

CptS 421

Software Design Project I

Lecture-1

Instructor : Sakire Arslan Ay, Ph.D.

Instructor:

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For other times, please make an appointment via phone or email.

Teaching Assistant

TBA

Course Overview

- Students integrate their software engineering knowledge and produce a useful software product.
- 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 co-enrolled in CptS422)
- 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 course syllabus and slides for first 2 lectures are available at <http://www.eecs.wsu.edu/~arslanay/CptS421/>

Class Meeting Times:

- TU,TH 13:25pm-14:40pm in Sloan 7.
- 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.

Course Information

Weekly Meeting Locations:

- 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).

Senior Design Lab:

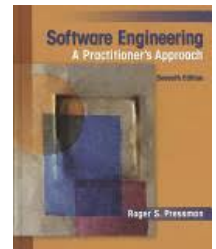
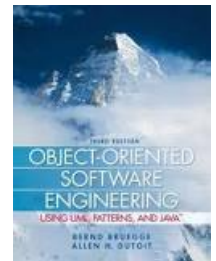
- Sloan 353A is being redesigned as a Computer Science Senior Design Lab.
- Each team will have a workspace in that lab. (*Some teams will share their workspace with another team.*)
- EME 107 will be used by the teams who need to store their equipment in a secure place.

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



GitHub

- Each team will have a private repository at the EECS GitHub server (<https://github.eecs.wsu.edu/>) under organization “2015-421-423-arslanay”
- The project teams will primary use GitHub for software version control, task management, and bug tracking.
- Teams will post their weekly meeting slides and meeting notes on GitHub.
- All team assignments and source code submissions will be uploaded onto GitHub.
- Project mentors will have access to their teams' repositories.
- The instructor and the industry mentors will consider the GitHub activity in evaluating teams progress during the semester.

Accessing EECS GitHub Server

- You can login to EECS GitHub server using your EECS account username and password. Your GitHub account is activated automatically after your first login.
- If you don't know your EECS account username and/or password, please contact EECS IT.
- The instructor will grant (admin) access to your teams' repository after team assignments are finalized.
- GitHub demo in the next lecture (Thursday 8/27)!

Blackboard

- The instructor will communicate with the class and project groups primarily via announcements posted on Blackboard
<https://learn.wsu.edu>
- Each project team will have a private group on Blackboard where they can discuss project related issues, exchange ideas, arrange team meetings, etc.
- Students should respond to instructor's requests and questions with meaningful and detailed answers.
- Assignment grades will be posted on Blackboard.

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 preliminary test plan. Describe the scope, approach, resources, and schedule of testing activities (should also include the tests which will be performed in CptS423).
 - Include your sprint (iteration) reports

CptS 421 Presentation Assignments

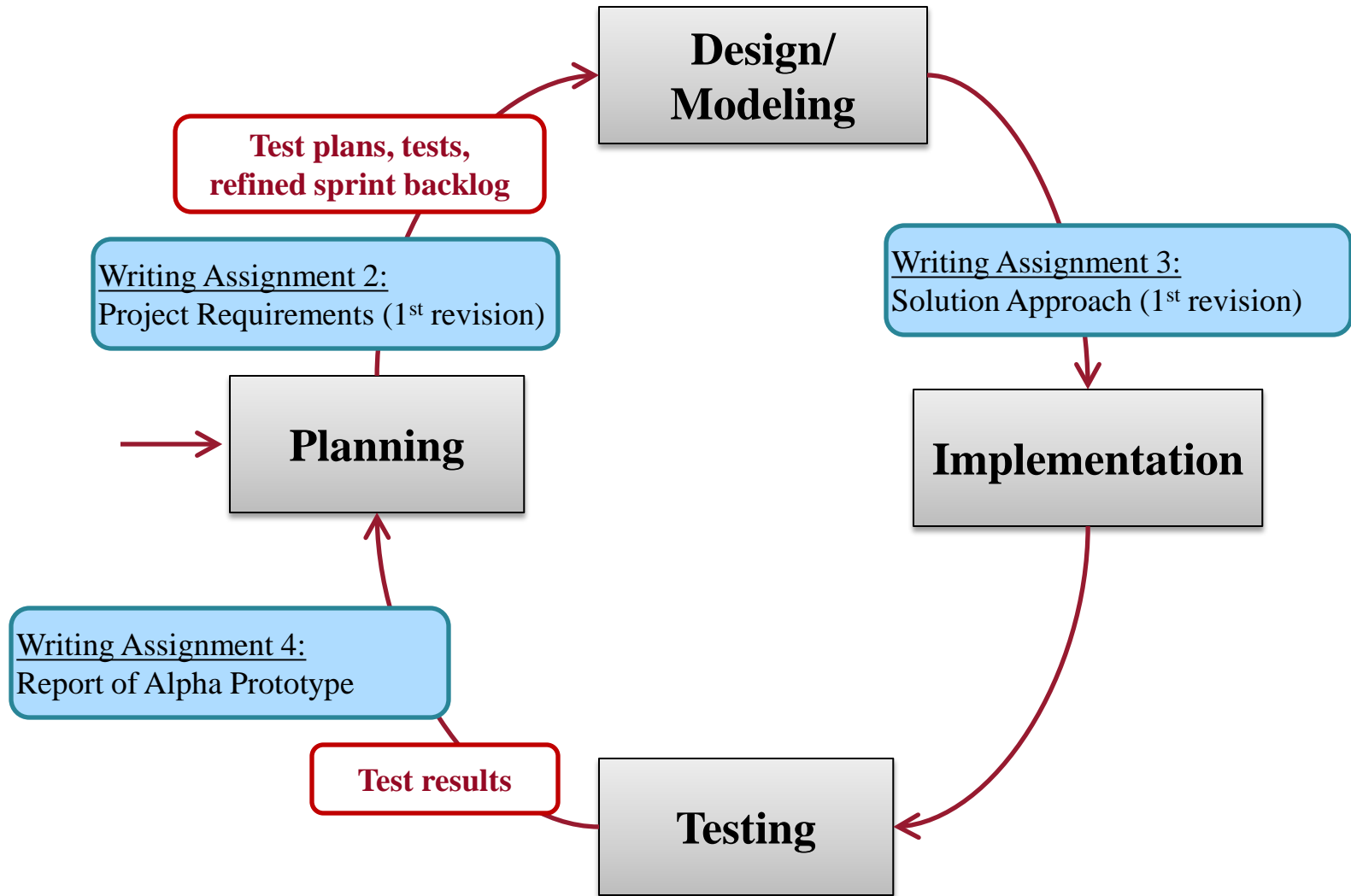
1. Design Review (in class)
 - With no more than 15 slides present your project to your classmates.
2. Design Review and Prototype Demonstration to Mentor
 - Present your design and prototype to your mentor
 - Discuss your testing approach and report your test results.
 - You will supplement the demonstration 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 25	2 pages + appendices and images as needed
Writing Assignment 2	Project Requirements and Technical Specifications	draft – Oct 16rd 1 st revision – Nov 20 2 nd revision – Jan 29*	3 pages + appendices and images as needed
Writing Assignment 3	Solution Approach	draft – Nov 13 1 st revision – Jan 29* 2 nd revision – TBA*	5 pages + appendices and images as needed
Presentation Assignment 1	Design Review (in class)	Nov 17	< 15 slides (~15 minutes)
Presentation Assignment 2	Design Review and Prototype Demonstration to Mentor	Dec 1 through Dec 11	25 slides (~30 minutes)
Writing Assignment 4	Report of Alpha Prototype	Dec18	5 pages + appendices and images as needed

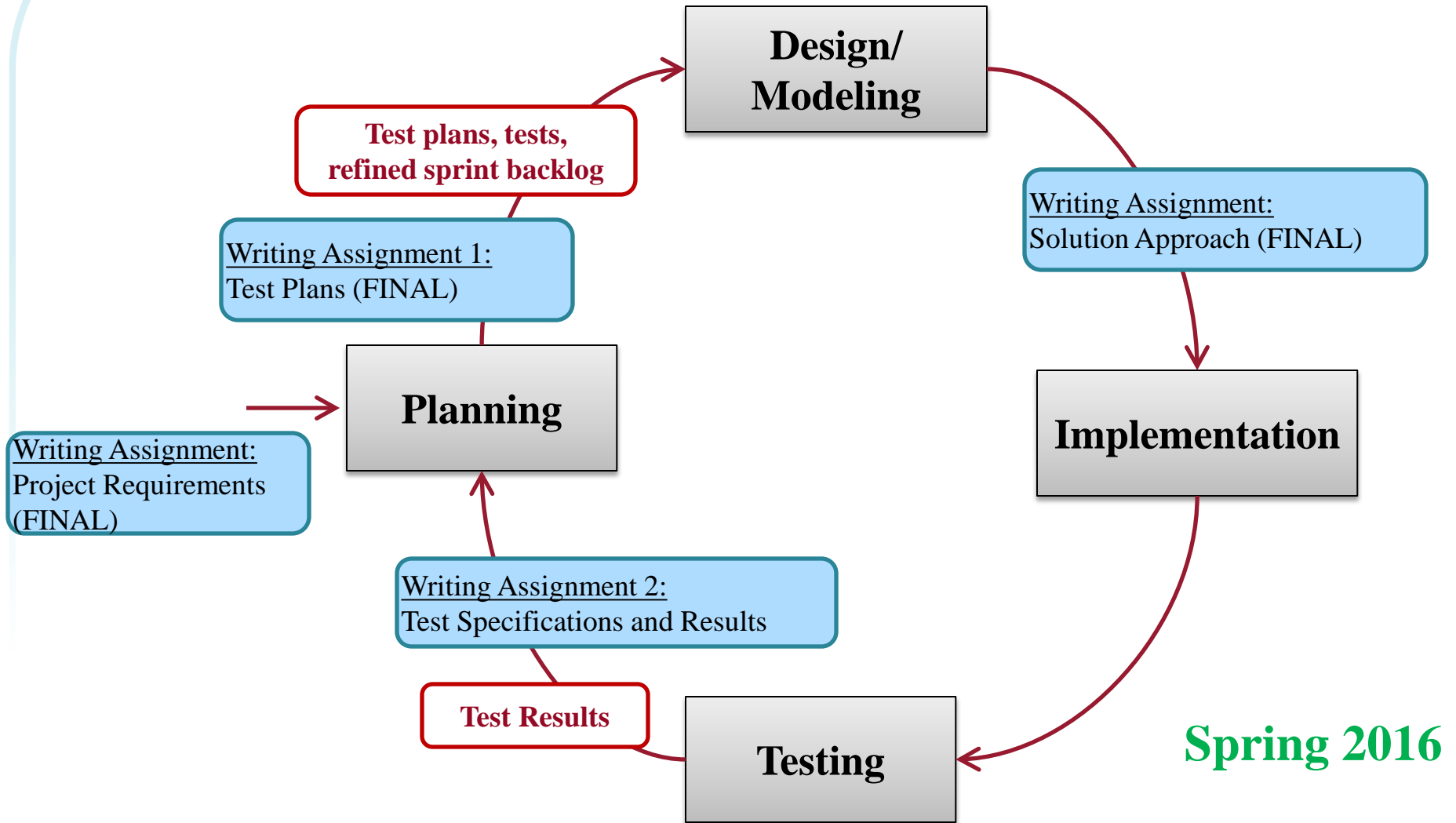
* Second revisions for Requirements Specifications and Solution Approach documents will be done in CptS 423 (spring semester)

Project Milestones Summary



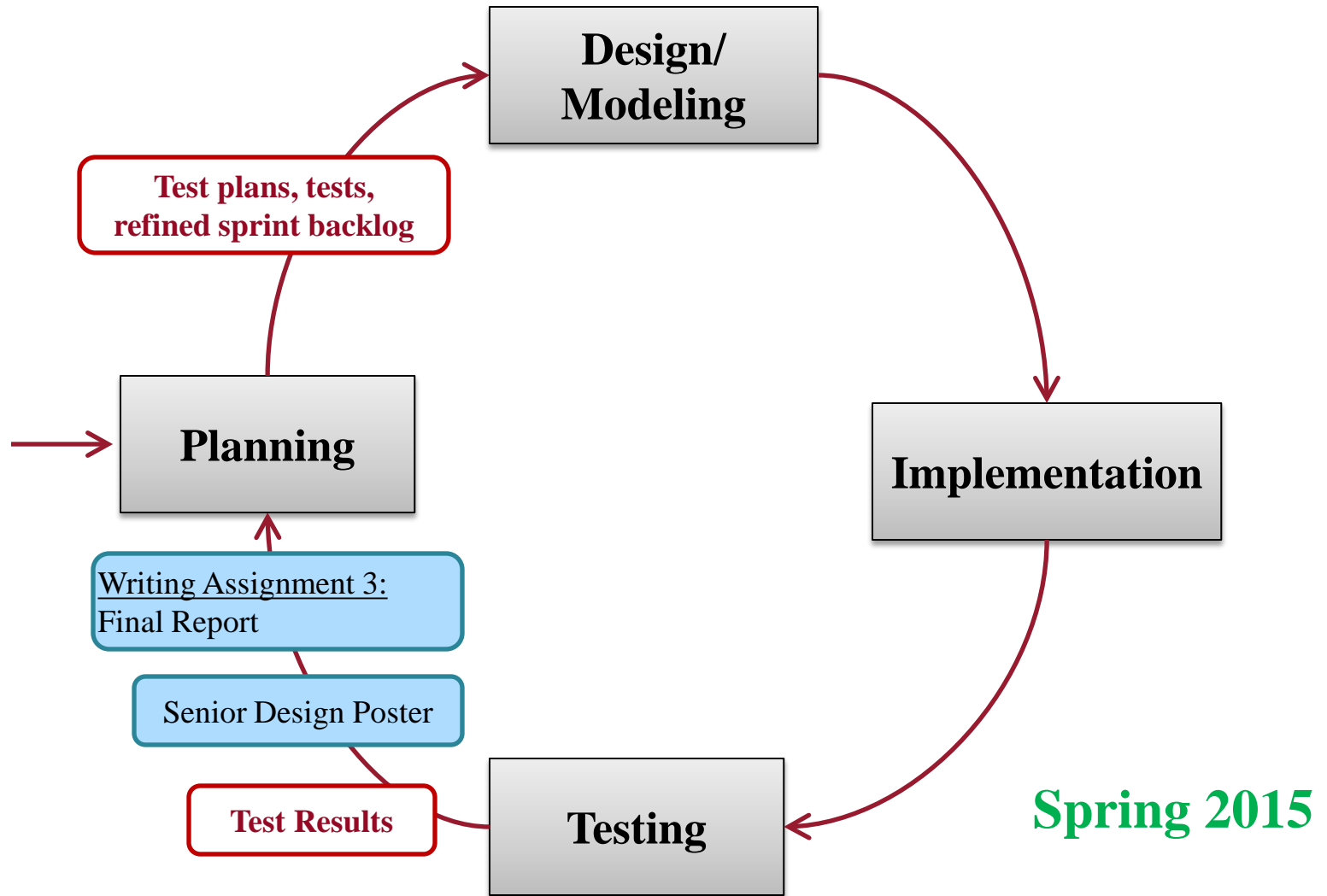
Software Development Model
Iteration-2 (CptS 421)

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 GitHub as a single file.
- One team member will take minutes during the meeting and post those on GitHub (Wiki pages)
- 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 instructor during weekly meetings. (Examples will be provided in the next lecture.)

Monthly Progress Evaluations

- The instructor will evaluate and grade the progress of each student once a month based on the weekly meeting presentations and the activity on GitHub and Blackboard.
- 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 GitHub.
- Skipping two meetings without notification would result in a score of “0” for instructor evaluation. Students with more than three unexcused absence in weekly meetings will receive a course grade of “F”.
- When a weekly meeting is cancelled, you will report your progress for the weeks since your last meeting and you will be given the same score for those weeks.

GitHub Activity Evaluations

- Project planning, defining milestones;
- Project management, issue tracking
- Team member contributions, code commits;
- Weekly meeting notes, slides, and sprint backlogs

Grading

- Writing Assignment #1: Project Description and Clarification.....8 % (Team Grade)
- Writing Assignment #2: Project Requirements and Technical Specifications.....15 % (Team Grade)
- Writing Assignment #3: Solution Approach.....20 % (Team Grade)
- Presentation #1: Design Review3 % (Ind. Grade)
- Writing Assignment #4: Report of Alpha Prototype Results15 % (Team Grade)
- Presentation #2: Alpha Prototype Presentation to Mentor15 % (Ind. Grade)
- Weekly Progress Evaluations by the Instructor.....20 % (Ind. Grade)
- Peer Evaluations.....4 % (Ind. Grade)

✓ Individual (Ind.) Grades add up to 42%;

✓ Team Grades add up to 58%

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

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

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

Grading (cont.)

- **Peer Grading:**
 - Each student will fill-in and submit a “peer evaluation” form.
 - The assignment scores will be adjusted according to peer evaluations:
$$\text{adjusted assignment grade} = \text{team assignment grade} * \text{percentage of contributions}$$
 - The instructor reserves the right to adjust the peer evaluation scores if the instructor and the mentor agree that the scores were prejudiced (either too high or too low).

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
4.65-5.50	93% - 110%	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 team, instructor, and mentor;
 2. completing writing/presentation assignments;
 3. engaging in the design process;
 4. project development and coding;
 5. reading the technical literature related to your design project;
 6. attending the sponsor company visits arranged by your mentor;
 7. strengthening your teaming skills;
 8. helping with project management;
 9. organizing team headquarters including obtaining pertinent hardware and software;

Upcoming Deadlines

Friday, Aug 28 th *	Send your resume and EECS email address to instructor
Saturday, Aug 29 th *	Project preferences are due
Thursday, Sep 3 rd *	Teams will be formed
Monday, Sep 7 th *	Teams will schedule their weekly meetings Teams will select their team liaisons and notify the instructor
Week of Sep 7 th *	Weekly meetings will start
Friday, Sep 25 th *	First writing assignment “Project Description and Clarification” is due
Friday, Oct 16 rd *	Second writing assignment “Project Requirements-draft” is due

*Due 11:59 pm , on the specified deadline.

- **Please send your resume and EECS email to the instructor until Friday, Aug 28**
- **Please provide your project preferences until Saturday Aug 29. (Instructor will email you the Project Preference Submission after the lecture)**
- **Each team should schedule a meeting time until Sep 7 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

- “WSU Presidents”

- George W. **Lilley** (1891–1892),
- John W. **Heston** (1892–1893),
- Enoch A. **Bryan** (1893–1915),
- Ernest O. **Holland** (1916–1944),
- Wilson M. **Compton** (1945–1951),
- C. Clement **French** (1952–1966),
- Glenn **Terrell** (1967–1985),
- Samuel H. **Smith** (1985–2000),
- V. Lane **Rawlins** (2000–2007),
- Elson S. **Floyd** (2007-2015),
- Daniel J. **Bernardo**

VS

- Games of Thrones

- House **Arryn**
- House **Mormont**
- House **Greyjoy**
- House **Clegane**
- House **Lannister**
- House **Stark**
- House **Tyrell**
- House **Targaryen**
- House **Baratheon**
- House **Tully**

- Other names:
- The **Dothraki**
- The **Wildlings**
- The **Night's Watch**

- Alternatively each team can choose their own team names (single word names only)
- All names need to be approved by the instructor first.

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?