Presenting and Aggregating Results

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Overview

Sorting query results

Applying aggregate calculations

Querying Residency

```
SELECT name,
       state
  FROM residency;
```

name	state
Amy	Oregon
Justin	Wyoming
Sheila	Texas
Jim	Texas
Marsha	Oregon
Richard	Arizona

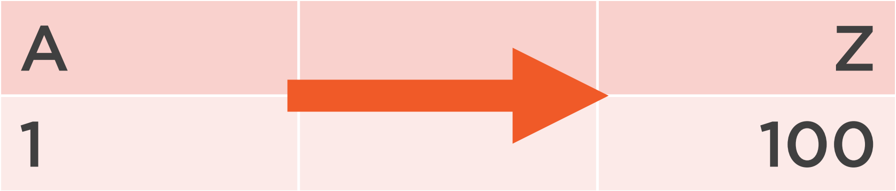
```
SELECT name,
       state
  FROM residency
ORDER BY name
```

name	state
Amy	Oregon
Jim	Texas
Justin	Wyoming
Marsha	Oregon
Richard	Arizona
Sheila	Texas

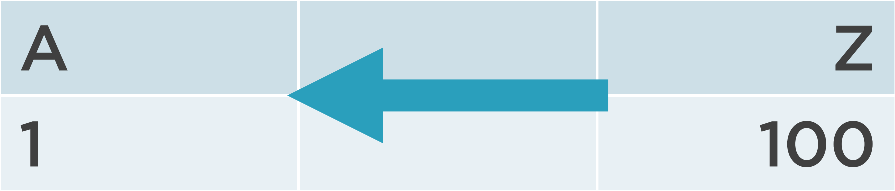
Residency table

name	state
Amy	Oregon
Justin	Wyoming
Sheila	Texas
Jim	Texas
Marsha	Oregon
Richard	Arizona

Specifying Sort Order



A		Z
1		100



A		Z
1		100

Ascending

Smallest to largest

SORT BY ASC

Descending

Largest to smallest

SORT BY DESC

```
SELECT name,
       state
  FROM residency
 ORDER BY state, name
```

name	state
Richard	Arizona
Amy	Oregon
Marsha	Oregon
Jim	Texas
Sheila	Texas
Justin	Wyoming

Residency table

name	state
Amy	Oregon
Justin	Wyoming
Sheila	Texas
Jim	Texas
Marsha	Oregon
Richard	Arizona

```
SELECT name,
       state
 FROM residency
ORDER BY state DESC, name ASC
```

Name	state
Justin	Wyoming
Jim	Texas
Sheila	Texas
Amy	Oregon
Marsha	Oregon
Richard	Arizona

Residency table

name	state
Amy	Oregon
Justin	Wyoming
Sheila	Texas
Jim	Texas
Marsha	Oregon
Richard	Arizona

```
SELECT name,
       state
 FROM residency
ORDER BY 2 DESC, 1 ASC
```

Name	state
Justin	Wyoming
Jim	Texas
Sheila	Texas
Amy	Oregon
Marsha	Oregon
Richard	Arizona

Residency table

name	state
Amy	Oregon
Justin	Wyoming
Sheila	Texas
Jim	Texas
Marsha	Oregon
Richard	Arizona

Aggregate Functions

COUNT

SUM

AVG

MIN

MAX

```
SELECT AVG(age)    AS avg_age
  FROM person;
```

name	grade_lvl	age
Eliza	Junior	17
Jane	Junior	17
Leslie	Senior	19
Matt	Junior	16
Ned	Freshman	15
Susie	Junior	18

Aggregate Functions

To use an aggregate function, include it in the SELECT clause

The above code returns an average age of 17

Analyzing Groups

Aggregate functions can be used for more sophisticated analysis

What is our average age by grade level?

GROUP BY keyword is used to specify groups

```
SELECT grade_lvl,
       AVG(age) AS avg_age
  FROM person
 GROUP BY grade_lvl;
```

- Aggregate average function
- Group results by grade level

grade_lvl	avg_age
Freshman	15
Junior	17
Senior	19

name	grade_lvl	age
Eliza	Junior	17
Jane	Junior	17
Leslie	Senior	19
Matt	Junior	16
Ned	Freshman	15
Susie	Junior	18

Using GROUP BY With Aggregation

Incorrect

```
SELECT grade_lvl,
       MIN(age) AS minimum_age
  FROM person;
```

All non-aggregate fields in the SELECT clause must be represented in the GROUP BY clause

Correct

```
SELECT grade_lvl,
       MIN(age) AS minimum_age
  FROM person
 GROUP BY grade_lvl;
```

Demo

Explore aggregate functions

Filtering Aggregate Results

WHERE

Filter single rows

HAVING

Filter aggregate results

```
SELECT grade_lvl,
       AVG(age) AS avg_age
  FROM person
 GROUP BY grade_lvl
HAVING AVG(age) < 19;
```

grade_lvl	avg_age
Freshman	15
Junior	17

- HAVING clause specifies that we want to filter aggregate values from AVG

name	grade_lvl	age
Eliza	Junior	17
Jane	Junior	17
Leslie	Senior	19
Matt	Junior	16
Ned	Freshman	15
Susie	Junior	18

Demo

Using HAVING to filter results

Summary

ORDER BY sorts query results

Aggregate functions perform calculations

- On entire data set
- On groups specified using GROUP BY

HAVING filters aggregate results