J Y

CS166 Lab 4

due Monday May 3rd, 2021

1. List the year and title of each book
$\Pi_{Title,Year}(BOOKS)$

SELECT Title, Year
FROM BOOKS;

2. List all information about students whose major is CS
$\Pi_{StId,StName,Major,Year}(\sigma_{Major="CS"}(STUDENTS))$

$\sigma_{Major="CS"}(STUDENTS)$

SELECT *
FROM STUDENTS
WHERE Major = "CS";

3. List all students with books they can borrow
$\Pi_{StId,StName,Tile}(STUDENTS \bowtie borrows)$

$STUDENTS \times BOOKS$

SELECT *
FROM STUDENTS, BOOKS;

4. List all books published by McGraw-Hill before 1990
$\Pi_{Tile}(\sigma_{Year<1990\ AND\ Publisher="McGraw-Hill"}(BOOKS))$

SELECT Title
FROM BOOKS
WHERE Year< 1990 AND Publisher = "McGraw-Hill";

5. List the name of those authors who are living in Davis
$\Pi_{AName}(\sigma_{Address="Davis"}(AUTHORS))$

SELECT AName
FROM AUTHORS
WHERE Address="Davis";

6. List the name of students who are older than 30 and who are not studying CS
$\Pi_{StName}(\sigma_{Year>30}(STUDENTS)) - \Pi_{StName}(\sigma_{Major="CS"}(STUDENTS))$

SELECT StName

FROM STUDENTS
WHERE Year> 30
EXCEPT
SELECT StName
FROM STUDENTS
WHERE Major="CS";

7. Rename AName in the relation AUTHORS to Name
$\rho_{AUTHORS(Name,Address)}(AUTHORS)$

ALTER TABLE AUTHORS
RENAME **COLUMN** AName **to** Name;

8. List the names of all students who have borrowed a book and who are CS majors
$\Pi_{StName}((\sigma_{Major="CS"}(STUDENTS)) \bowtie borrows)$

SELECT S.StName
FROM borrows B, STUDENTS S
WHERE B.Major=S.Major **AND** S.Major="CS";

9. List the title of books written by the author "Jones"
$\Pi_{Title}(BOOKS \bowtie (\sigma_{AName="Jones"}(has\text{-}written)))$

SELECT B.Title
FROM BOOKS B, has-written H
WHERE B.AName=H.AName **AND** H.AName="Jones";

10. As previous, but not books that have the keyword "database"
$\Pi_{Title}(BOOKS \bowtie (\sigma_{AName="Jones"}(has\text{-}written) \bowtie (describes - \sigma_{Keyword='database'}(describes))$

SELECT B.Title
FROM BOOKS B, has-written H, describes D
WHERE B.AName=H.AName **AND** H.AName = D.AName **AND** H.AName="Jones"
EXCEPT
SELECT B.Title
FROM BOOKS B, has-written H, describes D
WHERE B.AName=H.AName **AND** H.AName = D.AName **AND** H.AName="Jones" **AND** D.Keyword="database";

11. Find the name of the youngest student
$\Pi_{StName}(STUDENTS) - \Pi_{S1.StName}(\sigma_{S1.Year>S2.Year}(\rho_{S1}(STUDENTS) \times \rho_{S2}(STUDENTS))$

SELECT StName
FROM STUDENTS
WHERE Year=(**SELECT MIN**(Year) **FROM** STUDENTS);

12. Find the title of the oldest book
$\Pi_{Title}(BOOKS) - \Pi_{R1.Title}(\sigma_{R1.Year>R2.Year}(\rho_{R1}(BOOKS) \times \rho_{R2}(BOOKS)))$

SELECT Title
FROM BOOKS
WHERE Year=(**SELECT MIN**(Year) **FROM** BOOKS);