

CSE 4/562

Database Systems

Practicum Component

People

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Projects

- **Goal:** Build a Relational Query Engine
- **Teams:** Up to 3-person Groups (3 strongly recommended)
- Setup (Checkpoint 0) + 4 Project Checkpoints
 - Evaluation Criteria
 - **Correctness:** Produce correct results or get an F.
 - **Performance:** Meet or beat ref implementation for an A.
 - Resubmit as many times as desired until deadline.

Project Objectives

- Designed to make you...
 - understand how real database systems work
 - design an important component of a database system
- Shows what kind of problems you need to solve in the real world

Project Outline



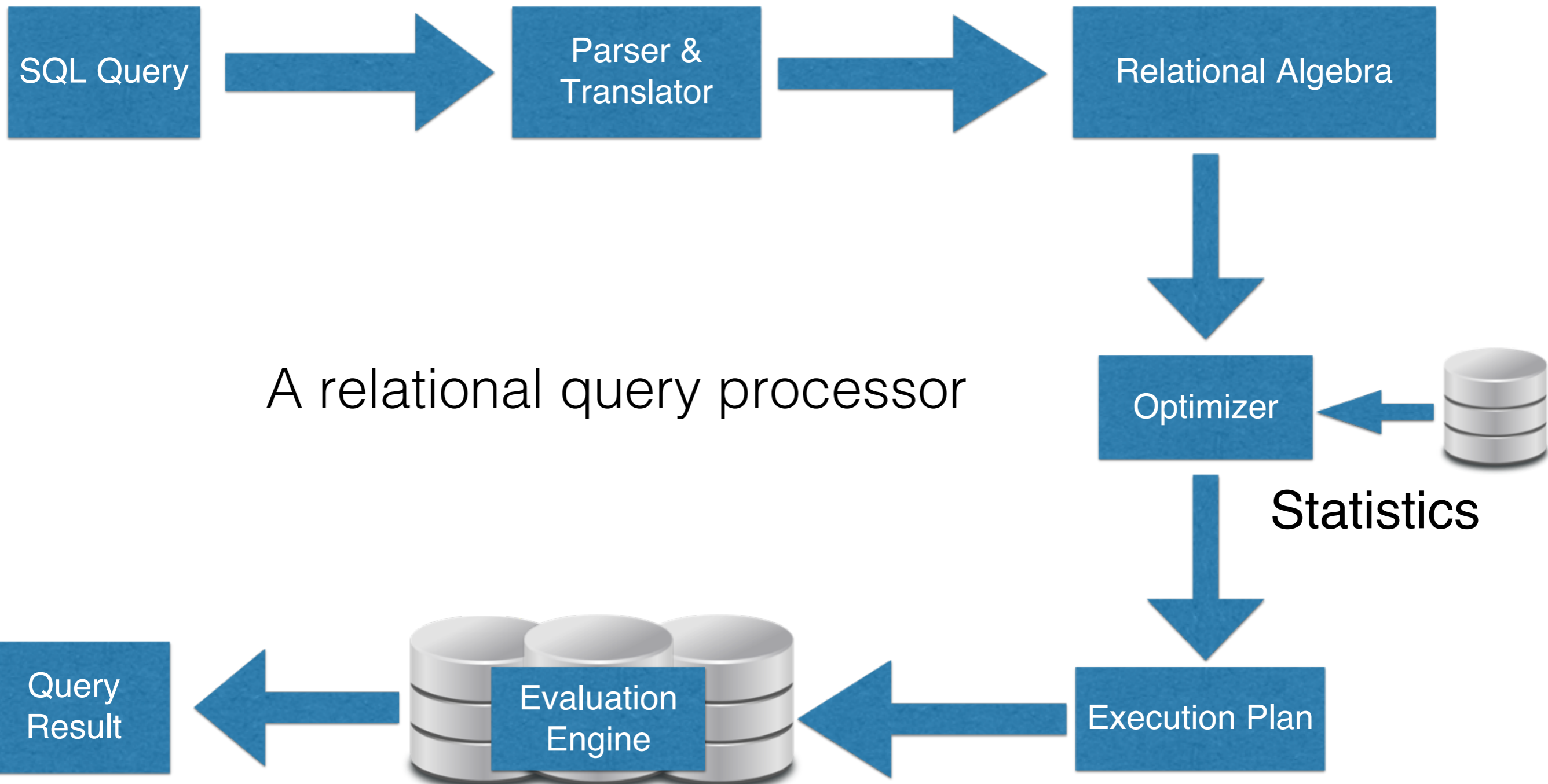
Checkpoint 0
Hello World

Hello, World
Java program

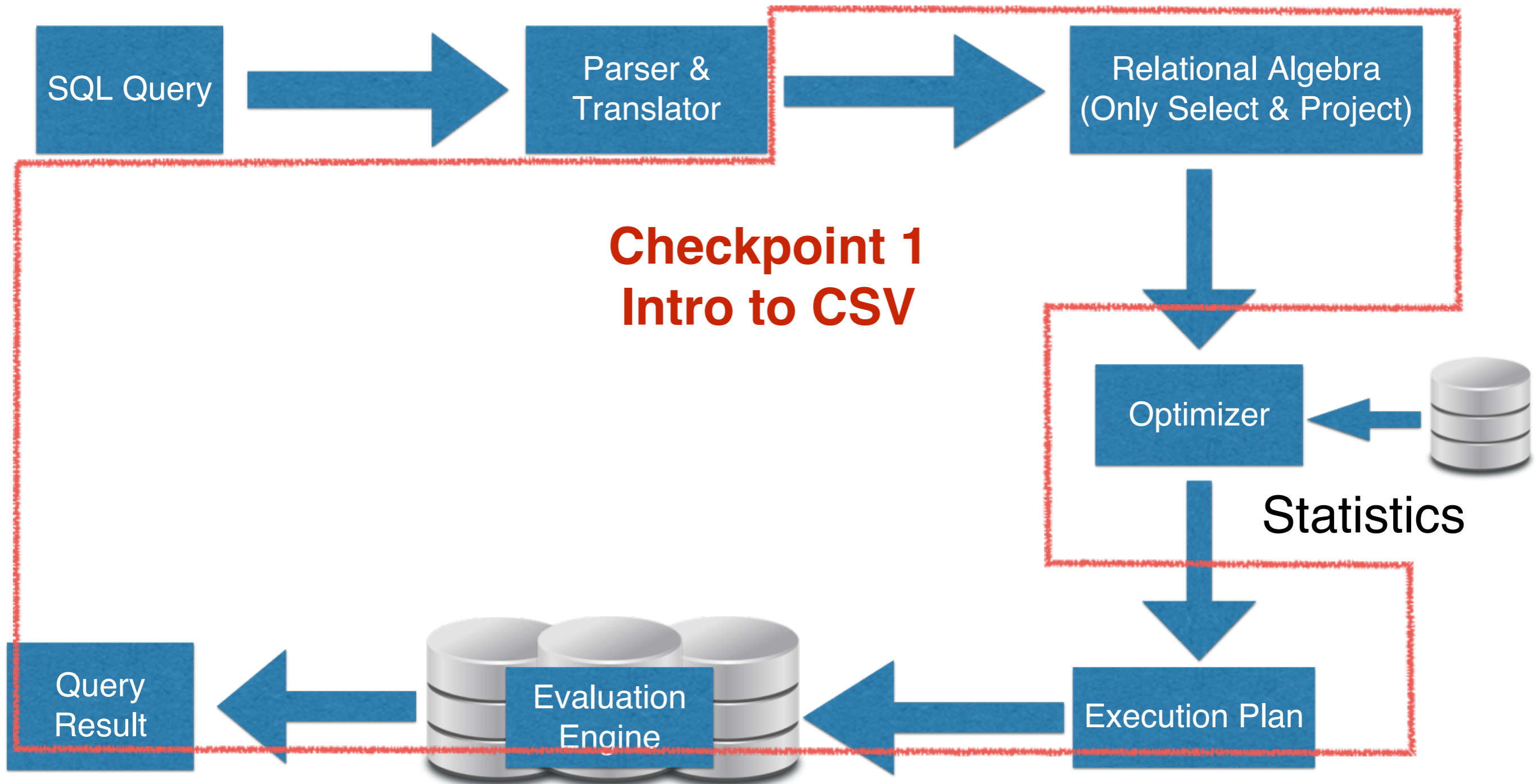


Submission
System

Project Outline

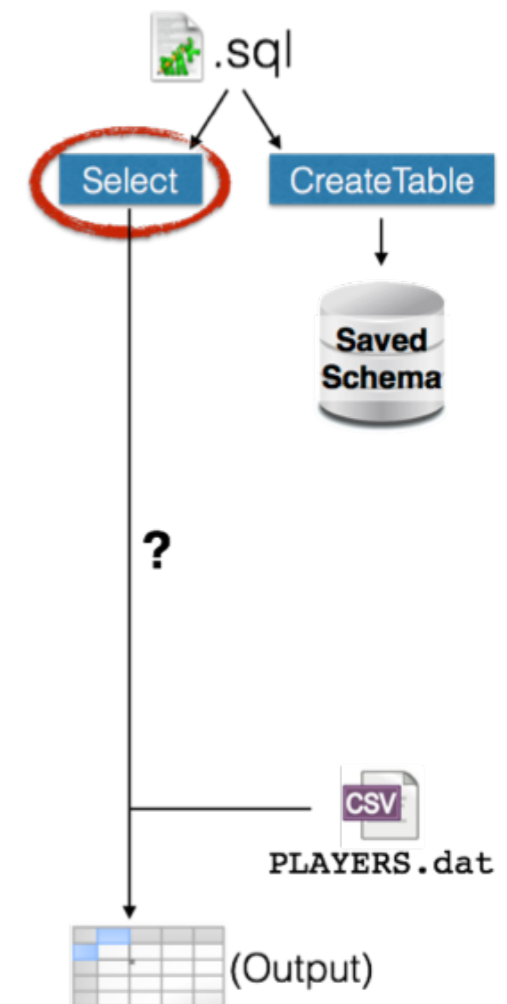


Project Outline

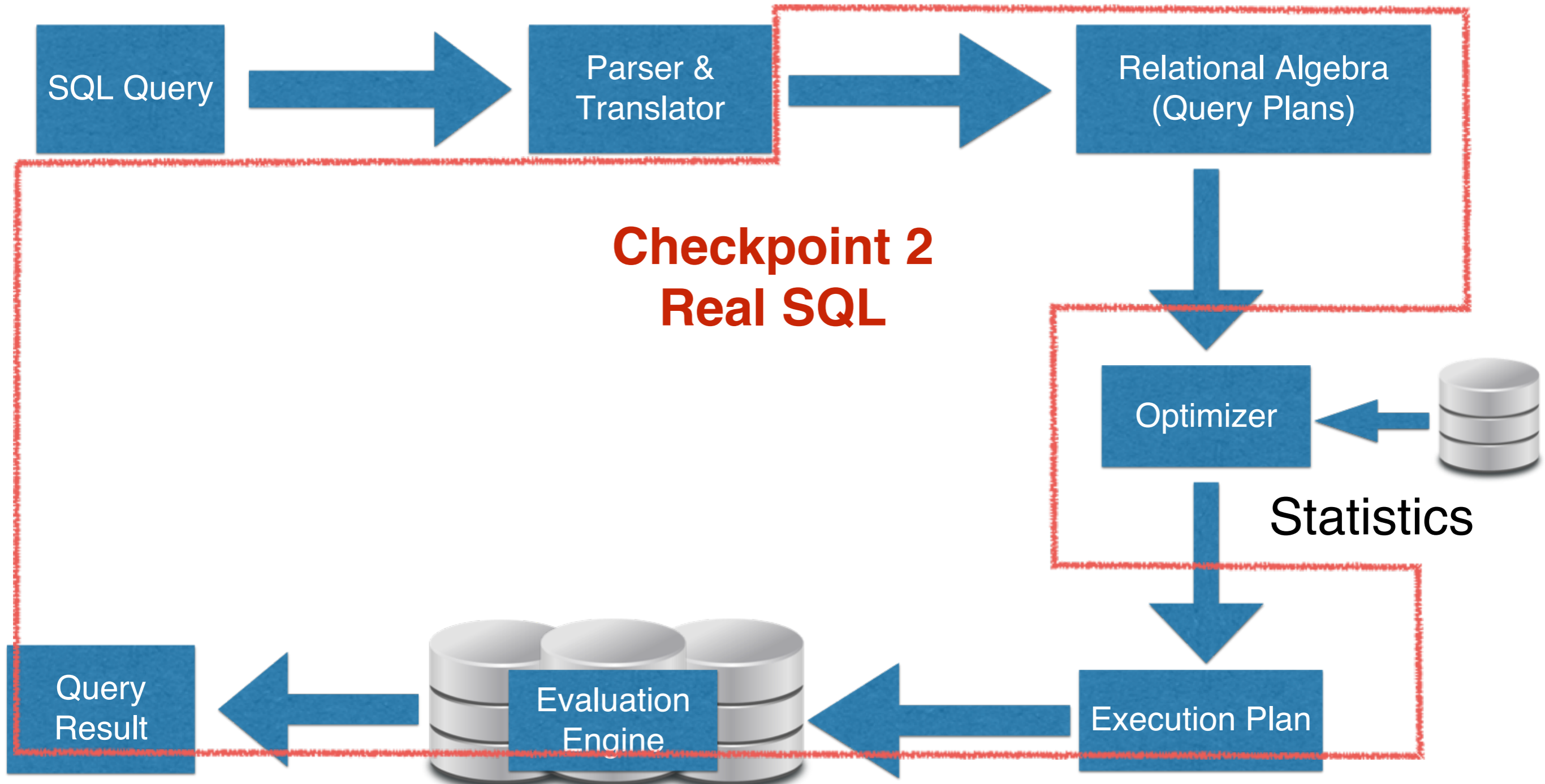


Checkpoint 1

- Sanity check
- How do you implement a given schema?
- How can you parse a query?
- Can you read from a CSV file and report results correctly?
- How do you use the least memory possible?

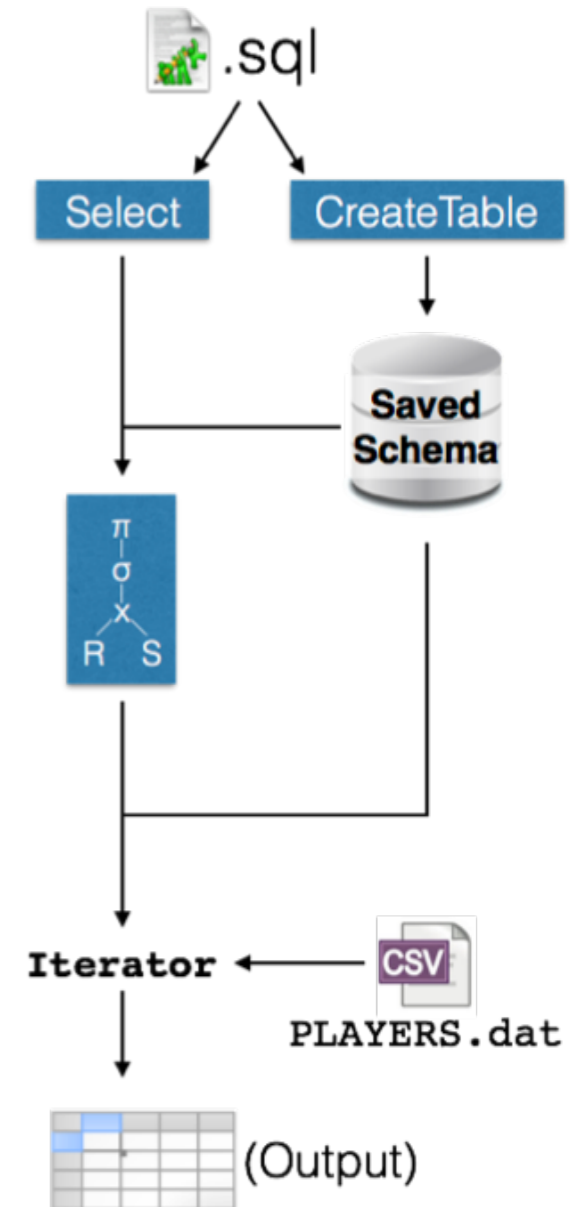


Project Outline

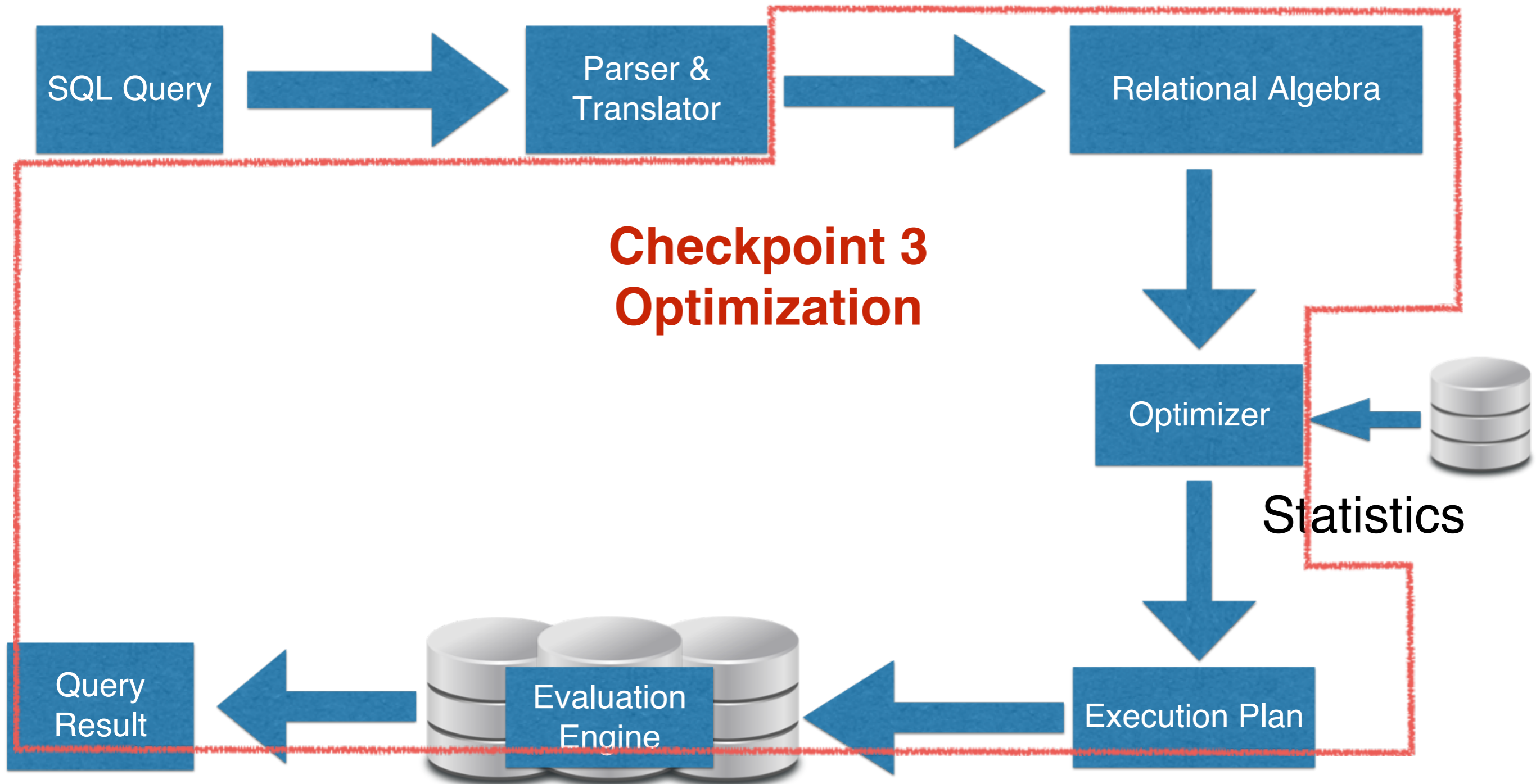


Checkpoint 2

- How do you join multiple tables, efficiently?
- How do you create a query plan?
- How do you deal with nested queries?
- Can you sort data? Just choose top-k rows?



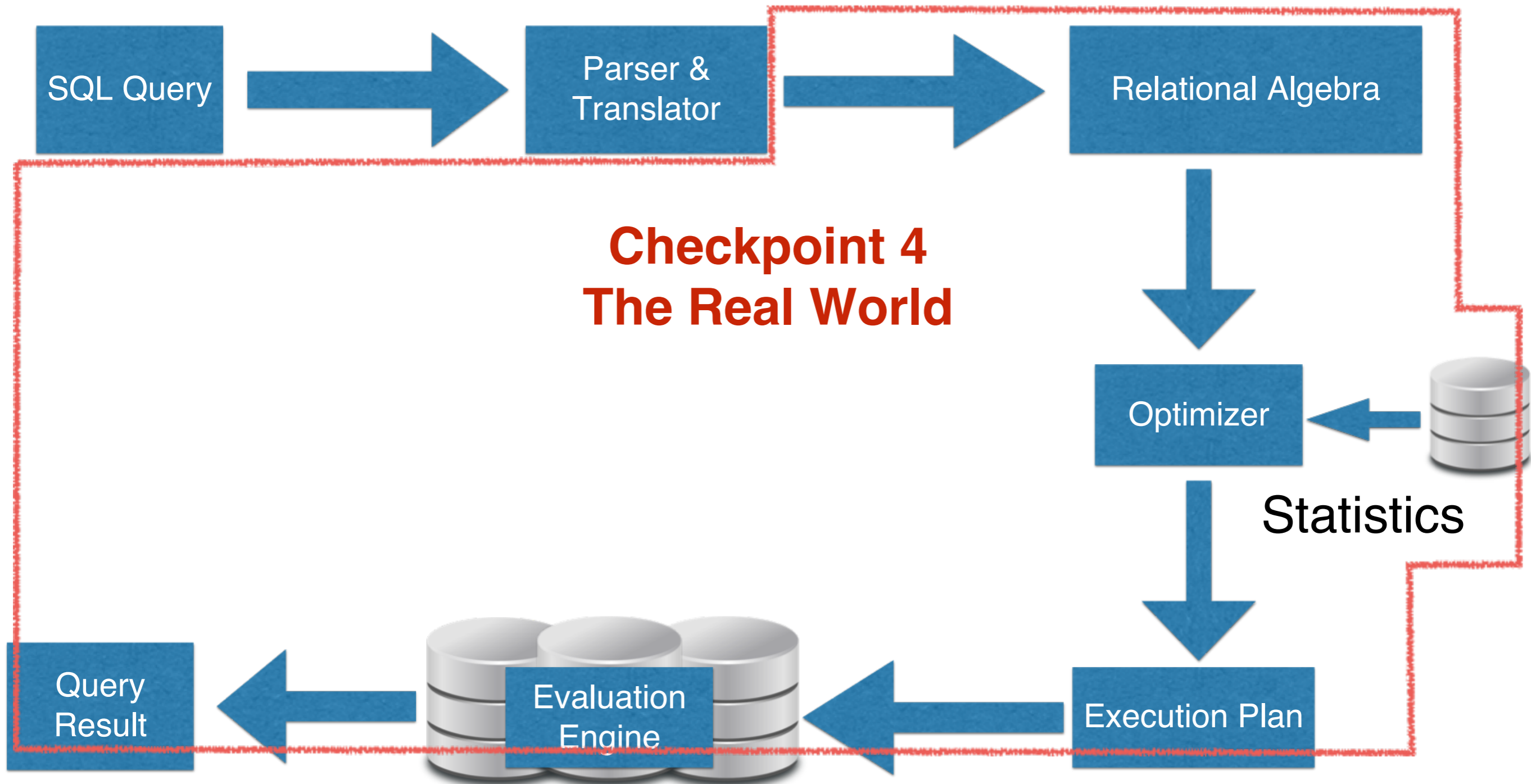
Project Outline



Checkpoint 3

- How do make your system faster?
 - Programming efficiency?
 - Choosing a strategy?
 - More efficient operators?
- How can you deal with aggregation?

Project Outline



Checkpoint 4

- What is the effect of the data you have on the query planning?
- What do you do when there is not enough memory for certain operators?

Libraries

- **JSqlParser (Forked version)**
 - Text to SQL Parse Tree
- **EvalLib**
 - Arithmetic Expression Evaluator
- **Apache Commons CSV**
 - CSV Format Support / Parsing CSV

Checkpoint 0

- **Team formations**
 - Form your team
 - The teams are final, you cannot switch teams
 - Create a private git repository on github or bitbucket
 - Do NOT share the link to your repository with anyone
 - Make sure all of you can push and pull code

Checkpoint 0

- **Repository structure**
 - Repository Name: CSE4562SP18
 - Main File: edu.buffalo.www.cse4562.Main.java
 - `System.out.println("Hello, World");`
 - Add `.gitignore` file for java before your first commit

Checkpoint 0

- **Timeline**

- Email Will and Gokhan until **Monday, February 5th 11:59 pm**
 - Names, UBIT names, UB ID #
 - The link to your repository
- We will provide you with your team number and a deploy key
- You will add the deploy key to your repository
- Submission will open on **Tuesday, February 6th 12:00 pm (noon)**
- Deadline is **Friday, February 9th 11:59 pm**

Checkpoint 0

- **Submission**

- <https://autograder.cse.buffalo.edu>
- Create a text file (submission.txt)
- First line: Link to your repository
 - [https://<websitename>.com/<username>/ CSE4562SP18.git](https://<websitename>.com/<username>/CSE4562SP18.git)
- Second line: Team number
 - 1,2, etc.
- Submit the file and wait for your grade

Checkpoint 0

- **Problems**

- Come to office hours
- Try asking your questions on Piazza
- If absolutely necessary, email us

Tips

- Github (for students), gitlab, and bitbucket provide free private repositories
- Learn how to use git commands
 - add
 - checkout
 - push
 - pull, and more...

Questions?