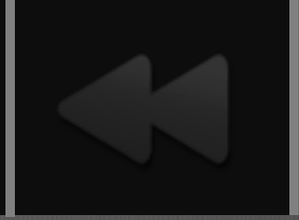
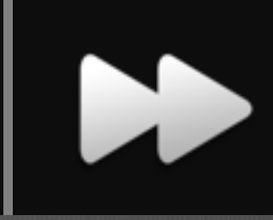




Database Systems

Introduction

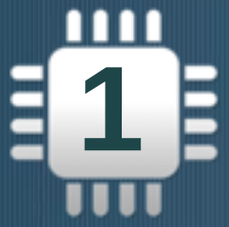
Benjamin Koo

Tsinghua University

AGENDA

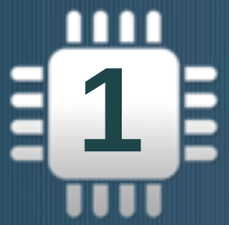
- **Introduction**
- What is data?
- How to store data?
- Where are they stored?
- Who have access to what?
- **Logistics for the course**

INTRODUCTION



COURSE OUTLINE

- Overview, Set Theory Terminologies
- Data Modeling
- Transaction Processing
- Networked Database Systems



Lecture Divisions

Week Number	Topics
Week 1	Introduction
2	Relational Model
3	SQL
4	E-R Model
5	Database Design
6	Data Serialization, XML
7	Data Storage and Query
8-9	Transaction
10-11	System Architectures
12-13	Networked Databases
14-15	Product Demonstration

1 WHAT IS DATA?

- Digital Information only
- Represented as bits

EXAMPLE

An application familiar to Industrial Engineers

24 hours worth of commercial flight data in the US

NASA Alex Bayen 2005

QuickTime?and a
H.264 decompressor
are needed to see this picture.

Tsinghua IE Database 2008

QuickTime?and a
mpeg4 decompressor
are needed to see this picture.

A Pattern of Database Apps

- The MVC Pattern
- Model/View/Controller
- Modularized Software Development
- Easier than you might imagine
  - With proper tools and disciplines

1 WHAT IS DATA?

- Digital Information only
- Represented as bits

EXAMPLE

If you were to record every moment in your life…

Prof. Deb Roy's talk on TED.COM

3 WHERE TO STORE DATA?

- Devices
- Mobility
- Performance
- Networks

1 WHERE TO STORE DATA

- Online, Offline, Synchronization?
- Different strategies

EXAMPLE

Dropbox

Evernote

Wordpress

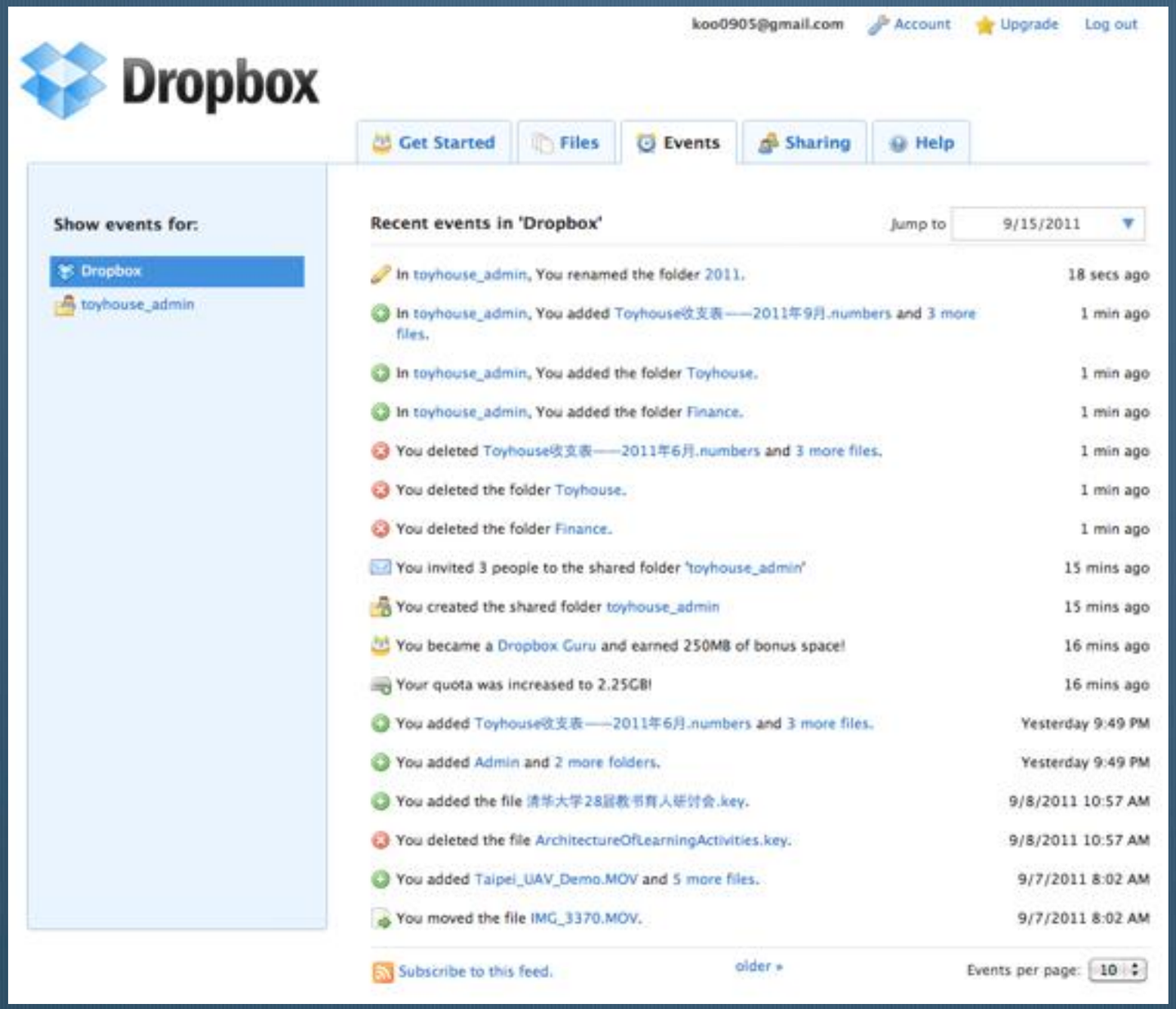
1 Cloud storage?

- A folder that refreshes itself automatically
- A transparent service

EXAMPLE

Dropbox

- Dropbox Screen shot



1 Where else to store DATA?

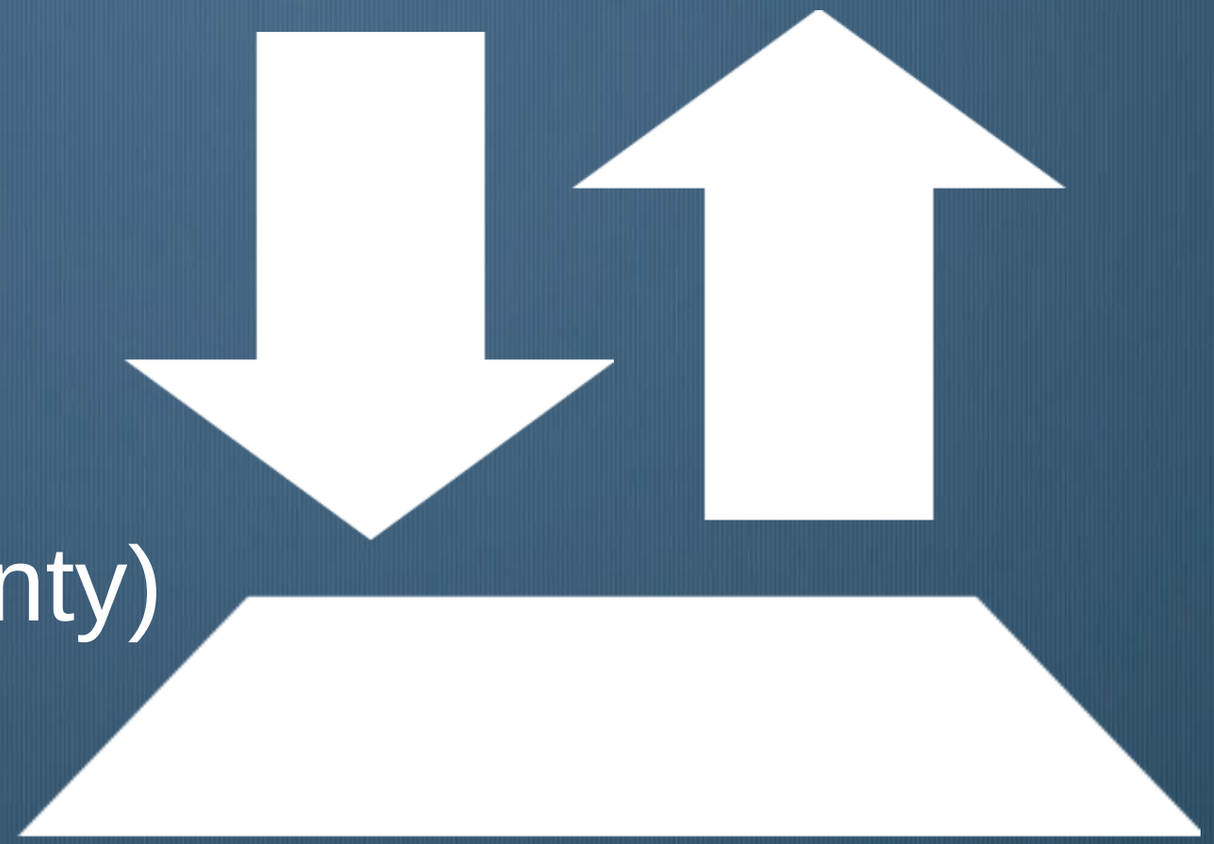
- If you want to take notes on the go...
- Video notes, location of events, words

EXAMPLE

Evernote

An interesting way to store everything in the “Cloud”...

2 HOW TO STORE/RETRIEVE DATA?



- Space
- Time
- Reliability (Uncertainty)

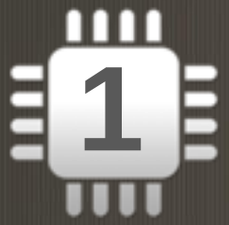
4 WHO HAVE ACCESS?

- Ownership of data
- Security

System Correctness

- Safety: Nothing bad happens
- Liveness: Do something good/useful
  - Representable as logical values (yes/no)

LOGISTICS OF THE COURSE



LOGISTICS

- Home work assignments
- Term Projects
- Grading Policies

1 Term Project

Each team pick a weekly topic: Say "Data Modeling"

- Develop a functional database program
- Proposal, Midterm, Final written reports
- Incrementally, create a 20 min video lecture
  - Report weekly progress on Toyhouse blog

2 A DEMONSTRATION

- A typical element of a term project
- Using WordPress as a platform for travel management
- Use video notes to present the final product

3 RESOURCES

- MAMP and XAMP
- For Mac and PC
- WordPress 3.3.4+
- Mathematica 8.0.4
- A lot of existing data

TERM PROJECT

A product/service that uses database for group learning

- All groups works on one big system
  - Each group works on one aspect of the system
  - Or just a feature to the system
    - Example: A plug-in for WordPress

5 HOME WORK

- Weekly blog entries
- Team Project
- Proposal,
- Midterm Report,
- Final Report
- Product Demo

5 A sample video lecture

- Product Features
- Usage Context
- Issues Addressed
- Design Schemes, Data Models
- Applications

4 TERM PROJECT PROPOSAL

- A project proposal:

WATCH VIDEO

5 Proposal in video form

- Team FanFood

QuickTime?and a decompressor are needed to see this picture.

- Project of Global Manufacturing Strategies

A THEME FOR THIS TERM

- Manage data about your own learning activities
  - Class notes, videos, images, ...
  - Blog Entries
  - Relevant Electronic Papers/Books
  - Social Network Contact Info

6 GRADING POLICIES

- Personal Blog Entries 25%
- Team Project Reports 25%
- Product Demonstrations 30%
- Team Spirits 20%
- Working with other teams/schools

%

6 A Personal Journey of Growth

- Mr. Zhang Lu Hang
- Currently 3rd year student at Ningbo Polytechnic
- Majored in Mechanical Engineering
- Age 20

Late August 2010

QuickTime?and a
H.264 decompressor
are needed to see this picture.

September, 2010

QuickTime?and a
H.264 decompressor
are needed to see this picture.

November through December, 2010

6 A Personal Journey of Growth

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Q and A