

The background is a dark teal gradient. In the corners, there are decorative white line-art elements resembling circuit traces or data paths, with small circles at the end of the lines.

PROJECT MANAGEMENT AND RISK TRACKING

A Primer for Capstone 2022

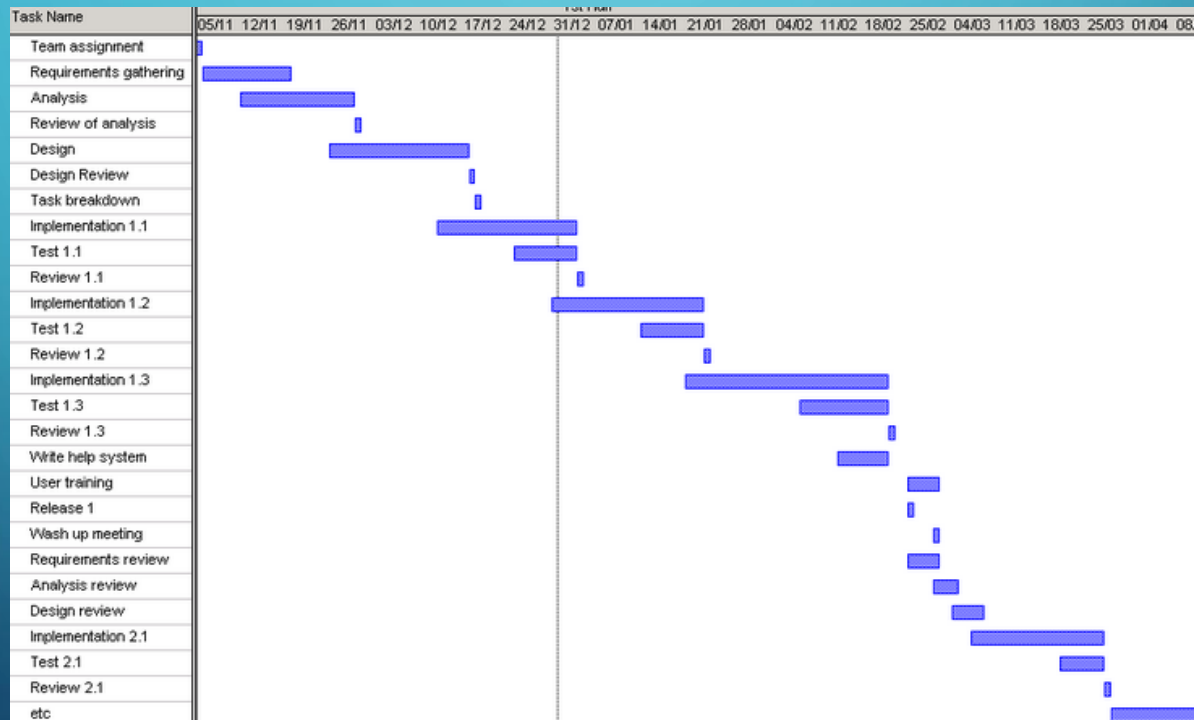
Mike D. Smith

ALL CAPSTONE TEAMS MUST:

- Choose a project management tool to maintain project status
- Identify and track risks to their Anticipated Best Outcome

TRADITIONAL METHODS

- Traditional waterfall (Gantt chart) planning
 - Customer needs and priorities might change
 - Estimating distant tasks is difficult
- Typically not effective for Capstone



AGILE DEVELOPMENT

- Iterative and incremental development methodology
- Organize work into short duration “sprints”
 - Typically 2 weeks
- Team commits to specific work for that period
- Tasks are well defined:
 - Specific work to be completed
 - Acceptance Criteria – When a task is “done”
 - Size of task (points or hours)
- Members focus on a single task
- Deliver something of value to the customer each sprint
 - Allows for feedback and new directions

AGILE VS WATERFALL, ADVANTAGES

Agile

- Flexible
- Easier to estimate
- Regular customer feedback
- Quality can be included in each iteration

Waterfall

- Project scope is fixed
- Larger teams possible
- Fewer meetings
- Known timeline and deliverable

STEP 1: FUTURE TASKS (BACKLOG)

The To-Do List

- A large group of ideas that together capture all of the features the customer wants
- Prioritized
- Not necessarily well defined
- Can be changed as needed:
 - Capture ideas for new work as you think of it
 - Remove work that is no longer necessary

STEP 2: SPRINT PLANNING (GROOMING)

Preparing To-Do Items That Will Be Started Soon

- Further define ideas in the backlog
- Agree on relative size of the task
- Break up extra large tasks into manageable pieces
- Prioritize tasks
- Only go far enough to fill 1.5-2 sprints

STEP 3: THE SPRINT ITSELF

Doing the Work

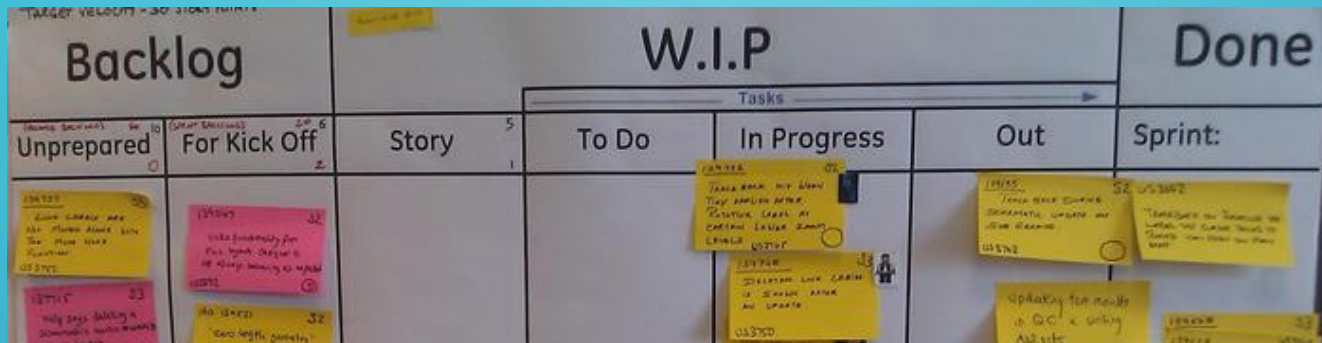
- The team commits to a set of tasks from the backlog
- You only get credit for tasks you complete
- Tasks move from To Do → Doing → Done

STEP 4: DEMO

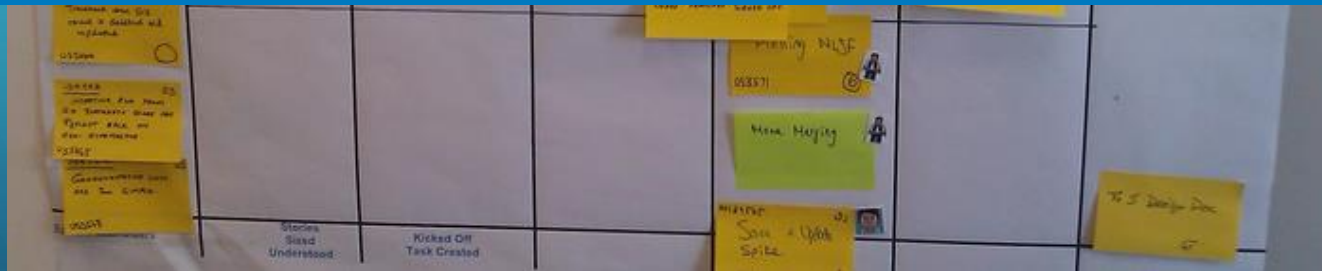
Deliver Something of Value from Each Sprint

- Show what the team has done in the sprint
- Get feedback and forward direction from the customer

IMPLEMENTATIONS



Future Tasks	Next Sprint	Current to Do	In Progress	Done 10/28
<ul style="list-style-type: none">Android App DevelopmentHardware/Software IntegrationFinal System Demonstration <p>Add a card...</p>	<ul style="list-style-type: none">Electronic Sensor Eye Interface CircuitiOS App development <p>Add a card...</p>	<ul style="list-style-type: none">Site SurveySetup Feeder and WebcamServer Software <p>Add a card...</p>	<ul style="list-style-type: none">Webcam Capture Software <p>Add a card...</p>	<ul style="list-style-type: none">Component Research [3]Order Materials [1] <p>Add a card...</p>



CAPSTONE TWO WEEK TIMELINE

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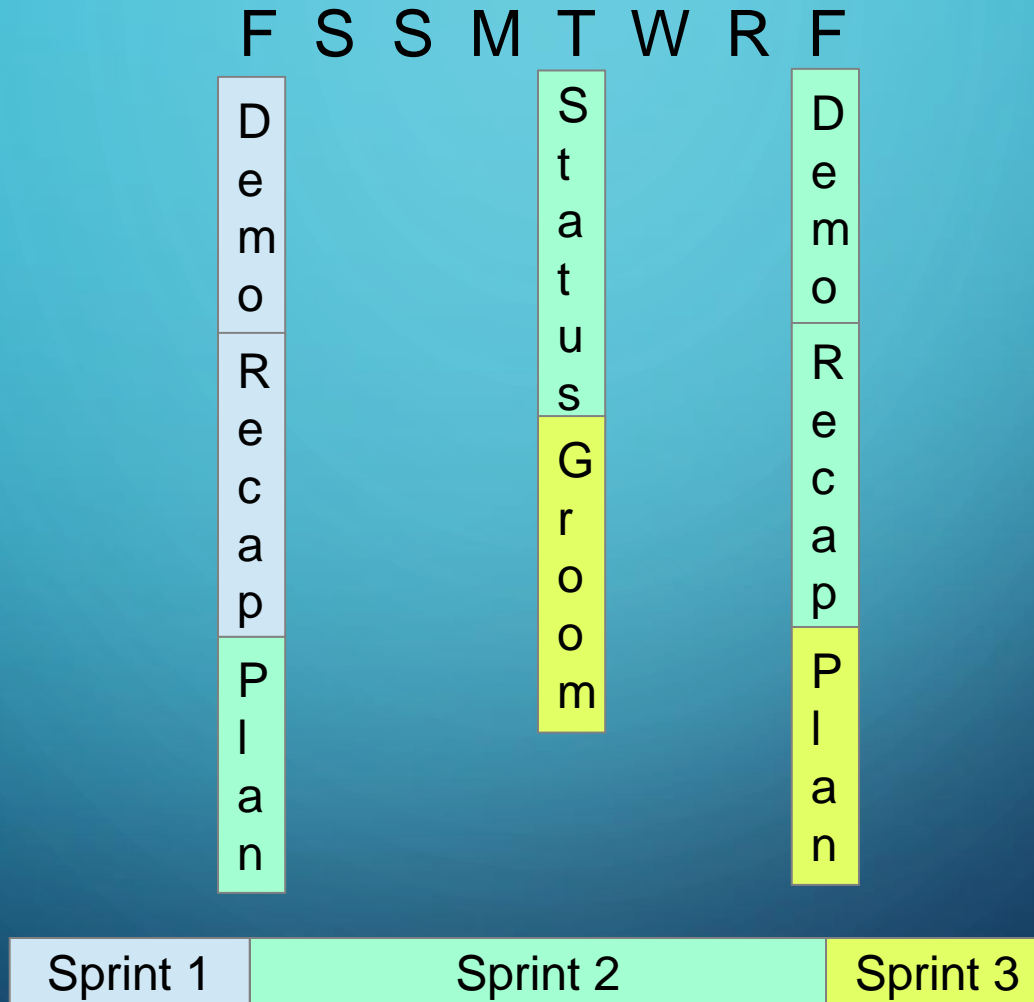
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Sprint 1

Sprint 2

Sprint 3

CAPSTONE ONE WEEK TIMELINE



START OF PROJECT

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Future Tasks

Android App Development

Server Software

Component Research [3]

Order Materials [1]

Webcam Capture Software

Setup Feeder and Webcam

Site Survey

Hardware/Software Integration

iOS App development

Electronic Sensor Eye Interface Circuit

Final System Demonstration

Add a card...

Next Sprint

Add a card...

Current to Do

Add a card...

In Progress

Add a card...

Done 10/28

Add a card...

DETAILED TASK EXAMPLE

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Future Tasks

- Android App Development
- Server Software
- Component Research [3]
- Order Materials [1]
- Webcam Capture Software
- Setup Feeder and Webcam
- Site Survey
- Hardware/Software Integration
- iOS App development
- Electronic Sensor Eye Interface Circuit
- Final System Demonstration
- Add a card...

Next Sprint

Add a card...

Component Research [3]

in list [Future Tasks](#)

Description [Edit](#)
Research possible bird feeders, electronic eyes, and wifi webcams. Total material budget is limited to \$150.

Acceptance Criteria: Generate a Bill of Materials for all components with price and lead time.

Points: 3

Add Comment

M Write a comment...

Send

Activity

[Show Details](#)

Add

- Members
- Labels
- Checklist
- Due Date
- Attachment

Actions

- Move
- Copy
- Subscribe
- Archive

[Share and more...](#)

READY FOR SPRINT 1

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Future Tasks ...

- Android App Development
- Server Software
- Hardware/Software Integration
- iOS App development
- Final System Demonstration

Add a card...

Next Sprint ...

- Component Research [3]
- Order Materials [1]
- Setup Feeder and Webcam
- Site Survey
- Electronic Sensor Eye Interface Circuit
- Webcam Capture Software

Add a card...

Current to Do ...

Add a card...

In Progress ...

Add a card...

Done 10/28 ...

Add a card...

SPRINT IN PROGRESS

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Future Tasks

Android App Development

Server Software

Final System Demonstration

Add a card...

Next Sprint

Hardware/Software Integration

iOS App development

Add a card...

Current to Do

Setup Feeder and Webcam

Electronic Sensor Eye Interface Circuit

Webcam Capture Software

Add a card...

In Progress

Site Survey

Order Materials [1]

Add a card...

Done 10/28

Component Research [3]

Add a card...

END OF SPRINT

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Future Tasks

Integrated PCB Development

Research Prototype Vendors

Refine BOM

Generate New Schematic Symbols

Generate New PCB Footprints

Schematic Capture

PCB Layout

PCB Fab

PCB Assembly

Etc. Etc. Etc.

Add a card...

Next Sprint

Hardware/Software Integration

iOS App development

Android App Development

Server Software

Final System Demonstration

Add a card...

Current to Do

Add a card...

In Progress

Webcam Capture Software

Add a card...

Done 10/28

Component Research [3]

Site Survey

Order Materials [1]

Setup Feeder and Webcam

Electronic Sensor Eye Interface Circuit

Add a card...

START OF SPRINT 2

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Future Tasks ...

- Integrated PCB Development
- Refine BOM
- Generate New Schematic Symbols
- Generate New PCB Footprints
- Schematic Capture
- PCB Layout
- PCB Fab
- PCB Assembly
- Etc. Etc. Etc.

Add a card...

Next Sprint ...

Add a card...

Current to Do ...

- Webcam Capture Software
- Hardware/Software Integration
- iOS App development
- Android App Development
- Server Software
- Final System Demonstration
- Research Prototype Vendors

Add a card...

In Progress ...

Add a card...

Done 11/11 ...

Add a card...

Done 10/28

- Component
- Site Survey
- Order Mate
- Setup Feed
- Electronic S

Add a card...



RISK TRACKING

ABOUT RISK TRACKING

- Managed projects typically capture and track risks to achieving specific or overall goal. While Capstone projects don't need the same level of formal tracking as more complex projects, a basic assessment of risks to the Best Anticipated Outcome should be included.

WHY TRACK RISK?

- **Better understand your current project status**

Everything may seem fine, but underlying risks might be jeopardizing your success

- **Manage Expectations**

Allow planning vs excuses

- **Plan Mitigation Strategies**

With time for them to be implemented

- **A large number of unlikely events typically yields some that are realized**

CAPSTONE GUIDANCE

- Only track risks with a reasonable likelihood of occurring
- Remember that risks have a negative impact and may occur

Once it happens, it's no longer a risk but an issue

Some programs have an Opportunities Register for positive events that may occur

- Identify:

Critical decisions that need to be made, Findings that need to occur,
Schedule targets that need to be hit, Points of failure, Assumptions made,
Critical resources, etc

that would impact the Best Anticipated Outcome of the project.

- Work backwards from your Best Anticipated Outcome

CAPSTONE IMPLEMENTATION

- You'll create a risk table in your logbook, from the template provided to include:
 - Description of Risk
 - Impact to the Project (Consequences if risk comes true)
 - Likelihood of Risk Occurring
 - Seriousness of Risk Occurring
 - Grade of Risk
 - Mitigation Strategy, if applicable
- Revisit weekly to update grade and action, add new risks, retire items that are no longer risks.
- Your current risk table will be included in your major progress reports throughout the year.

Grade		Seriousness			
Likelihood	Low	Low	Medium	High	
	Medium	D	D	C	B
	High	D	C	B	A
	High	C	B	A	

Recommended Action by Risk Grade	
Grade	Risk mitigation actions
A	Immediately identify and implement actions to reduce the likelihood and seriousness as a top priority.
B	Identify actions to reduce the likelihood and seriousness to implement as the risk become more likely/serious.
C	Identify actions to implement should the risk occur.
D	Monitor the risk for changes in the future.

RISK EXAMPLE

- **Description:** A critical system component is currently out of stock and may not be available in time for integration and testing
- **Impact:** A major feature of the project might not be implemented
- **Likelihood:** Medium
- **Seriousness:** High
- **Grade:** B
- **Mitigation Strategy:** Identify when the component will be available on the schedule. Check stock daily or pay premium price (reduces likelihood of risk occurring) if it becomes available. As the need by date approaches, investigate alternative components that could be used instead. (reduces seriousness)

Grade		Seriousness		
		Low	Medium	High
Likelihood	Low	D	D	C
	Medium	D	C	B
	High	C	B	A

Recommended Action by Risk Grade	
Grade	Risk mitigation actions
A	Immediately identify and implement actions to reduce the likelihood and seriousness as a top priority.
B	Identify actions to reduce the likelihood and seriousness to implement as the risk become more likely/serious.
C	Identify actions to implement should the risk occur.
D	Monitor the risk for changes in the future.

REQUIRED NEXT STEPS

- Discuss a project management approach with your TDs on Friday
 - Create Trello accounts or use Taiga or TD's preferred method
 - Note your program management decision in your logbook notes from the TD meeting.
 - Project status will be discussed on Tuesday evenings
- Start identifying risks, so that you have data to include in your logbook next week.
 - Logbook guidance will be provided in next slides and on the website
 - Update weekly
 - Include in your major progress report