-- Ex.1

create or replace trigger CheckUpdateYrsServed

before update of yrs\_serv

on President

for each row

begin

if :new.yrs\_serv < :old.yrs\_serv

then

raise\_application\_error(-20000, 'You cannot decrease...');

end if;

end;

-- Test:

update President

set yrs\_serv = 0

where pres\_name = 'BUSH G';

-- Ex.2 (with a simple cursor)

create or replace trigger CheckVotesPerYear

after insert or update of votes, election\_year

on Election

declare

cursor c\_elec is

select distinct election\_year

from Election;

sumVotes number;

begin

for r\_elec in c\_elec loop

select sum(votes) into sumVotes

from Election

where election\_year = r\_elec.election\_year;

if sumVotes > 538

then

raise\_application\_error(-20000,'Too many votes in ' || r\_elec.election\_year);

end if;

end loop;

end;

-- Test:

update Election

set votes = 175

where candidate = 'MCCAIN J'

and election\_year = 2008;

-- Ex.3 (the same solution as ex.2, but now with a “smart” cursor)

create or replace trigger CheckHobbiesPerPres

after insert or update of pres\_name

on Pres\_Hobby

declare

cursor c\_pres is

select count(\*) as countHobbies

from Pres\_Hobby

group by pres\_name;

begin

for r\_pres in c\_pres loop

if r\_pres.countHobbies > 5

then

raise\_application\_error(-20000,'Too many hobbies..');

end if;

end loop;

end;

-- Test:

insert into Pres\_Hobby

values('ROOSEVELT T', 'PINGPONG');

--Ex.4 **(a row trigger is allowed here, because we don’t need the Administration table in**

**-- the trigger block!!!)**

create or replace trigger CheckAgePres

before insert or update of year\_inaugurated

on Administration

for each row

declare

v\_birth\_yr President.birth\_yr%type;

begin

select birth\_yr into v\_birth\_yr

from President

where pres\_name = :new.pres\_name;

if (:new.year\_inaugurated - v\_birth\_yr) < 21

then

raise\_application\_error(-20000, 'Too young for being a president!');

end if;

end;

-- Test:

insert into administration

values(57, 'OBAMA B', 1980);

**-- Second part: a trigger on the table President in case that the birth year of a president is changed**

**create or replace trigger checkInaugBirth\_Pres**

before update of birth\_yr

on President

for each row

declare

minYearInaug Administration.year\_inaugurated%type;

begin

select min(year\_inaugurated) into minYearInaug

from Administration

where pres\_name = :new.pres\_name;

if (minYearInaug - :new.birth\_yr) < 21 then

raise\_application\_error(-20111, 'Too young!');

end if;

end;

-- Test:

update President

set birth\_yr = 2000

where pres\_name = 'OBAMA B';

-- Ex.5 (with a “smart” cursor like in ex. 3)

create or replace trigger CheckWinners

after insert or update of winner\_loser\_indic

on Election

declare

cursor c\_elec is

select count(\*) as countW

from Election

where upper(winner\_loser\_indic) = 'W'

group by election\_year;

begin

for r\_elec in c\_elec loop

if r\_elec.countW > 1

then

raise\_application\_error(-20000, 'Too many winners!');

end if;

end loop;

end;

-- Test:

insert into Election

values(2004, 'PAUL', 1, 'W');