

CptS 421

Software Design Project I

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Instructor:

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Course Overview

- Students integrate their software engineering knowledge and produce a useful engineering artifact.
- They practice major activities in software development process, including communication, planning, modeling and design, construction, and deployment.
- Students get experience in working as teams, participating in project planning and scheduling, writing reports, giving presentations, and dealing with uncertainties in a professional manner.
- It serves as a final preparation for students entering into industry.

Course Overview

- 3 credit hours
- Prerequisites: CptS 323, certified major in CptS, CptE, or EE.
(You need to be enrolled in CptS422 in Fall 2014)
- This is the first step of the two-semester senior design sequence: CptS 421/423
- In CptS 421:
 - the project teams are formed;
 - mentors are interviewed;
 - project requirements are defined;
 - design and architecture is developed;
 - the first few iterations of the prototype implementation is completed

Student Learning Outcomes

- Experience in large-scale software development;
- Communication with clients and other stakeholders;
- Gathering of project requirements;
- Designing of software according to requirements;
- Implementing the design;
- Performing adequate verification, validation, and testing procedures;
- Delivering a professional quality software that meets the client's requirements;
- Writing product specifications, documenting different phases of the project;
- Using software development and maintenance tools
- Planning and developing project timelines;
- Demonstrating an awareness of professional responsibilities;
- Negotiating team dynamics;
- Making presentations, using audio/visual tools, at different stages of the project.

Course Information

Homepage:

- The home page for this course is hosted at the WSU, EECS Socialcast platform.

<https://eecs-wsu-edu.socialcast.com/>



- The class syllabus is also available at <http://www.eecs.wsu.edu/~arslanay/CptS421/>

Course Information

Class Meeting Times:

- TU,TH 13:25pm-14:40pm in Sloan 223.
- We will meet as a class only a few times in CptS 421. The dates will be announced by the instructor.
- The instructor will also meet with each individual team weekly. The team mentors will join these meeting through conference calls.

Weekly Meeting Locations:

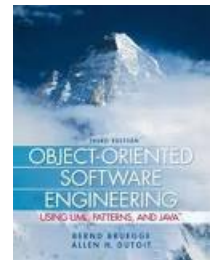
- EME 107 can be used by all CptS421 Senior Design teams.
- Each team will have a key for EME 107.
- Weekly meetings will take place in one of the following rooms: EECS conference room (EME 102A), instructor's office (EME 102D), CptS421 classroom (EME-233).

Course Information

Text Book & References:

There is no required textbook for CptS421. The recommended textbooks/references are:

- "*Object Oriented Software Engineering Using UML, Patterns and Java*", 3rd Edition, by Bernd Bruegge and Allen H. Dutoit, Prentice Hall, 2010.
- "*Software Engineering: A Practitioner's Approach*", 6th edition, by R. Pressman, McGraw Hill, 2005.
- IEEE Standards for Software Engineering
- Any other book or reference specified by your mentor



Socialcast Platform

- We will use the Socialcast enterprise social networking platform for easy communication between the instructor, students, and mentors.
- All course material (instructor prompts and student work) will be posted and managed on Socialcast.
- Instructor will communicate with the class primarily via announcements posted at the Socialcast course group page.
- Each project team will also have a private group on Socialcast, where members of that team can discuss their ideas and ask questions to their mentor.
- The instructor and the industry mentor will peer in and monitor the team's progress through the team's Socialcast stream.

Accessing Socialcast

- The EECS Socialcast server allows access by invitation only.
- An invitation will be sent to your eecs.wsu.edu email. Follow the link in the invitation email to create your Socialcast account.
- After we finalize the team placements, you will receive one more invitation to join your project group.
- Socialcast demo in the next lecture (Thursday 8/28)!

Version Control

- Each project team need to maintain their software on a repository where team members and the project mentor will have access to.
- The teams need to consult with their mentors about the version control tool they will use.
- You may maintain your software on EECS's GitHub server under organization "**2014-fall-421-423-arslanay**"
—<https://github.eecs.wsu.edu/>

CptS 421 Writing Assignments

1. **Project Description and Clarification (2+ pages)**
 - Give an overview of your project and provide a literature review.
 - Show that your team understands the problem
2. **Project Requirements and Technical Specifications (3+ pages)**
 - Summarize the project requirements.
 - You should focus on what your project should do rather than how it should do it.
3. **Solution Approach (5+ pages)**
 - Describe your software design
 - Explain the architecture that you built and provide an architecture diagram with pointers to detailed feature specifications of smaller pieces of the design.
 - Clearly outline all parts of the software and how they will work.
4. **Report of Alpha Prototype (5+ pages)**
 - Provide a detailed description of the prototype system you developed.
 - Provide your test plan. Describe the scope, approach, resources, and schedule of testing activities (should also include tests in CptS423).
 - Include your sprint (iteration) reports

CptS 421 Presentation Assignments

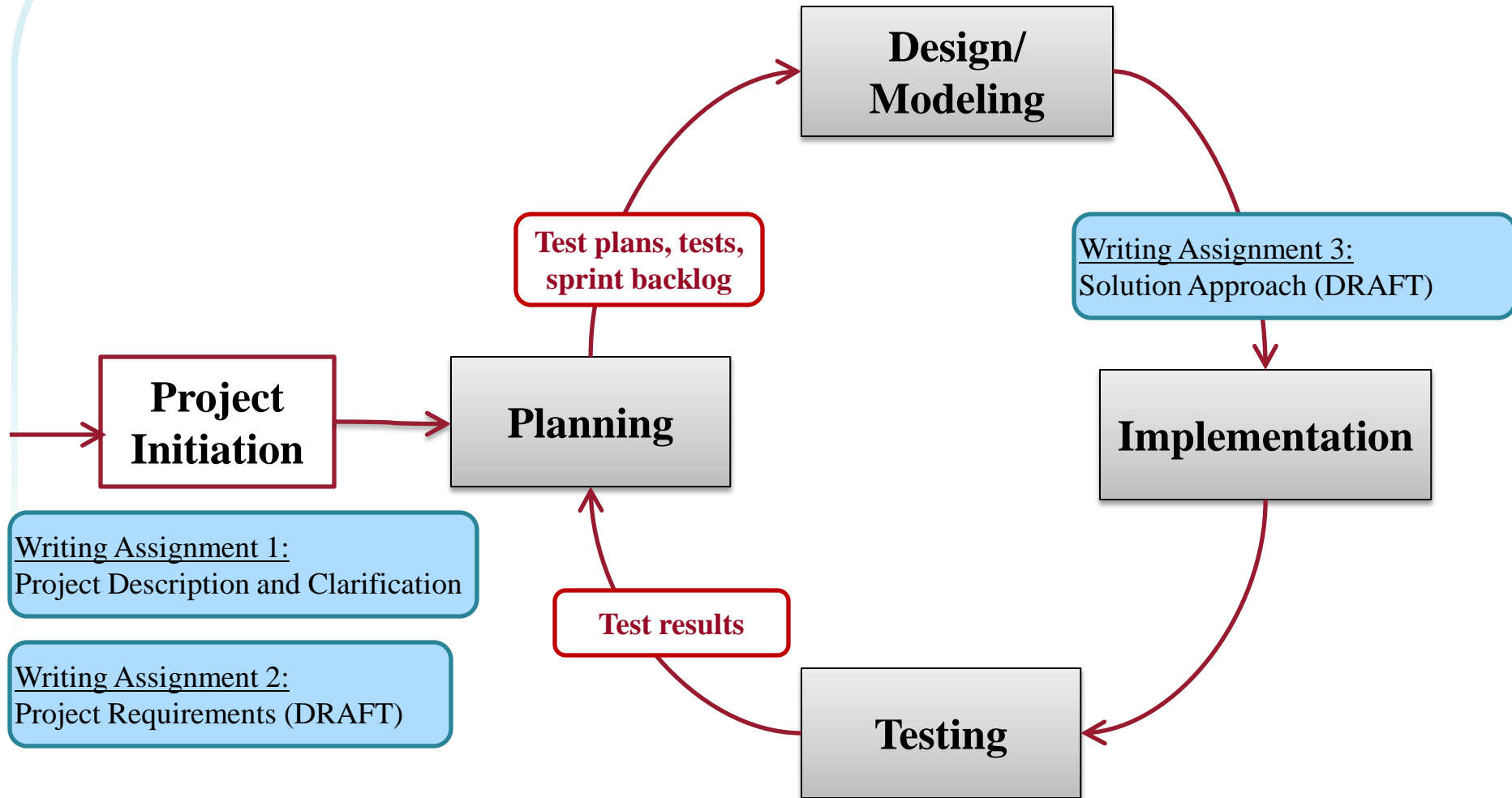
1. Design Review (in class)
 - With no more than 15 slides present your project to your classmates.
2. Design Review and Prototype Demonstration to Mentor
 - Present your design and prototype to your mentor
 - Discuss your testing approach and report your test results.
 - You will supplement the demonstration with presentation slides.

CptS 421 Assignments – Tentative Deadlines

Assignment Generic Name	Assignment Descriptor	Tentative Deadline	Average number of pages
Writing Assignment 1	Project Description and Clarification	Sep 19	2 pages + appendices and images as needed
Writing Assignment 2	Project Requirements and Technical Specifications	draft – Oct 3rd 1 st revision – Nov 17 2 nd revision – Jan 26*	3 pages + appendices and images as needed
Writing Assignment 3	Solution Approach	draft – Oct 20 1 st revision – Nov 17 2 nd revision – Jan 26*	5 pages + appendices and images as needed
Presentation Assignment 1	Design Review (in class)	Nov 18	< 15 slides (~15 minutes)
Presentation Assignment 2	Design Review and Prototype Demonstration to Mentor	Dec 1 through Dec 12	25 slides (~30 minutes)
Writing Assignment 4	Report of Alpha Prototype	Dec12	5 pages + appendices and images as needed

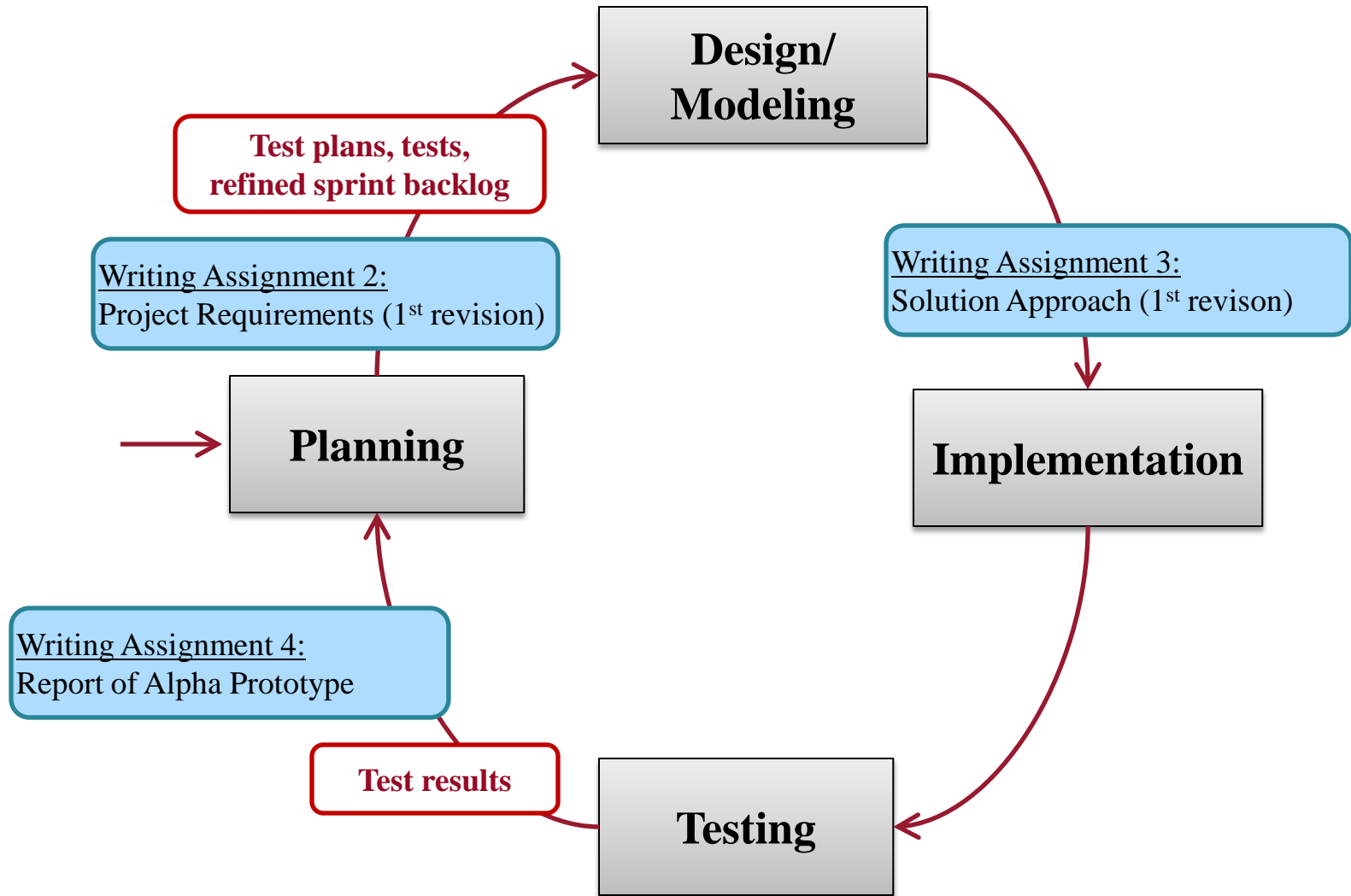
* Second revisions for Requirements Specifications and Solution Approach documents will be done in CptS 423 (spring semester)

Project Milestones Summary



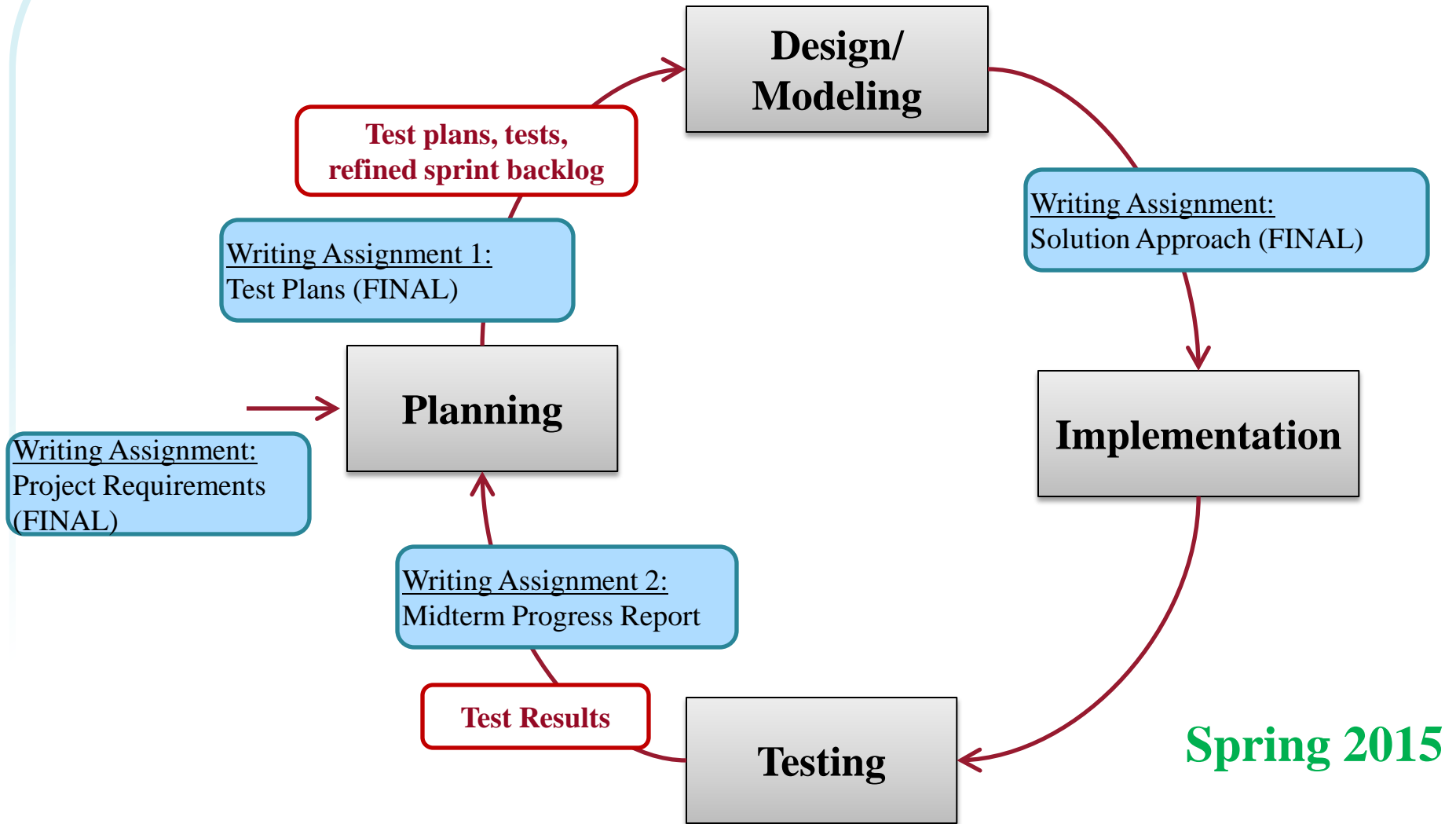
Software Development Model
Iteration-1 (CptS 421)

Project Milestones Summary



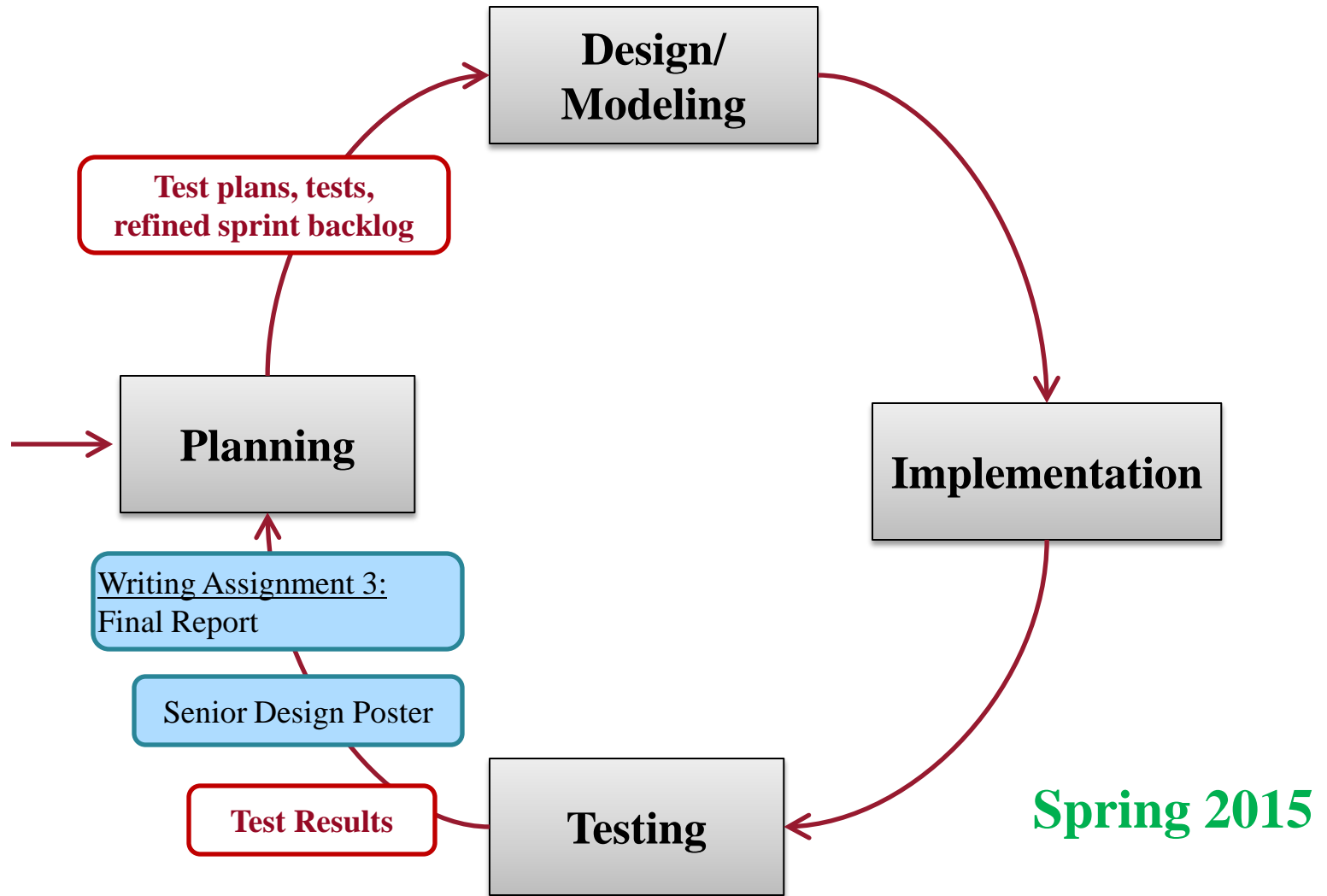
Software Development Model
Iteration-2 (CptS 421)

Project Milestones Summary



Software Development Model
Iterations-3,4 (CptS 423)

Project Milestones Summary



Software Development Model
Final Iteration (CptS 423)

Some Notes on Software Project Development in Senior Design

Project Initiation

- Up-front requirements gathering is important. They do not need to be detailed requirements, but high level requirements are necessary for planning.
- Start with use cases, user stories, or requirements that the customers can understand. These should be at the user level and in practice are not written by the customer. No design should be implied, if possible.
- Get requirements from stories (internal and external), keep requirements document light weight
- Everyone must understand the players involved, goals, constraints, what success looks like, and the overall vision of the customer.

Planning

- The initial development cycle receives more detailed planning than later ones.
- Creating an early prototype for a GUI is valuable.
- Requires team member ownership/commitment.
- Milestones and priorities should be customer driven.
- Hold a “warm-up” meeting for each iteration to determine which features will be added for that iteration.
- Each iteration should produce something useful for the customer .
- Make sure everyone sees/knows the schedule.

Some Notes on Software Project Development in Senior Design

Execution

- Similar to iterative development.
- At each iteration, refine your backlog for that iteration. (Break big tasks into small ones.)
- Make sure features that are part of an iteration are really committed to that iteration.
- Unit testing and regression tests are mandatory for each iteration. Continuous integration and test is part of the process (if build breaks, say who broke it).
- Create tests at the start of each iteration with test cases defined from stories.
- Track discussions or email chains. This does not have to be very formal.
- Documentation should scale to team/customer needs.

Control

- Teams should track velocity (the time spent on each feature and time remaining) to track the progress of an iteration.
- Brief daily team meetings provide good and early feedback on the project.
- The team must know it is responsible for the quality of the product.
- Maintain and follow a coding standard.
- Track code coverage.
- Track defects – opened, closed, re-introduced, etc.
- Maintain communications with the customer and be aware of requirements changes.

Weekly Team Meeting

- Each team will meet once a week with the instructor and the project mentor, where all team members will report the progress for the past week and present the plan for the upcoming week.
- Each team member will prepare 1 or 2 slides summarizing the progress for the past week and the plan for the upcoming week.
- The team leaders should upload the slides onto Socialcast as a single file.
- One team member will take minutes during the meeting and post those on Socialcast
- In the beginning of each sprint (iteration), the team will refine the sprint backlog, mark the completed requirements, bug-fixes, features and add new ones. The refined backlog will be presented to the mentor and the faculty during weekly meetings.

Weekly Progress Evaluations

- The instructor will evaluate and grade the progress within the past week based on the weekly meeting presentations and the activity on Socialcast.
- If a team member cannot attend the meeting due to a valid excuse, s/he should notify the instructor and report his/her progress on Socialcast.
- Skipping a meeting without notification would result in a score of “0” for weekly evaluation. Students with more than three unexcused absence in weekly meetings will receive a course grade of “F”.
- If we skip a weekly meeting, you will report your progress for the weeks since your last meeting and you will be given the same score for those weeks.

Socialcast Activity Evaluations

- Team dynamics
 - Full team participates with meaningful comments in Socialcast threads
- Frequency of Socialcast interactions
- Technical and professional content of Socialcast interactions
 - At least half of the Socialcast threads contain meaningful technical material
- Response to instructor and prompts/posts
- Team members responds in meaningful and detailed ways to instructor
- Material from outside of Socialcast

Grading

- Writing Assignment #1: Project Description and Clarification.....10 % (Team Grade)
- Writing Assignment #2: Project Requirements and Technical Specifications.....17 % (Team Grade)
- Writing Assignment #3: Solution Approach.....20 % (Team Grade)
- Presentation #1: Design Review3 % (Team Grade)
- Writing Assignment #4: Report of Alpha Prototype Results20 % (Team Grade)
- Presentation #2: Alpha Prototype Presentation to Mentor10 % (Ind. Grade)
- Weekly Progress Evaluations by the Instructor.....17 % (Ind. Grade)
- Peer Evaluations.....3 % (Ind. Grade)

✓ Individual (Ind.) Grades add up to 33%

✓ Team Grades add up to 67%

✓ Your performance in presenting your weekly progress will also affect the mentor evaluations.

✓ For documents with multiple revisions the grade will be calculated as:

✓ 40% of 1st version + 60% of 2nd version

Grading Scale and Letter Grades

- All CptS421 material will be graded based on a scale from **1** to **5**.
- **5** means your work satisfies the expectations.
- Above **5** is to recognize exceptional work.
- Extra credit will be given up to 0.5 points

Total Score	Total Score Percentage	Letter Grade
4.65-5.00	93% - 100%	A
4.50-4.65	90% - 93%	A-
4.30-4.50	86% - 90%	B+
4.15-4.30	83% - 86%	B
4.00-4.15	80% - 83%	B-
3.80-4.00	76% - 80%	C+
3.65-3.80	73% - 76%	C
3.50-3.65	70% - 73%	C-
3.30-3.50	66% - 70%	D+
3.00-3.30	60% - 66%	D
0.00-3.00	0% - 60%	F

Student Work Load

- CptS 421 is a 3-credit course.
- Student is expected to spend:
3hrs ("lectures") + 6hrs ("homework") = 9 hours per week
- The 9 hours per week will be spent in the following activities:
 1. meeting with the instructor and the team;
 2. meeting with the faculty resource person;
 3. completing writing and audio/visual assignments;
 4. reading the recommended text book and the technical literature related to your design project;
 5. attending plant visits arranged by your mentor;
 6. strengthening your teaming skills;
 7. helping with project management;
 8. engaging in the design process;
 9. organizing team headquarters including obtaining pertinent hardware and software;
 10. planning for and obtaining approval for a preliminary description of the demonstration prototype;

Upcoming Deadlines

Friday, Aug 29 th *	Send your resume and EECS email address to instructor
Monday, Sep 1 st *	Project preferences are due
Thursday, Sep 4 th *	Teams will be formed
Monday, Sep 8 th *	Teams will schedule their weekly meetings Teams will select their team leaders and notify the instructor
Week of Sep 8 th *	Weekly meetings will start
Friday, Sep 19 th *	First writing assignment “Project Description and Clarification” is due
Friday, Oct 3 rd *	Second writing assignment “Project Requirements-draft” is due

*Due 12:00 midnight , on the specified deadline.

- Please send your resume and EECS email to the instructor until Wednesday, Aug 29th
- Each team should schedule a meeting time until Sep 8th and team leaders should post the meeting time on Socialcast.
- If your team mentor will attend the meetings, you need to choose a time that works for your mentor as well.

Team Names – Please Vote

- I propose to use the following team names this year:
- Theme “Start wars”
 - Jedi
 - Force
 - Dark Side
 - Skywalker
 - Sith
 - Palpatine
 - Obi-Wan
 - Naboo
 - Padmé
- Alternatively each team can choose their own team names (one word only please)
- All names need to be approved by the instructor first.

Example Socialcast Posts

Technical content:

- *“Odd blog post about netgraph queuing and may contain a few ideas on how to fix our issue. Posted here for my own reference.”*

<http://shveitser.blogspot.com/>

Networker`s records

<http://shveitser.blogspot.com>

- *“I really want to use RethinkDB for our database needs (Outside of video storage) please respond with your thoughts. Its powerful and easy to use.*

RethinkDB - a distributed document database for scalable web applications

<http://www.rethinkdb.com.>”

Example Socialcast Posts

Professional content:

- *“Message to stakeholders:*

Could someone get back to me with some idea of how much security we're going to require in the long run? We need to know what kind of information we're going to be storing and to what extent, by law or preference, we want to secure it. We have several options that don't need to be pursued immediately but some thought and discussion on this should probably happen soon.”

Example Socialcast Posts

Professional content:

- *“Message to mentor:*

After some trouble while testing the AddGlobalParameter() method within the Writer, I found that making a seemingly trivial edit in the SQL queries within the method (queries which I tested prior in the SQLite Manager Firefox extension) alleviated the issue. The change was to simply find the location where two SQL queries were being concatenated and prepend the second of the queries with a semicolon where before there was no semicolon. See the change at the attached link. (link to GitHub repository)

What do you think of this change? As I said, I tested to two queries in the Firefox extension and the original query resulted in an error, while the edited query resulted in a passing test.”

Example Socialcast Posts

Team Dynamics

- *“Hey guys just wanted to say I have fully read over the essay. It will take a lot of time and coordination to get it to work since basically we all have to be together in the same room to write every section. Further, every section is 100% reliant on the previous section being finished. We will need to meet a few hours each day to finish this. Tell me when you are free so we can agree upon times.”*

Roles and Responsibilities

Course Instructor

The instructor is responsible to:

- overview the course objectives and expectations
- secure project sponsors and projects
- set project budgets and approve major purchases
- provide feedback on team processes and products, when requested
- establish and track deadlines for project deliverables
- evaluate project deliverables and assign grades
- monitor relations with the mentor

Roles and Responsibilities

Industry Mentors

The industry mentor is responsible to:

- provide the technical details about the project
- assist and lead the students with technical decisions and design
- help to evaluate the team processes and products

Questions?