CS3223 Lecture 0
Course Introduction

CS3223: Database Systems Implementation

- Lectures: Friday 10am - 12pm, I3 Auditorium
- Lecturer: Chan Chee Yong
  - Office: #03-24, COM1 Building
  - Email: chancy@comp.nus.edu.sg / dcsccy@nus.edu.sg
- Teaching Assistants:
  - Bennett Clement (bennett.clement@u.nus.edu)
  - Chen Yuming (yuming.chen@u.nus.edu)
  - Low Jie Feng (jiefeng.low@u.nus.edu)
  - Yu Jiaxiang (jiaxiang_yu@u.nus.edu)
- Course Information:

  `https://canvas.nus.edu.sg/courses/38601`
- Tutorials: start from week 3

Prerequisites

- ((CS2010 or its equivalent) or CS2020 or (CS2040 or its equivalent)) and (CS2102 or IT2002)
- You should know the following:
  - Relational data model
  - Relational algebra
  - SQL
- It will be useful to have background in CS2106 (Introduction to Operating Systems)

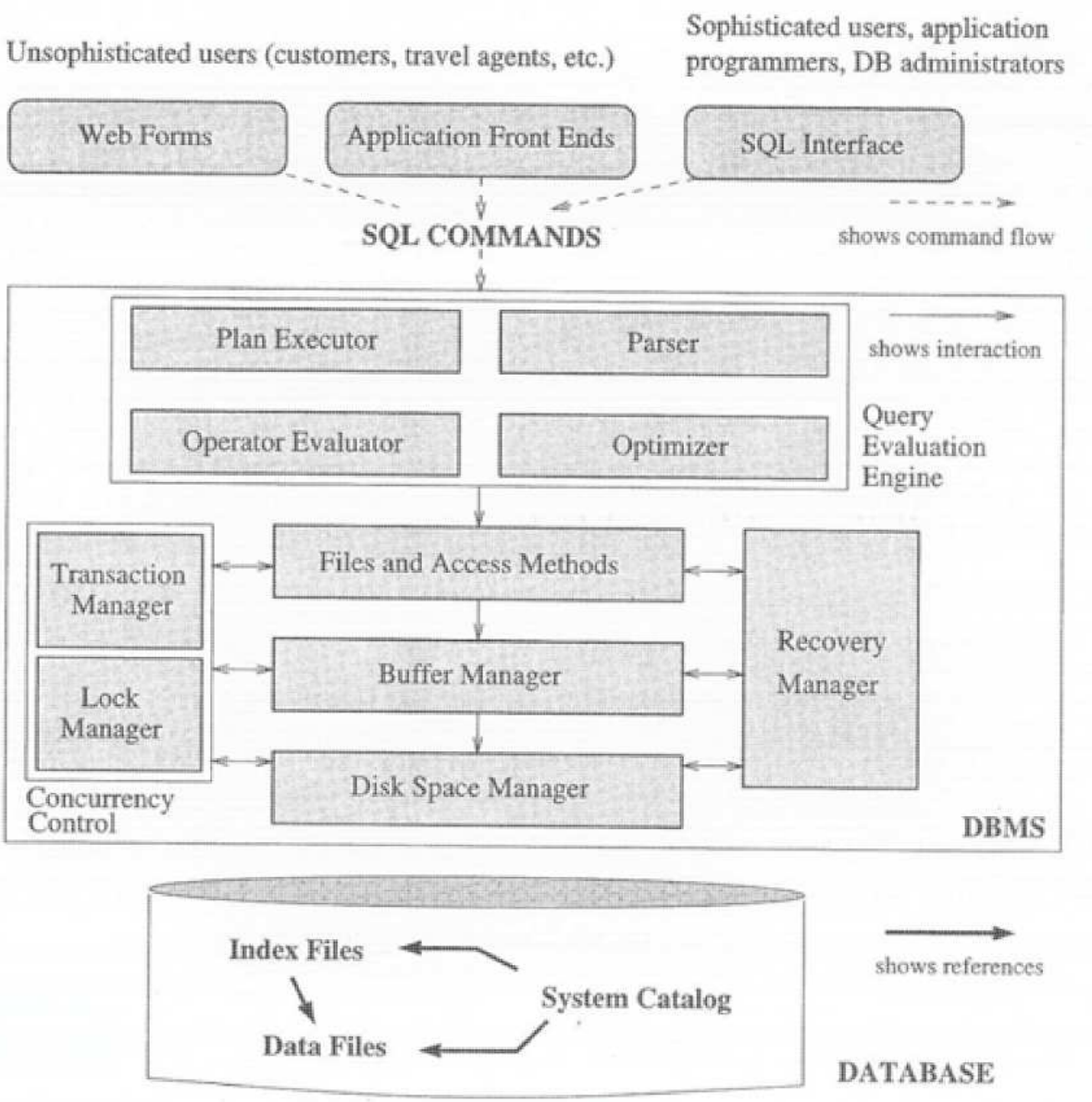
Reference Textbooks

- Raghu Ramakrishnan & Johannes Gehrke,
  Database Management Systems,
  McGraw-Hill, Third Edition, 2002.
  (QA76.9 Dbm.Ra 2003)
- Abraham Silberschatz, Henry Korth & S. Sudarshan,
  Database System Concepts,
  McGraw-Hill, Seventh Edition, 2020.
  (QA76.9 D3.Sil 2020)
- Hector Garcia-Molina, Jeffrey Ullman, & Jennifer Widom,
  Database Systems: The Complete Book,
  Prentice Hall, Second Edition, 2009.
  (QA76.9 Dbm.Gar 2009)

Study of DBMS

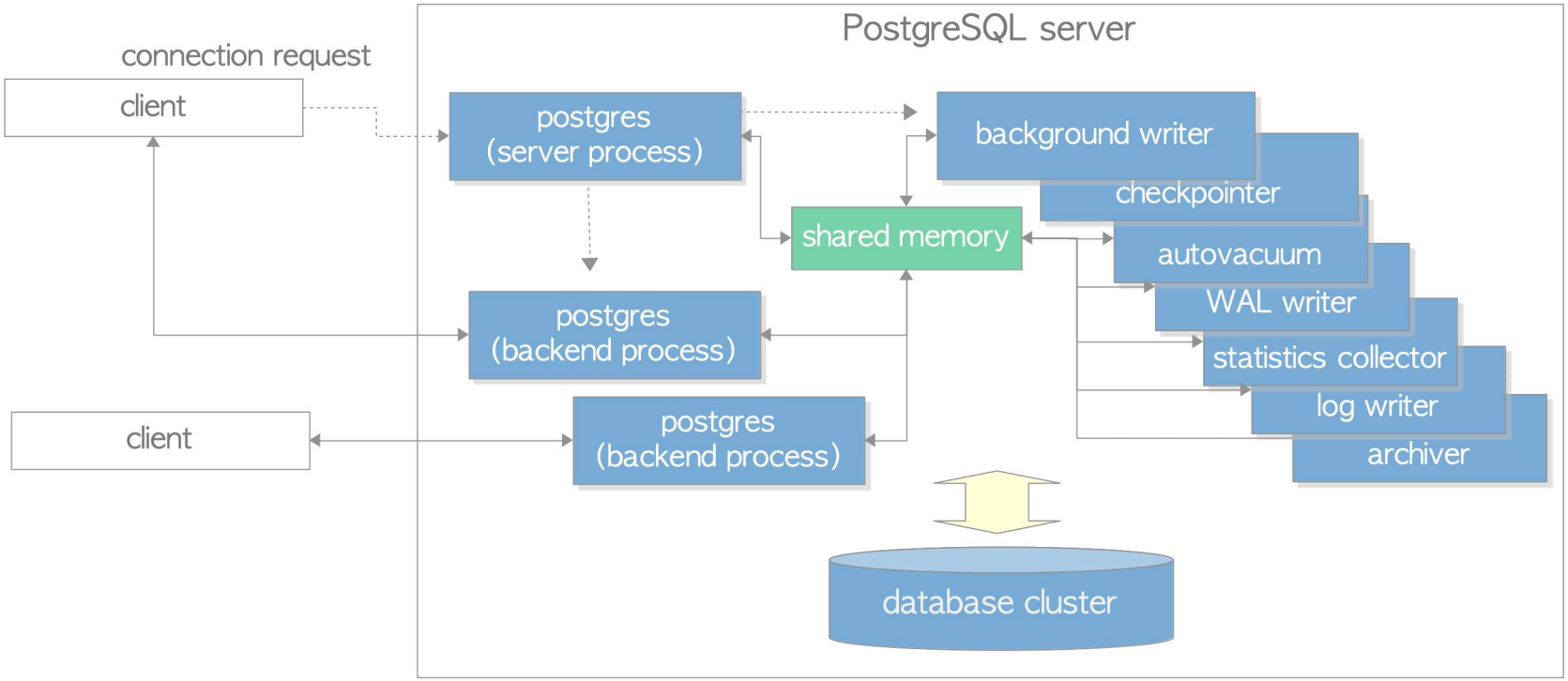
- **Database design**
  - How to model the data requirements of applications?
  - How to organize data using a DBMS?
- **Database programming**
  - How to create, query, and update a database?
  - How to specify data constraints?
  - How to combine database and conventional programming?
- **DBMS implementation**
  - How does a DBMS work?

Architecture of DBMS



Source: Ramakrishnan & Gehrke's Figure 1.3

Process Architecture in PostgreSQL



Source: H. Suzuki's The Internals of PostgreSQL

Tentative Schedule

Week	Topic	R&G Textbook Chapter
1	Data Storage	8,9
2	Tree-Structured Indexing	10
3	Hash-based Indexing	11
4	External Sorting	13
5	Query Evaluation	12
6	Evaluating Relational Operators	14
-	Recess Week	-
7	Midterm Test	-
8	Query Optimizer	15
9	Transaction Management	16
10	Concurrency Control	17
11	Concurrency Control	17
12	Lecture Cancelled	-
13	Crash Recovery	18

Workload & Assessment

- Number of credits = 4
- Workload per week = 9 hours
  - 2 lecture hours
  - 1 tutorial hour
  - 3 assignment hours
  - 3 preparatory work hours
- Tentative Module Assessment:

Assessment Component	**%**
Tutorial Participation	5
Assignments	30
Closed-book Midterm Test	25
Closed-book Final Test	40

Tutorials

- Tutorials will start from week 3
- A subset of the tutorial questions will be discussed in class
- Tutorial attendance & participation (5 marks)
  - Each student will be pre-assigned to prepare the answer for a question
  - For each discussed question, one of the assigned students will be randomly picked to lead the discussion
  - Other students are expected to participate as well: ask questions, suggest alternative answers, etc.

Assignments

I hear and I forget. I see and I remember. I do and I understand. - Confucius

- Assignments will be using 

  `http://www.postgresql.org`
- Some of the assignments require modifying PostgreSQL's code (written in C)
- Assignments are done in teams of two students
  - Register your team by completing the Canvas survey "Registration of Assignment Team"
  - Registration opens on January 13 (Friday, 1700) & closes on **January 20 (Friday, 2359)**

Course Policies

- Students are responsible for the following:
  - Attending lectures & discussions
  - Checking Canvas/emails for course-related announcements
- For clarifications on lecture material, the best way is to post your questions on **Canvas**. You can also email the lecturer to arrange for consultation sessions.

Course Policies (cont.)

- **Zero-tolerance for plagiarism/cheating**
- Students will be reported to University for disciplinary action for academic offence
- Resources:
  - `http://www.nus.edu.sg/celc/programmes/plagiarism.html`
  - `https://www.comp.nus.edu.sg/cug/plagiarism/`

Course Policies (cont.)

`https://www.comp.nus.edu.sg/cug/plagiarism/`

> *All students share the responsibility for upholding the academic standards and reputation of the University. Academic honesty is a prerequisite condition in the pursuit and acquisition of knowledge. Academic dishonesty is any misrepresentation with the intent to deceive or failure to acknowledge the source or falsification of information or inaccuracy of statements or cheating at examinations/tests or inappropriate use of resources. There are many forms of academic dishonesty and plagiarism is one of them.* **Plagiarism is generally defined as the practice of taking someone else's work or ideas and passing them off as one's own** *(The New Oxford Dictionary of English). The University does not condone plagiarism.*

Course Policies (cont.)

Students should adopt this rule - **You have the obligation to make clear to the assessor which is your own work, and which is the work of others.** *Otherwise, your assessor is entitled to assume that everything being presented for assessment is being presented as entirely your own work. This is a minimum standard.*

A student may not knowingly intend to plagiarise, but that should not be used as an excuse for plagiarism. **Students should seek clarification from their instructors or supervisors if they are unsure whether or not they are plagiarising the work of another person.**

What NOT to do for Assignments

- The following is a non-exhaustive list of unacceptable practices that are considered to be committing plagiarism
  - Accessing a solution that is not developed by your team
  - Viewing a solution that is not developed by your team and basing your solution on it
  - Showing/Sharing your solution to a student from another team
  - Searching or soliciting assignment solution from online or elsewhere
  - Using AI-assisted tools (e.g., ChatGPT, GitHub Copilot) for your assignment
- If you're unsure whether a practice constitutes plagiarism, please clarify with the lecturer

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