Introduction

- USC-CSE has added a new course CS599 Software Process Modeling. It's objectives are to:
  - review the field of software process modeling
  - develop skills to understand and model software process interactions and feedback
  - explore current process issues and research motivations
  - develop simulation term projects that address critical software issues

- This presentation will overview this year's student projects from the Fall 1999 course
CS599 Software Process Modeling
Student Term Projects

- Dynamics of architecture development process in MBASE inception and elaboration phases
- COTS glue code development and integration dynamics
- Reuse and language-level effects in software development
- CMM-based software process improvement strategies
- Application of RAD techniques to pre-IPO Internet companies

MBASE Architecting
Modeling Goals

- Investigate the dynamics of architecture development during early MBASE lifecycle phases
- Identify nature of process concurrence in early MBASE phases
- Understand impact of collaboration and prototyping on lifecycle parameters
MBASE Architecting

Model Features

- Schedule as independent variable
- Contains iterative process structures
- Covers sequentiality and concurrency
  - phases: requirements and architecture/design
  - activities: initial completion, coordination, quality assurance, iteration
- Demand-based resource allocation
- External and internal precedence constraints
- Calibrated to CS577A data

MBASE Architecting Model Overview

- Lifecycle artifacts
- Model structure

LEGEND

Products of phase
Return Error
Development phase
MBASE Architecting Causal Loop

COTS Modeling Goals

- To understand glue code development and COTS integration process and their correlation
- To determine efficient starting points of glue code development and COTS integration
- To calibrate the component parameters from COCOTS
- To analyze the impact of new parameters such as ratio of new and updated COTS component and number of COTS component
Reuse and High Level Language Modeling

• Goals
  - investigate project reuse dynamics
  - productivity and effort of individual phases
  - understand effects of different language levels

• Model features
  - rework included
  - learning curve formulations
  - increased training for higher level languages
Reuse Structure

TMM-Based Software Process Improvement Study

- Goal: to research and produce a system dynamics model for Software Process Improvement based on the CMM model
- Provides insights into complex process behavior
  - help evaluate different approaches
- Support planning, tracking and prediction
  - reduce costs
  - reduce cycle time
  - reduce defects
- Based on the scenario of a Xerox S/W development group working from just assessed as a Level 2 organization moving towards achieving Level 3.
The Lifecycle process models how software size, effort, quality, and schedule relate to each other in order to produce a product. 

SPI benefits are modeled as percent reductions in either size, effort, error rate or schedule. 

In People, three attitudes of staff that affected the potential benefit of process improvement: pro-SPI people, con-SPI people, and no-care people. 

The attitudinal mix and the pro/con ratio can affect the overall potential benefit realized by a SPI effort. 

KPA Processing models the timing of the flow of process improvements into the lifecycle and people subsystems.
Internet RAD Modeling Goals

- Investigate dynamics of pre-IPO Internet companies
- Contrast to non-Internet software development
- Survey companies and determine major impact factors
Internet RAD Model Features

- Modified evolutionary delivery lifecycle with small teams
  - schedule minimization
- Outsourcing considerations
- Defect detection and elimination
  - short term and long-term feedback
- Includes Internet preview and web-site personalization
- Model sectors: Specification and Design, Outsourcing, Development, Integration and Personalization, Human Resources
References

USC-CSE Web Sites

- sunset.usc.edu/classes/es599_99
  - CS599 Software Process Modeling Course (includes final reports and other system dynamics links)

- sunset.usc.edu/Research_Group/ray/spd