CS251
Intermediate Software Design

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CS 251 Course Philosophy

• Good design & programming techniques & practices are not best learned through generalities & platitudes

• Instead, it’s more effective to see by example how significant programs can be made
  • easier to write & read,
  • easier to maintain & modify, &
  • more efficient & resilient via the application of time-proven software patterns & advanced design/programming techniques
Summary of CS 251 Course Contents

- Focus on topics important to developing & maintaining quality software:
  - Reuse of patterns & software components
  - Developing, documenting, testing, & applying reusable classes & object-oriented frameworks
Patterns will be taught via an extended case study to provide good role models for software designs & to clearly articulate design tradeoffs

**Summary of CS 251 Course Contents**

- **Subject**
  - state
  - observerList
  - setData
  - getData
  - notify
  - attach
  - detach

- **Observer**
  - *
  - update

- **ConcreteObserver**
  - update
doSOMething

- **Observer pattern**

  for all observers in observerList do
  observer.update()
Summary of CS 251 Course Contents

- Object-oriented techniques will be taught to show how to build software architectures that minimize dependencies & coupling between components

- We assume you know C++, equivalent to what is covered in CS 201
Summary of CS 251 Course Contents

• No matter what you know about C++, however, you’ll learn a lot more by the time this class is done!
  • Especially C++11, STL, & patterns
CS 251 Course Work

- Programming assignments
  - All programs will be written in C++ & C++11
  - Will be graded using a GNU C++ compiler
    - We provide you with a VM (see course website for details)
  - Must be done individually
CS 251 Course Work

- Programs will be graded based on:
  - 40% Execution correctness
  - 30% Structure (e.g., modularization, information hiding, etc.)
  - 10% Insightful programming (e.g., developing reusable class components, etc.)
    - 5% effort-based assessment at first submission
  - 10% Consistent style (e.g., capitalization, indenting, etc.)
  - 10% Appropriate commenting style
CS 251 Course Work

- Programs turned in after the due date will receive a 0
- Weekly quizzes
  - Starting next week on Wednesday
- A Final Exam
CS 251 Course Work

• The relative weighting* of each portion of the course is:
  • 45% Quizzes
  • 40% Programming projects
  • 10% Final exam
  • 05% Participation

* Relative weighting may change
CS 251 Semester Outline

• C++ overview/review
  • History & evolution
  • Summary of programming paradigms & how they can be realized in C++

• Advanced C++ programming
  • Generic programming, exception safety, & memory management
  • C++11 features
    • e.g., range-based for loops, Lambda expressions, move semantics, type traits, etc.

• C++ Standard Template Library
  • Containers, iterators, algorithms, etc

• Gang-of-Four design patterns
  • Expression tree case study
CS 251 Ground Rules

- Assignments *must* be submitted on time
- Work *must* be your own
  - [www.vanderbilt.edu/student_handbook/the-honor-system#statement-of-the-honor-code](http://www.vanderbilt.edu/student_handbook/the-honor-system#statement-of-the-honor-code)
- *No* laptops open, texting, iPads, or smartphones during lecture or quizzes
  - Failure to comply will affect your class participation grade.
- Audio versions of the lectures (plus slides) will be recorded & placed on the course website after class
CS 251 Ground Rules

• You may be called upon periodically to answer questions

• You’ll get out of this course what you put into it, so be prepared to work hard

• Be prepared for quizzes, lots of in class discussions, many hours of programming assignments, & occasional guest lectures

• Make sure to avail yourself of available help
  • e.g., office hours, TAs, Piazza, email, recorded lectures, etc.
CS251 Office Hours & Evacuation Plan

- All office hours will take place in Featheringill Hall room 226
- Check course website www.dre.vanderbilt.edu/~schmidt/cs251 for the list of office hour times
- See engineering.vanderbilt.edu/about/evacuationplans.php for the class evacuation plan