CS275 – Intro to Databases

Aggregate Functions

Getting a test set of data

• http://dev.mysql.com/doc/index-other.html

SELECT:
AGGREGATE OPERATORS

• COUNT([DISTINCT] A)
• SUM([DISTINCT] A)
• AVG([DISTINCT] A)
• MAX([DISTINCT] A)
• MIN([DISTINCT] A)
SELECT:
Aggregate Operators

- Sailors(sid:integer, sname:string,rating:integer,age:real)
- Boats(bid:integer, bname: string, color: string)
- Reserves(sid:integer, bid: integer, day: date)

- Find the average age of sailors with a rating of 10
  - SELECT AVG(S.age)
  - FROM Sailors S
  - WHERE S.rating = 10

- Find the name and age of the oldest sailor
SELECT: Aggregate Operators

• Sailors(sid:integer, sname:string, rating:integer, age:real)
• Boats(bid:integer, bname: string, color: string)
• Reserves(sid:integer, bid: integer, day: date)

• Find the name and age of the oldest sailor
  SELECT S.sname, MAX(S.age)
  FROM Sailors S

SELECT: Aggregate Operators

• Sailors(sid:integer, sname:string, rating:integer, age:real)
• Boats(bid:integer, bname: string, color: string)
• Reserves(sid:integer, bid: integer, day: date)

• Find the name and age of the oldest sailor
  SELECT S.sname, S.age
  FROM Sailors S
  WHERE S.age = (SELECT MAX(S2.age)
                 FROM Sailors S2)

SELECT: Aggregate Operators

• Sailors(sid:integer, sname:string, rating:integer, age:real)
• Boats(bid:integer, bname: string, color: string)
• Reserves(sid:integer, bid: integer, day: date)

• Count the number of sailors
SELECT:
Aggregate Operators

- Sailors(sid:integer, sname:string, rating:integer, age:real)
- Boats(bid:integer, bname: string, color: string)
- Reserves(sid:integer, bid: integer, day: date)

- Count the number of sailors
  SELECT COUNT (*)
  FROM Sailors S

SELECT:
Aggregate Operators

- Sailors(sid:integer, sname:string, rating:integer, age:real)
- Boats(bid:integer, bname: string, color: string)
- Reserves(sid:integer, bid: integer, day: date)

- Count the number of different sailor names
  SELECT COUNT (DISTINCT S.sname)
  FROM Sailors S
SELECT:
Aggregate Operators

• Sailors(sid:integer, sname:string,rating:integer,age:real)
• Boats(bid:integer, bname: string, color: string)
• Reserves(sid:integer, bid: integer, day: date)

• Find the names of sailors who are older than the oldest sailor with a rating of 10

SELECT:
Aggregate Operators

• Sailors(sid:integer, sname:string,rating:integer,age:real)
• Boats(bid:integer, bname: string, color: string)
• Reserves(sid:integer, bid: integer, day: date)

• Find the names of sailors who are older than the oldest sailor with a rating of 10

SELECT S.sname
FROM Sailors S
WHERE S.age > (SELECT MAX(S2.age)
FROM Sailors S2
WHERE S2.rating = 10)

SELECT: GROUP BY and HAVING Clauses

• Sailors(sid:integer, sname:string,rating:integer,age:real)
• Boats(bid:integer, bname: string, color: string)
• Reserves(sid:integer, bid: integer, day: date)

• Find the age of the youngest sailor for each rating level

SELECT S.rating, MIN (S.age)
FROM Sailors S
GROUP BY S.rating
SELECT: GROUP BY and HAVING Clauses

- Sailors(sid:integer, sname:string, rating:integer, age:real)
- Boats(bid:integer, bname: string, color: string)
- Reserves(sid:integer, bid: integer, day: date)

- Find the age of the youngest sailor
  SELECT MIN (S.age)
  FROM Sailors S

SELECT: GROUP BY and HAVING Clauses

- Sailors(sid:integer, sname:string, rating:integer, age:real)
- Boats(bid:integer, bname: string, color: string)
- Reserves(sid:integer, bid: integer, day: date)

- Find the age of the youngest sailor who is eligible to vote, i.e. 18 or older, for each level of rating with at least two such sailors
  SELECT S.rating, MIN (S.age) AS minage
  FROM Sailors S WHERE S.age >= 18
  GROUP BY S.rating
  HAVING COUNT(*) > 1
SELECT: GROUP BY and HAVING Clauses

- Sailors(sid:integer, sname:string, rating:integer, age:real)
- Boats(bid:integer, bname: string, color;charset)
- Reserves(sid:integer, bid:integer, day:date)

- Find the age of the youngest sailor who is eligible to vote, i.e., older than 18) for each level of rating with at least two such sailors
  
  SELECT S.rating, MIN(S.age) AS minage
  FROM Sailors S
  WHERE S.age >= 18
  GROUP BY S.rating
  HAVING COUNT(*) > 1

  **Step 1**

SELECT: GROUP BY and HAVING Clauses

- Sailors(sid:integer, sname:string, rating:integer, age:real)
- Boats(bid:integer, bname: string, color;charset)
- Reserves(sid:integer, bid:integer, day:date)

- Find the age of the youngest sailor who is eligible to vote, i.e., older than 18) for each level of rating with at least two such sailors
  
  SELECT S.rating, MIN(S.age) AS minage
  FROM Sailors S
  WHERE S.age >= 19
  GROUP BY S.rating
  HAVING COUNT(*) > 1

  **Step 2**

SELECT: GROUP BY and HAVING Clauses

- Sailors(sid:integer, sname:string, rating:integer, age:real)
- Boats(bid:integer, bname: string, color;charset)
- Reserves(sid:integer, bid:integer, day:date)

- Find the age of the youngest sailor who is eligible to vote, i.e., older than 18) for each level of rating with at least two such sailors
  
  SELECT S.rating, MIN(S.age) AS minage
  FROM Sailors S
  WHERE S.age >= 19
  GROUP BY S.rating
  HAVING COUNT(*) > 1

  **Step 3**
SELECT: GROUP BY and HAVING Clauses

- Sailors(sid:integer, sname:string, rating:integer, age:real)
- Boats(bid:integer, bname: string, color: string)
- Reserves(sid:integer, bid: integer, day: date)

- Find the age of the youngest sailor who is eligible to vote, i.e., older than 18) for each level of rating with at least two such sailors

```sql
SELECT s.rating, MIN(s.age) AS minage
FROM Sailors s
WHERE s.age >= 19
GROUP BY s.rating
HAVING COUNT(*) > 1
```

- Step 4

SELECT: GROUP BY and HAVING Clauses

- Sailors(sid:integer, sname:string, rating:integer, age:real)
- Boats(bid:integer, bname: string, color: string)
- Reserves(sid:integer, bid: integer, day: date)

- Find the age of the youngest sailor who is eligible to vote, i.e., older than 18) for each level of rating with at least two such sailors

```sql
SELECT s.rating, MIN(s.age) AS minage
FROM Sailors s
WHERE s.age >= 19
GROUP BY s.rating
HAVING COUNT(*) > 1
```

- Step 5

SELECT: GROUP BY and HAVING Clauses

- Sailors(sid:integer, sname:string, rating:integer, age:real)
- Boats(bid:integer, bname: string, color: string)
- Reserves(sid:integer, bid: integer, day: date)

- Find the age of the youngest sailor who is eligible to vote, i.e., older than 18) for each level of rating with at least two such sailors

```sql
SELECT s.rating, MIN(s.age) AS minage
FROM Sailors s
WHERE s.age >= 19
GROUP BY s.rating
HAVING COUNT(*) > 1
```

- Step 6
SELECT: GROUP BY and HAVING Clauses

• Sailors(sid:integer, sname:string, rating:integer, age:real)
• Boats(bid:integer, bname: string, color: string)
• Reserves(sid:integer, bid: integer, day: date)

• Find the number of reservations for each red boat

SELECT B.bid, COUNT(*) AS reservationcount
FROM Boats B, Reserve R
WHERE B.bid = R.bid AND B.color = 'Red'
GROUP BY B.bid

SELECT: GROUP BY and HAVING Clauses

• Sailors(sid:integer, sname:string, rating:integer, age:real)
• Boats(bid:integer, bname: string, color: string)
• Reserves(sid:integer, bid: integer, day: date)

• Find the number of reservations for each red boat

SELECT: GROUP BY and HAVING Clauses

• Sailors(sid:integer, sname:string, rating:integer, age:real)
• Boats(bid:integer, bname: string, color: string)
• Reserves(sid:integer, bid: integer, day: date)

• Find the average age of sailors for each rating level that has at least two sailors
SELECT: GROUP BY and HAVING Clauses

- Sailors(sid:integer, sname:string, rating:integer, age:real)
- Boats(bid:integer, bname: string, color: string)
- Reserves(sid:integer, bid: integer, day: date)

- Find the average age of sailors for each rating level that has at least two sailors
  SELECT S.rating, AVG(S.age)
  FROM Sailors S
  GROUP BY S.rating
  HAVING COUNT(*) > 1

SELECT: GROUP BY and HAVING Clauses

- Sailors(sid:integer, sname:string, rating:integer, age:real)
- Boats(bid:integer, bname: string, color: string)
- Reserves(sid:integer, bid: integer, day: date)

- Find those ratings for which the average age of the sailors is the minimum over all ratings

SELECT: GROUP BY and HAVING Clauses

- Sailors(sid:integer, sname:string, rating:integer, age:real)
- Boats(bid:integer, bname: string, color: string)
- Reserves(sid:integer, bid: integer, day: date)

- Find those ratings for which the average age of the sailors is the minimum over all ratings
  SELECT S.rating
  FROM Sailors S
  WHERE AVG(S.age) = (SELECT MIN(AVG(S2.age))
                      FROM Sailors S2
                      GROUP BY S2.rating)
SELECT: GROUP BY and HAVING Clauses

- Sailors(sid:integer, sname:string, rating:integer, age:real)
- Boats(bid:integer, bname: string, color: string)
- Reserves(sid:integer, bid: integer, day: date)

- Find those ratings for which the average age of the sailors is the minimum over all ratings
  ```sql
  SELECT S.rating
  FROM Sailors S
  WHERE AVG(S.age) = (SELECT MIN(AVG(S2.age))
                      FROM Sailors S2
                      GROUP BY S2.rating)
  ```

SELECT: GROUP BY and HAVING Clauses

- Sailors(sid:integer, sname:string, rating:integer, age:real)
- Boats(bid:integer, bname: string, color: string)
- Reserves(sid:integer, bid: integer, day: date)

- Find those ratings for which the average age of the sailors is the minimum over all ratings
  ```sql
  SELECT Temp.rating, Temp.average
  FROM (SELECT S.rating, AVG(S.age) AS average
         FROM Sailors S
         GROUP BY S.rating) AS Temp
  WHERE Temp.average = (SELECT MIN(Temp.average)
                         FROM Temp)
  ```