Christian Campos
Lab 4 - CS166

- **BOOKS**(DocId, Title, Publisher, Year)
- **STUDENTS**(StId, StName, Major, Age)
- **AUTHORS**(AName, Address)
- **borrows**(DocId, StId, Date)
- **has-written**(DocId, AName)
- **describes**(DocId, Keyword)

1. List the year and title of each book
2. List all information about students whose major is CS
3. List all students with books they can borrow
4. List all books published by McGraw-Hill before 1990
5. List the name of those authors who are living in Davis
6. List the name of students who are older than 30 and who are not studying CS
7. Rename AName in the relation AUTHORS to Name
8. List the names of all students who have borrowed a book and who are CS majors
9. List the title of books written by the author “Jones"
10. As previous, but not books that have the keyword “database"
11. Find the name of the youngest student
12. Find the title of the oldest book

Relational Algebra

1. $\prod_{year,\ title}$ (BOOKS)
2. $\sigma_{major=CS}$ (STUDENTS)
3. STUDENTS X BOOKS
4. $\sigma_{Publisher=McGraw\ Hill}$ (BOOKS) - $\sigma_{Year > 1990}$ (BOOKS)

5. $\prod_{AName} (\sigma_{Address=Davis} (AUTHORS))$

6. $\prod_{StName} (\sigma_{Age > 30} (STUDENTS) - \sigma_{Major=CS} (STUDENTS))$

7. $\rho (Name, \prod_{AName} (AUTHORS))$

8. $\prod_{StName} (STUDENTS \bowtie_{Major=CS} borrows)$

9. $\prod_{Title} (BOOKS \bowtie_{AName=Jones} has\text{-}written)$

10. $\prod_{Title} (BOOKS \bowtie_{AName=Jones} has\text{-}written - BOOKS \bowtie_{Keyword=database} describes)$

11. $\rho (S1, STUDENTS)$
    $\rho (S2, STUDENTS)$
    $\prod_{StName} (S1 - (S1 \bowtie_{S1.Age > S2.Age} S2)$

12. $\rho (B1, BOOKS)$
    $\rho (B2, BOOKS)$
    $\prod_{Title} (B1 - (B1 \bowtie_{B1.Year < B2.Year} B2)$

SQL Query

1. SELECT B.Year, B.Title
   FROM BOOKS B

2. SELECT *
   FROM STUDENTS S
   WHERE S.Major='CS'

3. SELECT *
   FROM STUDENTS, BOOKS

4. SELECT B.Title
   FROM BOOKS B
   WHERE B.Publisher='McGraw-Hill' AND B.Year<1990

5. SELECT A.Aname
   FROM AUTHORS A

```
WHERE A.Address='%Davis%'
```

6.
```
SELECT S.StName
FROM STUDENTS S
WHERE S.Age>30 AND S.Major NOT LIKE 'CS'
```

7.
```
ALTER TABLE AUTHORS
RENAME COLUMN 'Aname' TO 'Name'
```

8.
```
SELECT S.StName
FROM STUDENTS S, borrows B
WHERE S.StId=B.StId AND S.Major='CS'
```

9.
```
SELECT B.Title
FROM BOOKS B, has-written H
WHERE B.DocId=H.DocId AND H.Aname='Jones%'
```

10.
```
SELECT B.Title
FROM BOOKS B, has-written H, describes D
WHERE B.DocId=H.DocId AND H.Aname='Jones%'
AND D.Keyword NOT LIKE 'database'
```

11.
```
SELECT S.StName
FROM STUDENTS S
WHERE S.Age = (SELECT MIN(S2.Age)
                FROM STUDENTS S2)
```

12.
```
SELECT B.Title
FROM BOOKS B
WHERE B.Year = (SELECT MIN(B2.Year)
                 FROM BOOKS B2)
```