















ACLS

Databases



SS 2020 – Week 2
February 24

Schedule

| | | | | | | | | | | | | | | |
|---------------|---|---|---|---|--|---|---|---|---|---|---|---|---|---|
| Calendar Week | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 |
| Module Week | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 |
| Date | 17.02. | 24.02. | 02.03. | 09.03. | 16.03. | 23.03. | 30.03. | 06.04. | 13.04. | 20.04. | 27.04. | 04.05. | 11.05. | 18.05. |
| Topic |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| | February | | March | | | | April | | | | May | | | |



Introduction & RDB



Structured Query Language



Database & Python



Database & R



Data Warehouse



Not only SQL



Graph Database



Special

Content

| | | |
|----------------------------|---|-----|
| • Review | | 10' |
| • SQL | | 10' |
| • MySQL | | 25' |
| • Create – Modify – Delete | 🎓 | 45' |
| • Create – Modify – Delete | 🔧 | 45' |
| • Retrieve | 🎓 | 45' |
| • Retrieve | 🔧 | 45' |



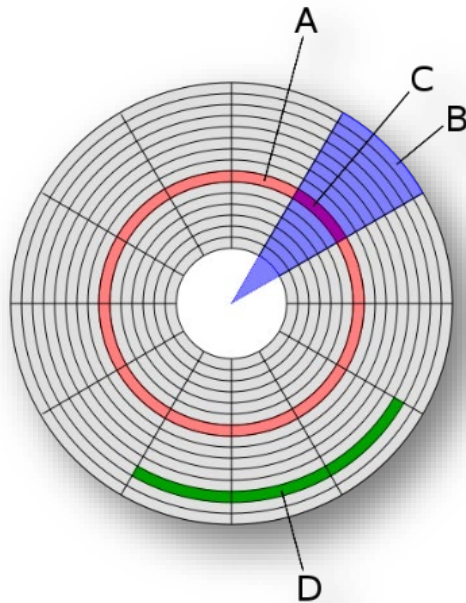
Content

| | | |
|---------------------------|---|-----|
| • Review | | 10' |
| • SQL | | 10' |
| • MySQL | | 25' |
| • Create – Alter – Delete | ? | 45' |
| • Create – Alter – Delete | ? | 45' |
| • Retrieve | ? | 45' |
| • Retrieve | ? | 45' |



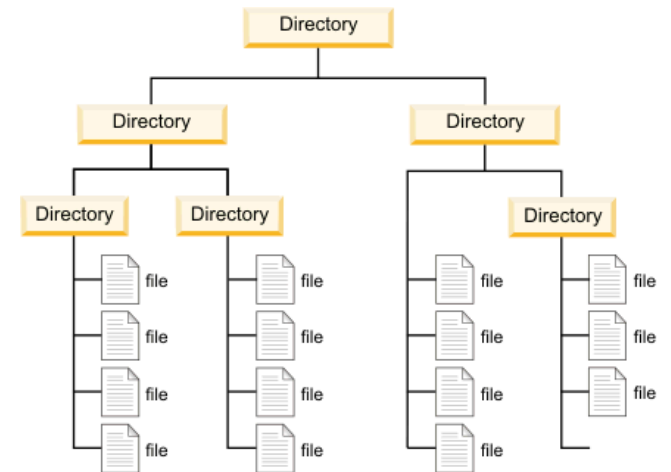
Review (1/5)

File Systems



- 77 tracks
- 26 sectors per track
- 128 bytes per sector
(which results in 256'256 bytes in total)

| Bytes | Meaning | Note |
|-------|-----------------------|---|
| 0 | Usually set to 0 | Used for multiple users |
| 1-8 | Filename | The name was limited to 8 characters |
| 9-11 | File type | Three character file type identifier, e.g. TXT or COM |
| 12 | File extend | Used when a file needed more than one directory entry |
| 13-14 | Reserved | Usually set to 0 |
| 15 | Sectors in last block | How many used sectors in the last allocation block |
| 16-31 | Disk map | Numbers of the used allocation blocks (from 0 to 242) |



Review (2/5)

Why a Database?

| My Clients | | | | | | | | | | | |
|------------|----------------|------------|--------------|--------|----------------|-------|----------|----------------|--------------|-----------|----------|
| | Name | DOB | Age | Sex | Address | PLZ | City | Country | Civil Status | Religion | Abo-Type |
| 1 | Tim Smith | 04.11.1993 | 27 | male | Main Street 7 | 10001 | New York | US | Single | None | Basic |
| 2 | Laura Jones | 9/23/1988 | 29 | f | Avenue 23 | CB22 | Duxford | United Kingdom | Married | Christian | Basic |
| 3 | Bob Goodman | 1/18/1972 | 46 | male | Big Street 11A | 10200 | New York | United States | Divorced | Jewish | Premium |
| 4 | Diana Kingston | 13.06.1989 | twenty-eight | female | Wood Road 62 | CB22 | Duxford | United Kingdom | Single | - | Basic |
| 5 | | | | | | | | | | | |
| 6 | | | | | | | | | | | |
| 7 | | | | | | | | | | | |
| 8 | | | | | | | | | | | |
| 9 | | | | | | | | | | | |
| 10 | | | | | | | | | | | |

Clear overview

Consistent

Multi-user

Queries



Database

Performance

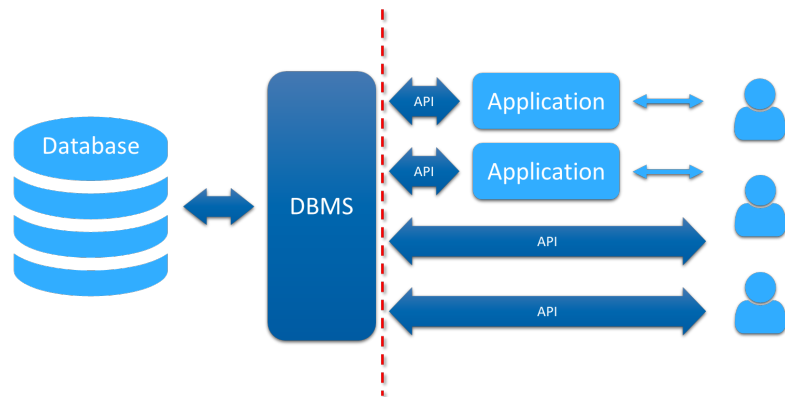
What tables

Review (3/5)

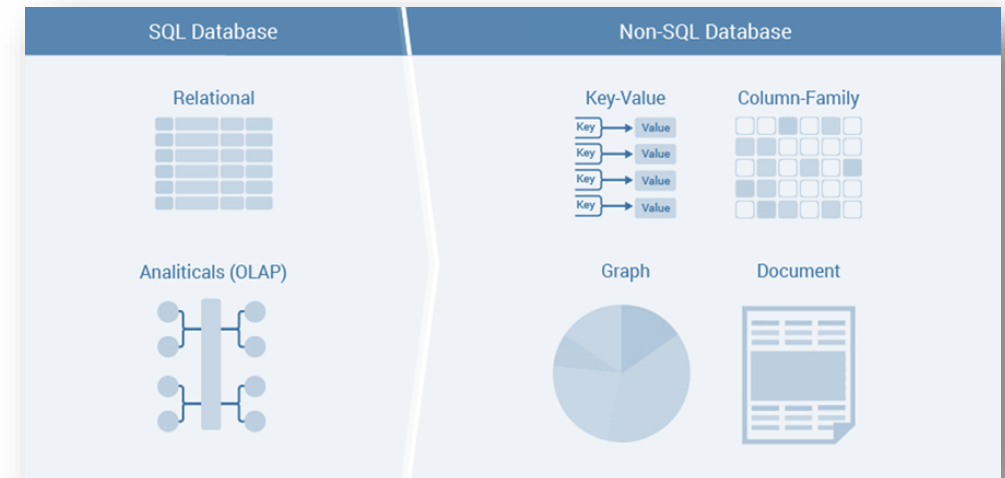
Qualities

- ✓ Consistency
- ✓ Independence
- ✓ Abstraction

❖ Performance



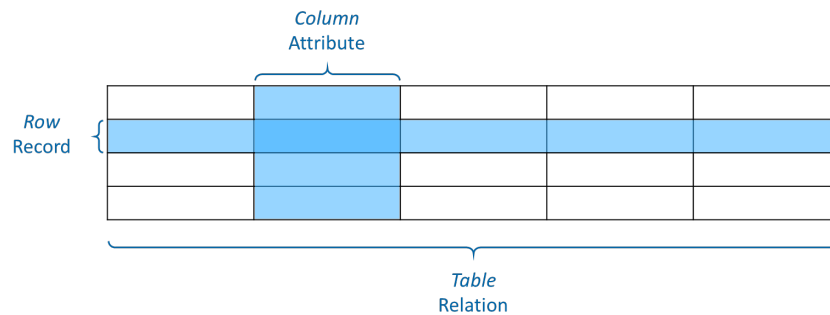
Types



Review (4/5)

Relational Databases

Data is stored in tables



Keys and Relationships

| EmployeeNr | Department | Name | Age |
|------------|------------|-----------------|-----|
| MN0345 | MN | John Smith | 52 |
| SE2376 | SE | Peter Johnson | 29 |
| SE8568 | SE | Alice Winter | 32 |
| MN3785 | MN | Mary Jones | 24 |
| MN9448 | MN | Peter McAlister | 47 |

PK

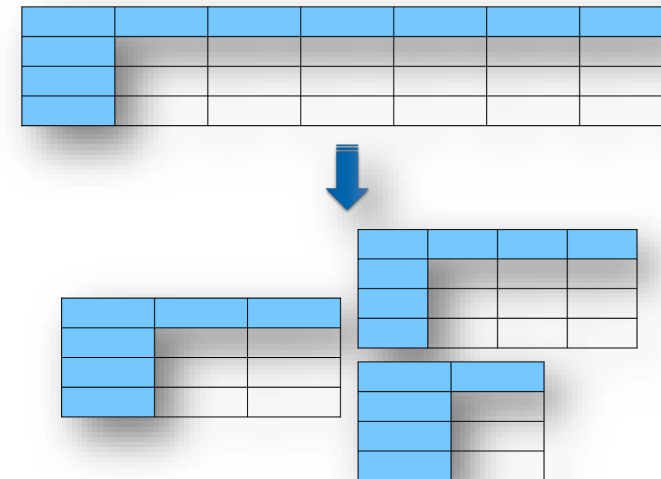
| ProjectNr | PM | Budget |
|-----------|--------|---------|
| P870 | MN3785 | 50'000 |
| P348 | MN0345 | 120'000 |
| P101 | MN0345 | 1'000 |

PK

FK

Relationships

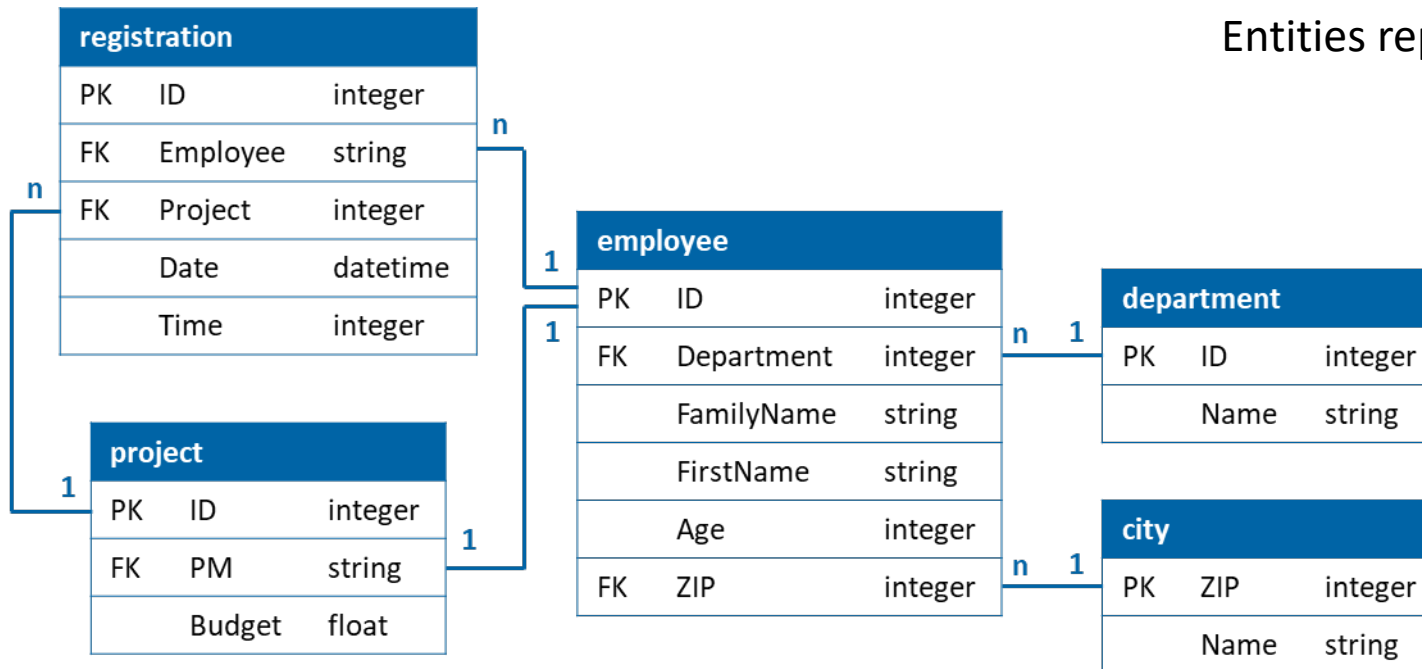
Normalization and Data Separation



Review (5/5)

Entity-Relationship-Model

Entities represent the tables



Relationships:

- One-to-One
- One-to-Many
- Many-to-Many

Content

| | | |
|----------------------------|---|-----|
| • Review | | 10' |
| • SQL | | 10' |
| • MySQL | | 25' |
| • Create – Modify – Delete | 🎓 | 45' |
| • Create – Modify – Delete | 🔧 | 45' |
| • Retrieve | 🎓 | 45' |
| • Retrieve | 🔧 | 45' |



Content

| | | |
|----------------------------|---|-----|
| • Review | | 10' |
| • SQL | | 10' |
| • MySQL | | 25' |
| • Create – Modify – Delete | 🎓 | 45' |
| • Create – Modify – Delete | 🔧 | 45' |
| • Retrieve | 🎓 | 45' |
| • Retrieve | 🔧 | 45' |



Content

| | | |
|----------------------------|---|-----|
| • Review | | 10' |
| • SQL | | 10' |
| • MySQL | | 25' |
| • Create – Modify – Delete | 🎓 | 45' |
| • Create – Modify – Delete | 🔧 | 45' |
| • Retrieve | 🎓 | 45' |
| • Retrieve | 🔧 | 45' |

ACLS | DDAS

SQL

Create – Modify – Delete

```





graph LR
    A((+)) --> B((Pencil))
    B --> C((-))
  
```

21.02.2020

R. Vorbürger

1

Content

| | | |
|----------------------------|---|-----|
| • Review | | 10' |
| • SQL | | 10' |
| • MySQL | | 25' |
| <hr/> | | |
| • Create – Modify – Delete |  | 45' |
| • Create – Modify – Delete |  | 45' |
| • Retrieve |  | 45' |
| <hr/> | | |
| • Retrieve |  | 45' |

MSc ACLS Databases and Data Architecture

[Dashboard](#) / [My courses](#) / [ACLS DDAS SS20](#) / [Exercises](#) / [Week 02](#)

Week 02



Download folder

Edit

Content

| | | |
|----------------------------|---|-----|
| • Review | | 10' |
| • SQL | | 10' |
| • MySQL | | 25' |
| • Create – Modify – Delete | 🎓 | 45' |
| • Create – Modify – Delete | 🔧 | 45' |
| • Retrieve | 🎓 | 45' |
| • Retrieve | 🔧 | 45' |

ACLs | DDAS

SQL





Retrieve

21.02.2020

R. Vorbürger

1

Content

| | | |
|----------------------------|---|-----|
| • Review | | 10' |
| • SQL | | 10' |
| • MySQL | | 25' |
| • Create – Modify – Delete |  | 45' |
| • Create – Modify – Delete |  | 45' |
| • Retrieve |  | 45' |
| • Retrieve |  | 45' |

MSc ACLS Databases and Data Architecture

[Dashboard](#) / [My courses](#) / [ACLS DDAS SS20](#) / [Exercises](#) / [Week 02](#)

Week 02



Download folder

Edit