	3.00	0
5	2020-12-04 13:58:21	333000004	5.00	5.00	0
6	2020-12-04 13:58:21	333000004	5.00	5.00	C
7	2020-12-04 13:58:21	333000001	3.00	3.00	C
8	2020-12-04 13:58:21	333000010	3.00	5.00	C
9	2020-12-04 13:58:21	333000020	4.00	4.00	0
10	2020-12-04 13:58:21	333000020	4.00	4.00	C

Services

TX: »SYSTEM» UPDATE CELL SET MaxCalls = MaxCalls -10

console [2020-12-04 15:23:31] [72000][20000]

ORA-20000: Garanzia di Servizio non rispettata

EXCEP [2020-12-04 15:23:31] ORA-06512: at "SYSTEM.GARANZIASERVIZIO", Line 10

EXC [2020-12-04 15:23:31] ORA-04080: error during execution of trigger 'SYSTEM.GARANZIASERVIZIO'

Trigge [2020-12-04 15:23:31] Position: 7