

* Constraints

- are correctness tests
 - = you specify them in SQL
 - = the DBMS enforces them

* Triggers:

- event/condition /
action rules



Human-subject study (HSJ)

(1) Name

(2) Date

(3) TSS [time spent
sleeping]

HR

(4) TSO [time spent
online]



Constraint:

Sum of TSS
and TS0 ≤ 24 (hours)

CREATE TABLE HSS

(name ,

date ,

TSS ,

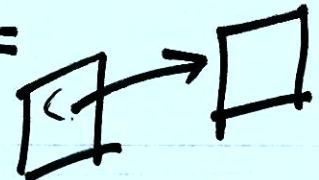
TS0 ,

CHECK (TSS + TS0 ≤ 24);



Tuple-based checks:

can be used to
express the full
power of



- foreign-key constraints?
- functional dependencies?

$$\boxed{A \rightarrow \underline{B}}$$



[campus]

If

enrollment

< 10,000

then

rank > 5

AND
OR
NOT

CHECK (enrollment >= 10000
OR rank > 5)



If A then B
(implication)

((NOT A) OR B)



In CREATE TABLE :

can express

- primary keys
- NOT NULL
- UNIQUE
- foreign keys
- attribute-based checks
- tuple-based checks



Assertions

[CREATE
ASSERTION]

- Boolean conditions on the db

Triggers

[CREATE
TRIGGER]

[EVENT
CONDITION
ACTION]) rules



Average GPA > 3.0

AND ✓ Average SAT > 1200

CREATE ASSERTION HIGHVALS

CHECK (

3.0 < (SELECT avg(GPA)
FROM student)

AND

1200 < (SELECT avg(SAT)
FROM student);



Student:

ID	GPA	SAT
2	4.0	1200
3	2.1	1300

1. Trying to insert

(1 0.0 1)

- rejected

2. Trying to delete (2 4.0 1200)

- rejected



A student with $GPA < 3.0$ can only
apply to campuses with rank > 4

Undesirable combination:

A student with $GPA < 3.0$ who has
applied to a campus with
rank ≤ 4



CREATE ASSERTION
Restrict Apps

CHECK (NOT EXISTS

(SELECT * from
Student S, Apply A,
Campus C
where S.ID = A.ID AND
A.location = C.location
AND S.GPA < 3.0
AND C.RANK <= 4));



Can you use
assertions to express
the full power of
- foreign keys?
- FD?



If an application tuple is inserted for a student with GPA > 3.9 to NCSU
 ⇒ set decision to 'y'] action

CREATE TRIGGER AutoAccept
 AFTER INSERT ON Apply] event
 REFERENCING NEW AS NewApp
 WHEN (NewApp.location = 'NCSU'
 AND 3.9 < (SELECT GPA
 FROM Student WHERE
 ID = NewApp.ID))

condition

(E)

action UPDATE Apply
SET decision = 'Y'
WHERE ID = NewApp. ID
AND location
= NewApp. Location
FOR EACH Row;

