Main Project for Spring 2010

MultiDraw--A Distributed, Collaborative and Extensible Version of ObjectDraw

Project Objectives

• To illustrate component-based software development, including concepts such as serialization, and persistence, and distributed systems.
• To gain experience in developing a software architecture.
• To provide experience with the evaluation and use of modern component technologies
• To provide a substantial team-based project experience.
• To have some fun.
General Problem Statement:

– Develop a version of ObjectDraw that permits multiple users on different computers to collaborate, across a network, on a drawing.

– At a minimum the application should:
  • permit remote users to view a MultiDraw session in real time.
  • Allow the “owner” of an open drawing to transfer control to a remote user, thereby allowing that user to manipulate and modify the drawing, while others continue to view the modifications in real time.
  • Allow a drawing to be saved as a file and later reopened for display or modification

General Problem Statement--Continued

• Your implementation of MultiDraw should be extensible
  – Able to add new drawing tools (and perhaps other capabilities) without recompiling the basic application
    • Able to add tools that didn’t exist when original application was written
    • Ideally, new tools can be added while the application is running
  – In a distributed collaboration, users should be able to share tools
    • e.g. if one collaborator has a tool that others don’t possess, it can give them a copy.
**Key design/technology issues:**

- **Distributed interaction framework**
  - RMI
  - CORBA
  - .NET
  - roll-your-own

- **Object serialization**
  - Java serialization
  - roll-your-own (e.g. XML)
  - other—e.g. SOAP

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**Key design/technology issues (continued):**

- **Extensibility**
  - class distribution
  - class loading
  - reflection
Designing MultiDraw--Where Do We Start?

• Requirements Analysis
  – Need to figure out exactly what functionality will be provided (functional requirements)
  – Need to identify system constraints (non-functional requirements)
  – Mock-up user interfaces
  – Develop high-level (essential) use cases

Some Dictated Constraints

• Platform independence--Want this application to work anywhere that Java works.
• Low network overheads--want to have acceptable performance over low-bandwidth network connections.
• Robustness & security--Must be sure that errors or failures don’t mess up a drawing & that a remote user cannot obtain control of a drawing without the consent of the “owner”.
Dictated Constraints--Continued

• Extensibility
  – System design must scale to support relatively large collaborations (e.g. 10 or more collaborators).
  – System architecture should seek to maximize extensibility without recompilation—at a minimum, extensibility of drawing tools.
  – Overall, system should exhibit good component-based design properties.

System Architecture

• Transform requirements into an architectural model
• Must address all system constraints
• Should convey the component-level structure of the system
55:182/22C:182
Project Milestones

• Each Team will develop an architectural model, and development plan for their system by Monday, April 12.
• Each Team will do a 5-minute, in-class presentation of their architecture, technology choices, and development plan on Monday, April 12.

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Project Milestones

• Each Team will do a presentation on their design and implementation during class in the last week of the semester (Wed. May 5, Fri. May 7)
• A separate demonstration for me will be scheduled separately.
• Final Documentation of architecture, design, and implementation is due by Wednesday, May 5.
Project Team Assignments

- Project Team Assignments will be posted on Tues. March 30
- A portion of the class period on Wed. March 31 will be set aside for initial team meetings.

Project—Personal Logs

- Each student MUST keep a detailed personal log
  - should chronicle participation in, and contributions to, the project
  - should critically assess experiences on the team
    - good vs. bad decisions
    - problems encountered
    - lessons learned
- Personal logs will be submitted at the end of the semester and will be an important factor in assigning final grades
Class Schedule

• Lecture will be cancelled on the following dates so that teams can use the time for work sessions:
  – Fri., April 9
  – Fri., April 16
  – Mon., April 19
  – Wed. April 21
  – Fri. April 30