Course ratings

INTRODUCTION TO DATA ENGINEERING

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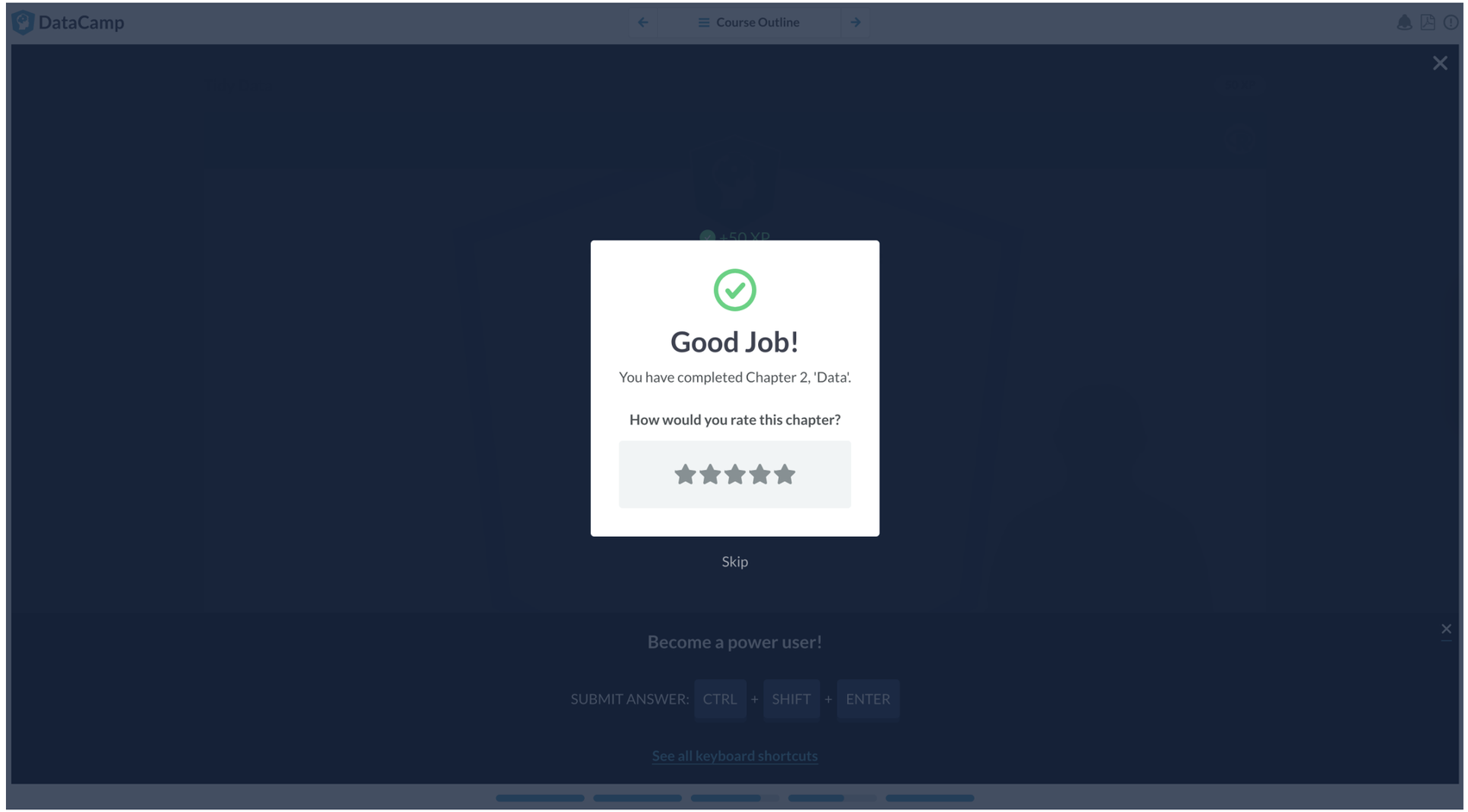
Ratings at DataCamp

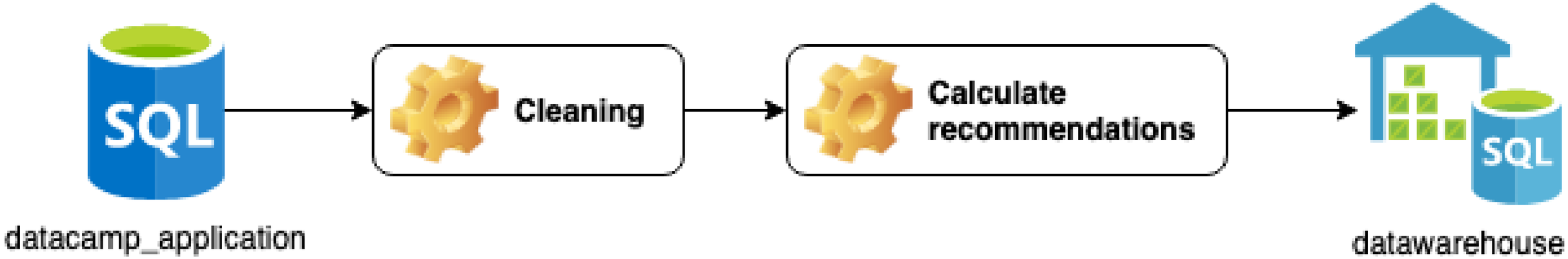


Recommend using ratings

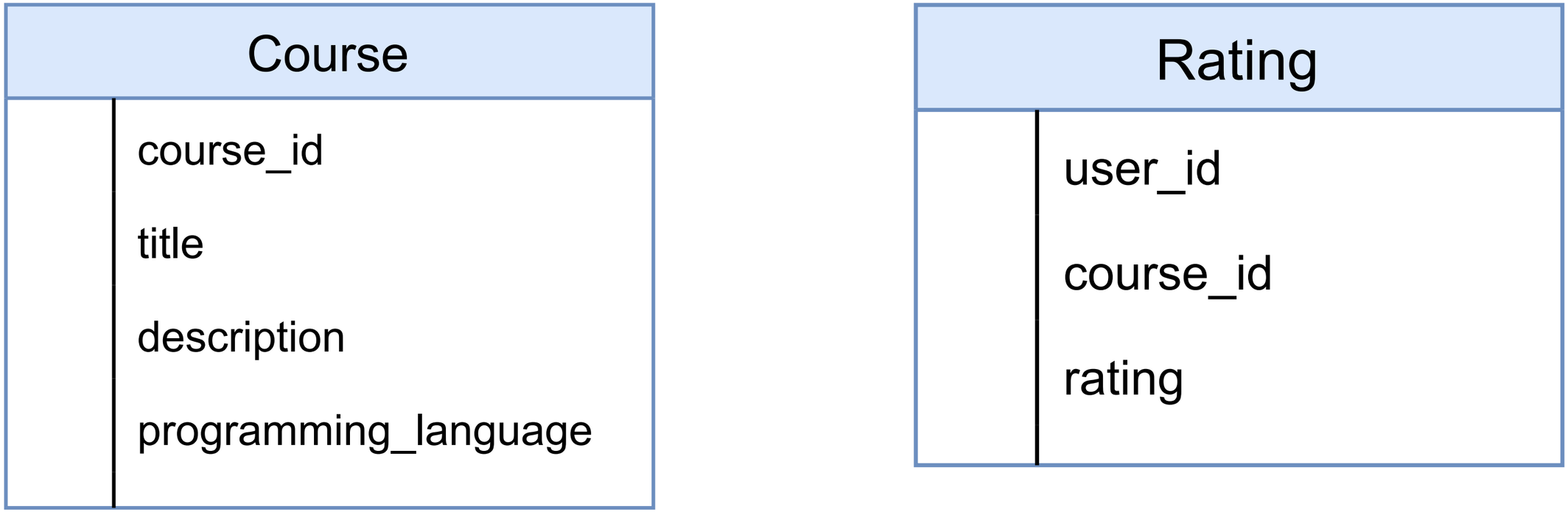
- Get rating data
- Clean and calculate top-recommended courses
- Recalculate daily
- Example usage: user's dashboard

As an ETL process

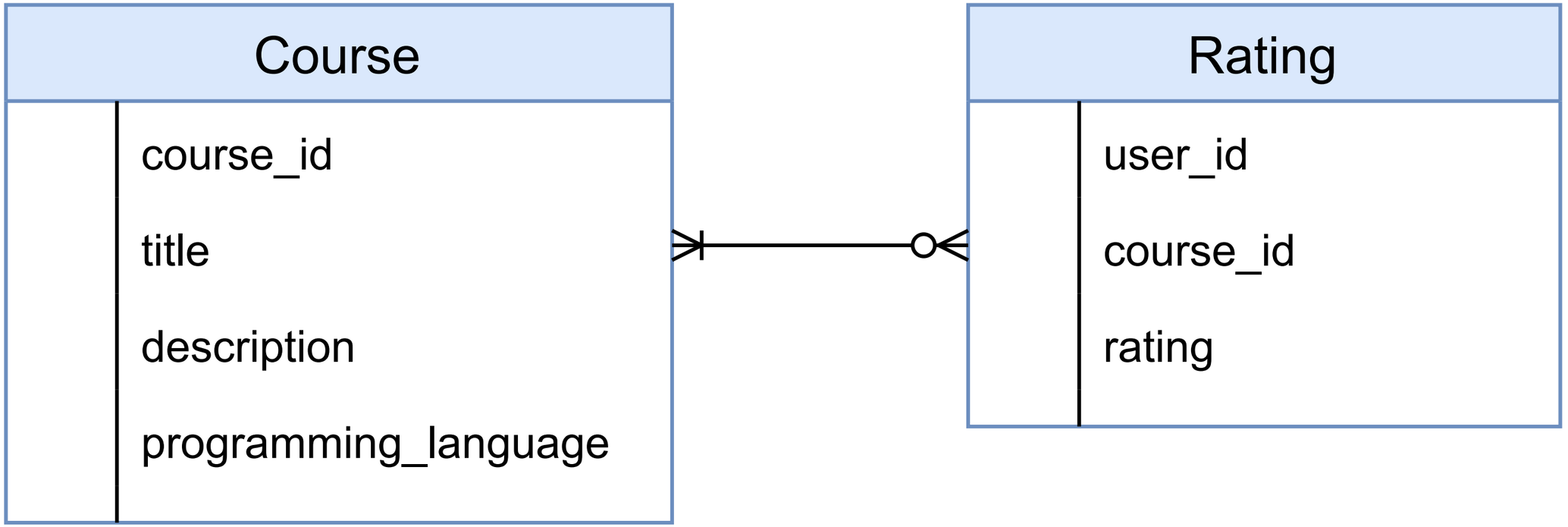
It's an ETL process!



The database



The database relationship



Let's practice!

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From ratings to recommendations

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The recommendations table

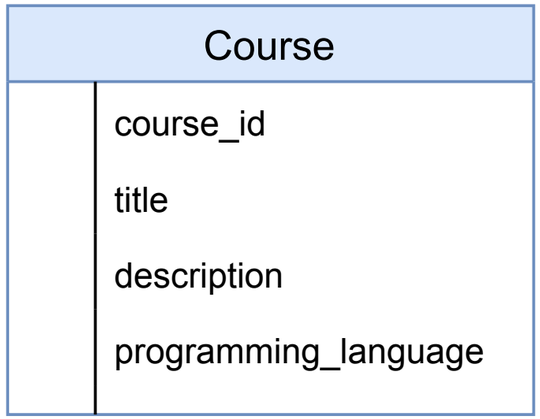
user_id	course_id	rating
1	1	4.8
1	74	4.78
1	21	4.5
2	32	4.9

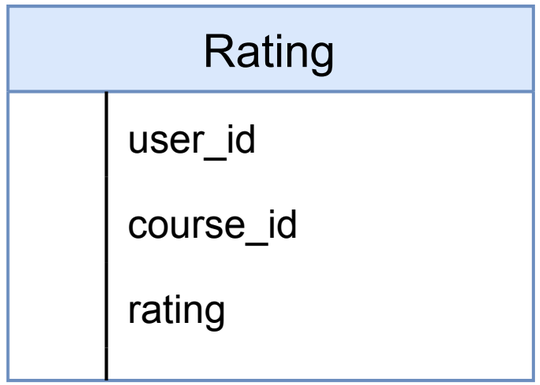
The estimated rating of a course the user hasn't taken yet.

Recommendation techniques

- Matrix factorization
- Building Recommendation Engines with PySpark

Common sense transformation





Recommendations

user_id	course_id	rating
1	1	4.8
1	74	4.78
1	21	4.5
2	32	4.9

Average course ratings

Average course rating

course_id	avg_rating
1	4.8
74	4.78
21	4.5
32	4.9

We want to recommend highly rated courses

Use the right programming language

Rating

user_id	course_id	programming_language	rating
1	1	r	4.8
1	74	**sql**	4.78
1	21	**sql**	4.5
1	32	python	4.9

Recommend SQL course for user with id 1

Recommend new courses

Rating

user_id	course_id	programming_language	rating
1	1	r	4.8
1	74	sql	4.78
1	21	sql	4.5
1	32	python	4.9

Don't recommend the combinations already in the rating table

Our recommendation transformation

- Use technology that user has rated most
- Don't recommend courses that user already rated
- Recommend three highest rated courses from remaining combinations

Rating

user_id	course_id	programming_language	rating
1	12	sql	4.78
1	52	sql	4.5
1	32	r	4.9

Recommend three highest rated SQL courses which are not 12 and 32.

Let's practice!

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Scheduling daily jobs

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What you've done so far

- Extract using `extract_course_data()` and `extract_rating_data()`
- Clean up using NA using `transform_fill_programming_language()`
- Average course ratings per course: `transform_avg_rating()`
- Get eligible user and course id pairs: `transform_courses_to_recommend()`
- Calculate the recommendations: `transform_recommendations()`

Loading to Postgres

- Use the calculations in data products
- Update daily
- Example use case: sending out e-mails with recommendations

The loading phase

```
recommendations.to_sql(
    "recommendations",
    db_engine,
    if_exists="append",
)
```

```
def etl(db_engines):
    # Extract the data
    courses = extract_course_data(db_engines)
    rating = extract_rating_data(db_engines)
    # Clean up courses data
    courses = transform_fill_programming_language(courses)
    # Get the average course ratings
    avg_course_rating = transform_avg_rating(rating)
    # Get eligible user and course id pairs
    courses_to_recommend = transform_courses_to_recommend(
        rating,
        courses,
    )
    # Calculate the recommendations
    recommendations = transform_recommendations(
        avg_course_rating,
        courses_to_recommend,
    )
    # Load the recommendations into the database
    load_to_dwh(recommendations, db_engine))
```

Creating the DAG

```
from airflow.models import DAG
from airflow.operators.python_operator import PythonOperator

dag = DAG(dag_id="recommendations",
          scheduled_interval="0 0 * * *")

task_recommendations = PythonOperator(
    task_id="recommendations_task",
    python_callable=etl,
)
```

Let's practice!

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Congratulations

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Introduction to data engineering

- Identify the tasks of a data engineer
- What kind of tools they use
- Cloud service providers

Data engineering toolbox

- Databases
- Parallel computing & frameworks (Spark)
- Workflow scheduling with Airflow

Extract, Load and Transform (ETL)

- Extract: get data from several sources
- Transform: perform transformations using parallel computing
- Load: load data into target database

Case study: DataCamp

- Fetch data from multiple sources
- Transform to form recommendations
- Load into target database

Good job!

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