IMPORTANT NOTICE TO STUDENTS

These slides are **NOT** to be used as a replacement for student notes.
These **slides** are sometimes **vague and incomplete on purpose** to spark class discussions

Final Exam Review

CS 446/646 ECE452
Jul 26th, 2011

WATERLOO
CHERITON SCHOOL OF COMPUTER SCIENCE

Coordinates & Time

When

- Aug 2nd, 2011 @ 12:30PM – 3:00 PM

Where

- PAC 7,8

Structure

Section 1: Multiple Choice [20]

- 20 questions (answer all)

Section 2: Design Questions [85]

- 17 design questions (answer all)
  - mostly short answers
  - 2 bit longer questions
    - Garlan & Shaw Case Study
    - Covered in class

Structure

Section 3: Bonus Questions [9]

- 4 short answer questions

Maximum possible - 100%

Topics

UML

- notation, class & sequence diagrams
- NO use cases

Design Patterns

- Singleton, Adapter, Bridge, Façade, Command, Iterator, Observer, Strategy, Composite, Visitor, Interpreter
- For each
  - intent, class diagram
  - applicability
    - given a scenario, which and why
  - discussion in the class

Topics

Software architecture styles

- basic styles
  - pipe & filter, data abstraction, implicit invocation, layered, repository, interpreter style
- for each know the
  - intent,
  - advantages & disadvantages
  - variations
  - applications
- first three case studies

Topics

Architectural types

- definition & differences
  - the role of each in the software design process

4+1 views

- for each view
  - definition & diagram
  - purpose
  - usage

Topics

Quality concerns

- functional & non-functional requirements

Enterprise web application architecture

- the different iterations (1st, 2nd, GWT)
- components & tiers
- connectors & protocols
- JEE design patterns
  - front controller, Intercepting Filters, Transfer Object, DAO

Topics

Enterprise web application architecture

- design considerations
  - presentation tier enhancements
    - front controller + intercepting filter
  - business tier
    - service layer with Facade and Command
  - persistence tier
    - storage neutrality using DAO & Abstract Factory

Topics

Cloud Computing

- NIST Definition
  - essential characteristics
  - deployment models
  - SPI services
- reference architecture/model
- distributed storage
  - CAP theorem (availability & consistency)
  - scaling & partitioning
  - characteristics

Topics

Cloud Computing

- distributed computing
  - map reduce
    - basic understanding
    - four examples
      - wc
      - distributed grep
      - URL access frequency
      - inverted index

Topics

Re-factoring to Patterns

- Guest lectures by Mehdi
- exercise 4*

Creativity

Another look at design

Alloy

- class activities (binary tree, river crossing)

seL4 Kernel

General Hints

Focus on

- all material discussed in class
- exercises & assignments
- extra reading

Not Included

- Ian Davis guest lecture
- architectural methodology overview