

Agile Project Management

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PMG 622
Master of Project Management

Lecture 06



Working with a Framework (Scrum)

Lecture 6

PMG 622

Agile Project Management

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Learning Objectives

- Apply Scrum framework on a sample project to:
 - Develop a Product Vision, Product Roadmap, and Release Plan
 - Develop an Initial Product Backlog
 - Perform Story Mapping
 - Perform Sprint Planning including story splitting, user story development and estimation
 - Use Kanban Boards to manage Sprints
 - Develop Burndown Charts and calculate Velocity
 - Perform Sprint Review and Retrospective
 - Perform Backlog Refinement

Note for Lecture Exam:

Please Review Lecture 2 and Lecture 4
for definitions of terms used in this
Lecture.

Key Points from Previous Lecture

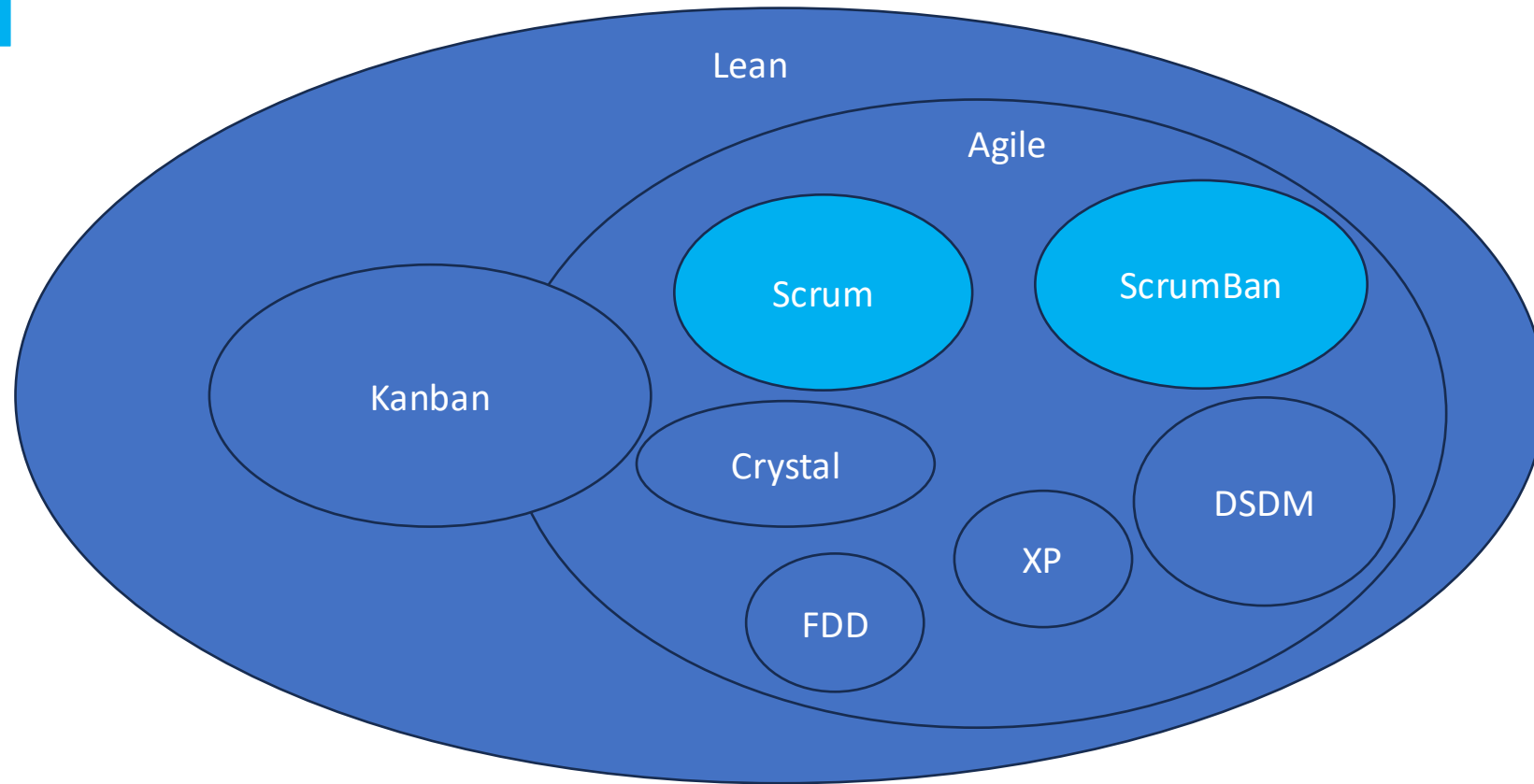
Scrum is the most widely used Agile Methodology

Some Agile methodologies as Lean, Crystal has no prescribed processes

Most methodologies started in the Software Industry, except for Lean and Kanban who came from manufacturing

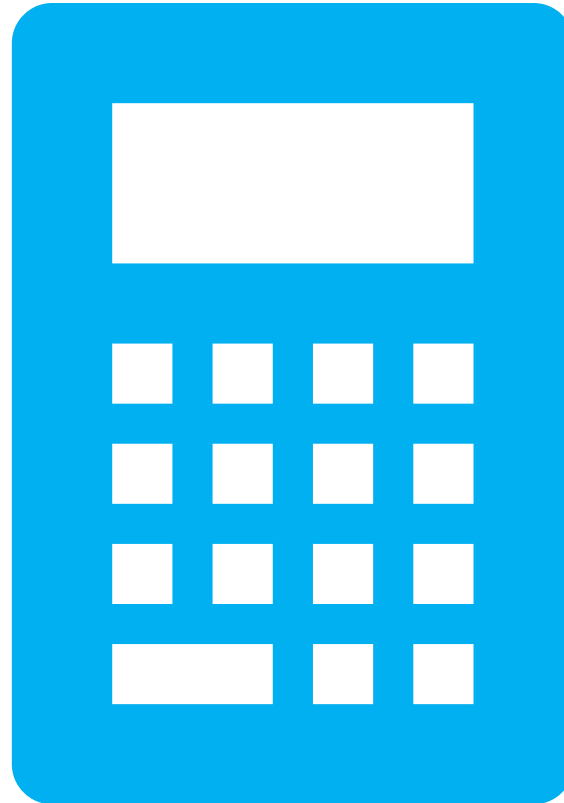
You can mix tools from different methodologies together in your Agile project

There are many different Agile Frameworks



The Project: Develop a Calculator Application

- Arithmetic Functions
- Algebraic Equations
- Trigonometric Functions
- Statistical Functions

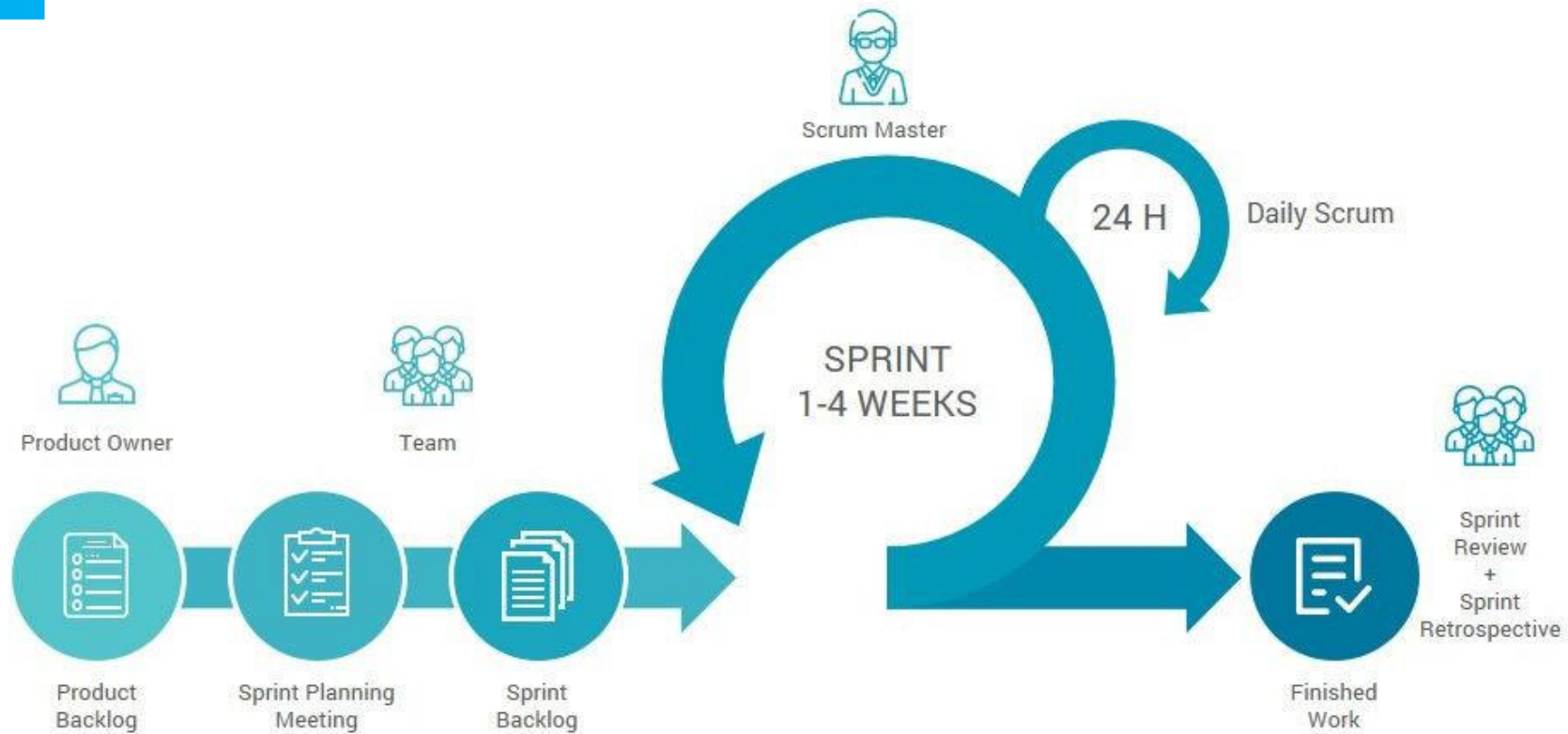


- Works on multiple platforms:
 - Web
 - IOS
 - Android

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Scrum Process



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Product Vision, Roadmap, and Release Plan



Product Vision

- Describes the purpose of a Product, the intention with which the Product is being created, what problems it tries to resolve, and what it aims to achieve for customers

VISION: The BEST Calculator APP for Students.

Target Group:

1. High School Students
2. University Students
3. Post-Graduate Students

Needs:

- User Friendly
- Performs Arithmetic, Algebra, Trigonometry, and statistics Functions

Product:

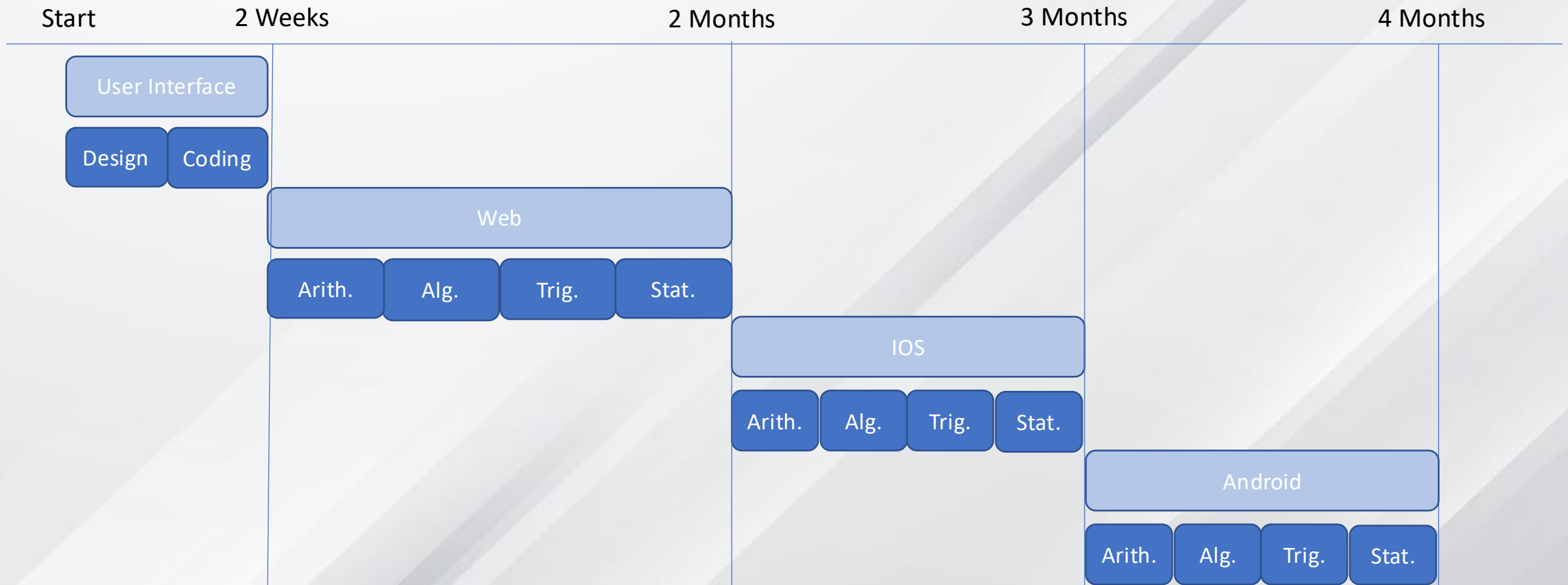
- Multi-Platform (Web, IOS, Android)
- Supports Touchscreens
- Uses AI to predict input

Business Goals:

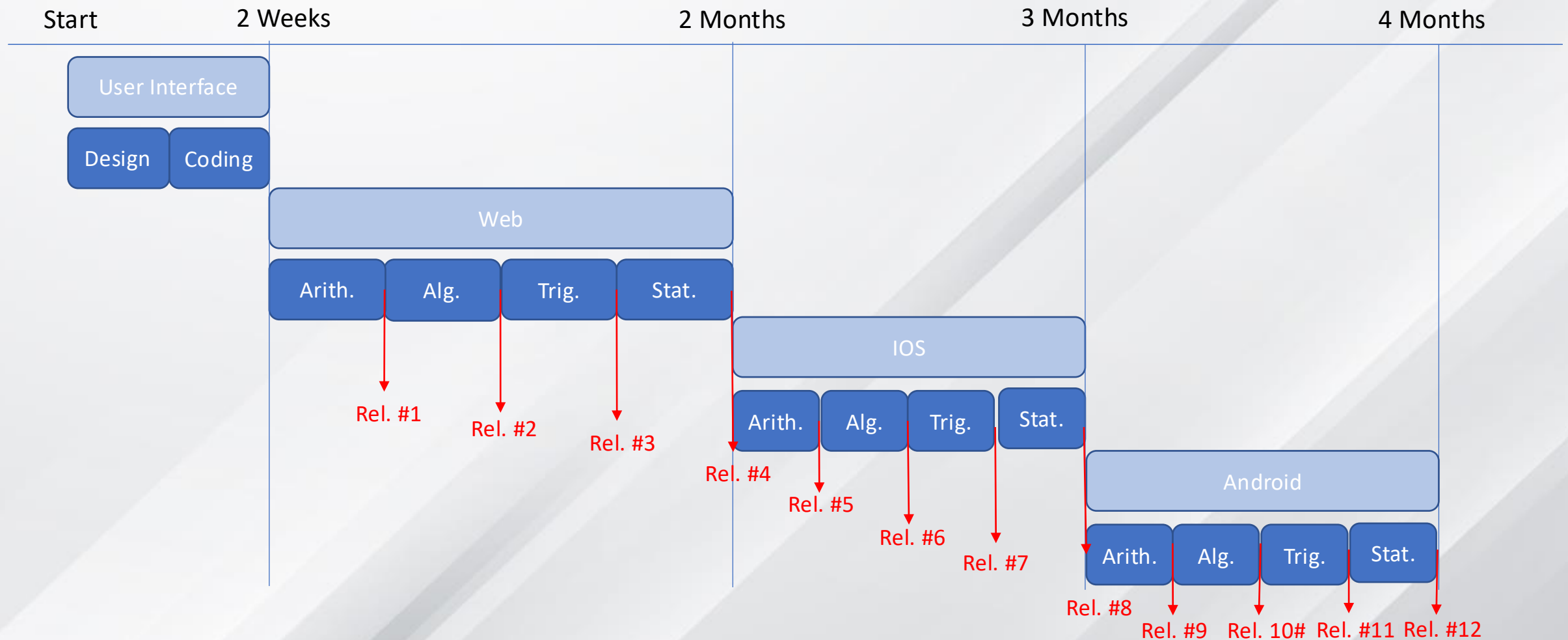
- Gain 1 M subscribers by end of year 1
- Generate 1 M USD/month by end of Month 6

Product Roadmap

- A visual depiction of the product releases and the main components that will be included in each release.
- Usually, developed by Product Owner to decide on business priorities with some input from the team.



Product Release Plan



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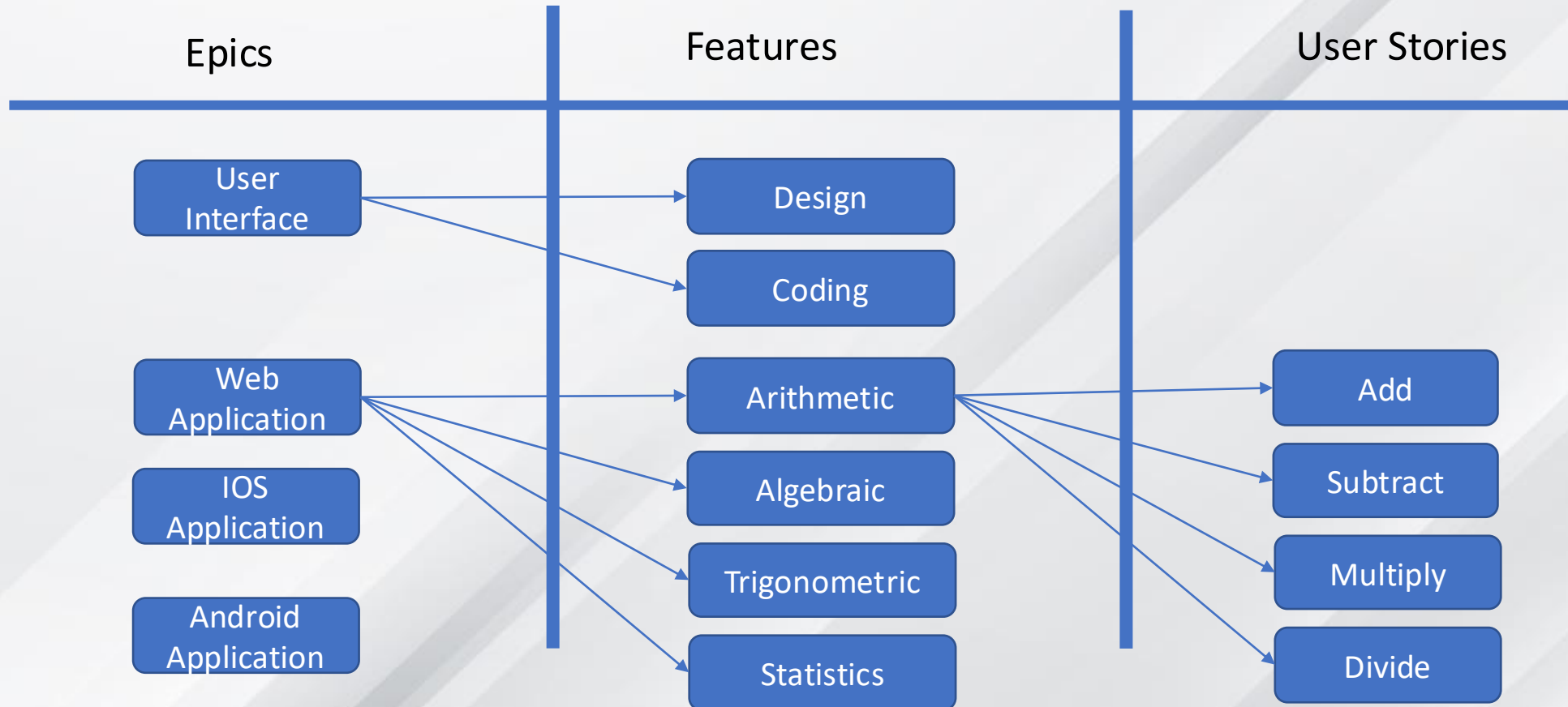
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User Stories, Story Mapping, Product Backlog, and Estimating



EPIC vs. Features vs. User Stories

- Epics are big chunks of work that has multiple features
- Features are divided into multiple User Stories (Story Splitting)
- Big User-Stories can be further divided into multiple User Stories (Story splitting)
- Product backlog can be developed on feature or user story levels



Writing User Stories

- A short description of a feature or requirement from the user perspective.
- Written on a card in the following format:

User Story #1 (ADD)

As a **User**
I want to **Add 2 Numbers**
So that **I can perform basic Arithmetic Function**

Acceptance Criteria

- The user should be able to enter two numbers into the calculator.
- The user should be able to select the addition operation.
- The calculator should display the sum of the two numbers.

User Story #2 (Subtract)

As a **User**
I want to **Subtract 2 Numbers**
So that **I can perform basic Arithmetic Function**

Acceptance Criteria

- The user should be able to enter two numbers into the calculator.
- The user should be able to select the subtract operation.
- The calculator should display the difference of the two numbers.

User Story #20 (Sin)

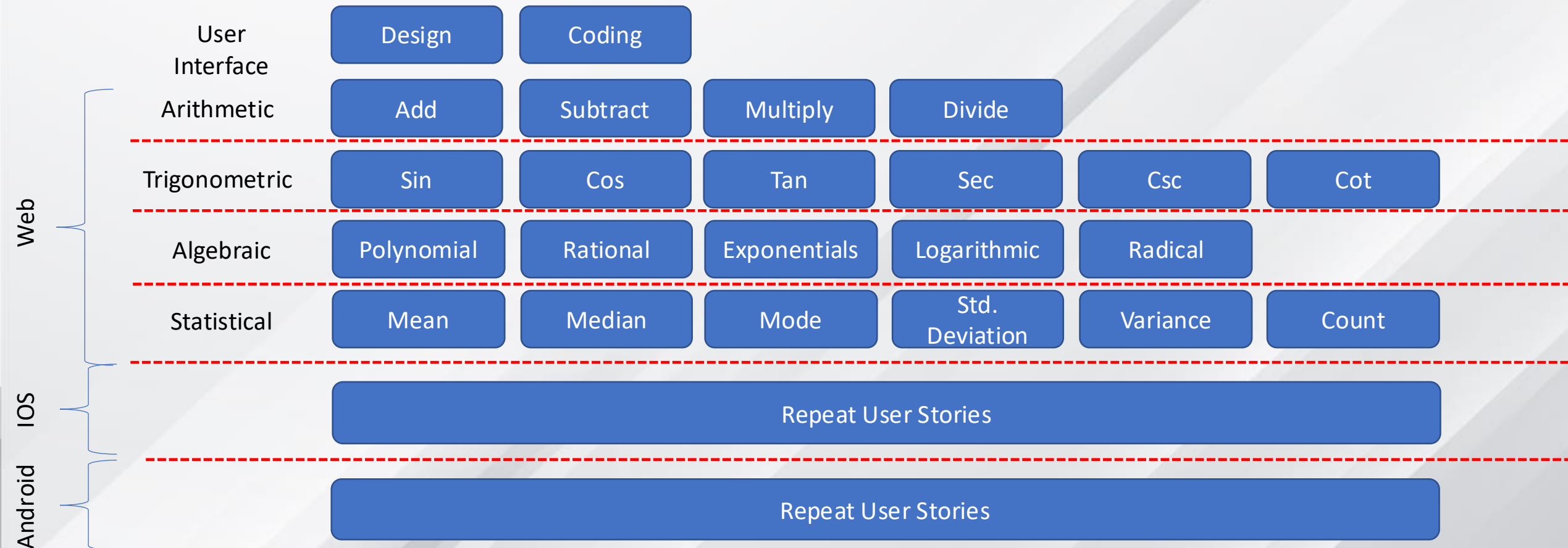
As a **User**
I want to **be able to calculate the Sin of a Number**
So that **I can perform trigonometric Function**

Acceptance Criteria

- The user should be able to enter a number into the calculator.
- The user should be able to select the sin operation.
- The calculator should display the sine of a number.

Story Mapping

- Story mapping consists of ordering user stories along two independent dimensions.
- Horizontal axis user activities are put roughly in the order in which the user would perform the task.
- Vertical axis, user stories are ordered by priority and/or increasing sophistication of the implementation.



Initial Product Backlog

- A prioritized list of all the work that needs to be done to complete the project as new features, changes to existing features, fixes, process changes, or other activities.

Id	Backlog Item	Assigned to Sprint	Status	Size (In Story Points)
1	Design		Open	
2	Coding		Open	
3	Add		Open	
4	Subtract		Open	
5	Multiply		Open	
6	Divide		Open	
7	Sin		Open	
8	Cos		Open	
9	Tan		Open	
10	Sec		Open	

Id	Backlog Item	Assigned to Sprint	Status	Size (In Story Points)
11	Csc		Open	
12	Cot		Open	
13	Polynomial		Open	
14	Rational		Open	
15	Exponential		Open	
16	Logarithmic		Open	
17	Radical		Open	
18	Mean		Open	
19	Median		Open	
20	Mode		Open	

Id	Backlog Item	Assigned to Sprint	Status	Size (In Story Points)
21	Std. Deviation		Open	
22	Variance		Open	
23	Count		Open	
24				
25				
26				
27				
28				
29				
40				
			Total	

Estimating

# of Story Points				
User Stories	Add: 3	Sin: 5	Design: 15	Log.: 40
	Subtract: 3	Cos: 5	Coding: 20	Exp.: 50
	Multiply: 3	Tan: 5	Mean: 13	
	Divide: 3	Sec: 5	StdDev: 13	
	Count: 3	Csc: 5	Var: 13	
		Cot: 5	Poly: 20	
		Median: 8	Rat.: 20	
		Mode: 8	Rad: 15	

Update Product Backlog with User Story estimates

Id	Backlog Item	Assigned to Sprint	Status	Size (In Story Points)
1	Design		Open	15
2	Coding		Open	20
3	Add		Open	3
4	Subtract		Open	3
5	Multiply		Open	3
6	Divide		Open	3
7	Sin		Open	5
8	Cos		Open	5
9	Tan		Open	5
10	Sec		Open	5

Id	Backlog Item	Assigned to Sprint	Status	Size (In Story Points)
11	Csc		Open	5
12	Cot		Open	5
13	Polynomial		Open	20
14	Rational		Open	20
15	Exponential		Open	50
16	Logarithmic		Open	40
17	Radical		Open	15
18	Mean		Open	13
19	Median		Open	8
20	Mode			8

Id	Backlog Item	Assigned to Sprint	Status	Size (In Story Points)
21	Std. Deviation		Open	20
22	Variance		Open	13
23	Count		Open	3
24				
25				
26				
27				
28				
29				
40				
			Total	287

End of Project Day 1

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Sprint Management



Sprint 1: Sprint Planning Meeting

- Team decided sprints will be **2 weeks long**
- Initially we assume velocity, let's say **velocity = 35 Story points/Sprint**
- **All team meets at Sprint 1 Day 1 to perform Sprint Planning**

Product Backlog

Id	Backlog Item	Assigned to Sprint	Status	Size (In Story Points)
1	Design		Open	15
2	Coding		Open	20
3	Add		Open	3
4	Subtract		Open	3
5	Multiply		Open	3
6	Divide		Open	3
7	Sin		Open	5
8	Cos		Open	5
9	Tan		Open	5
10	Sec		Open	5

Sprint 1 Backlog

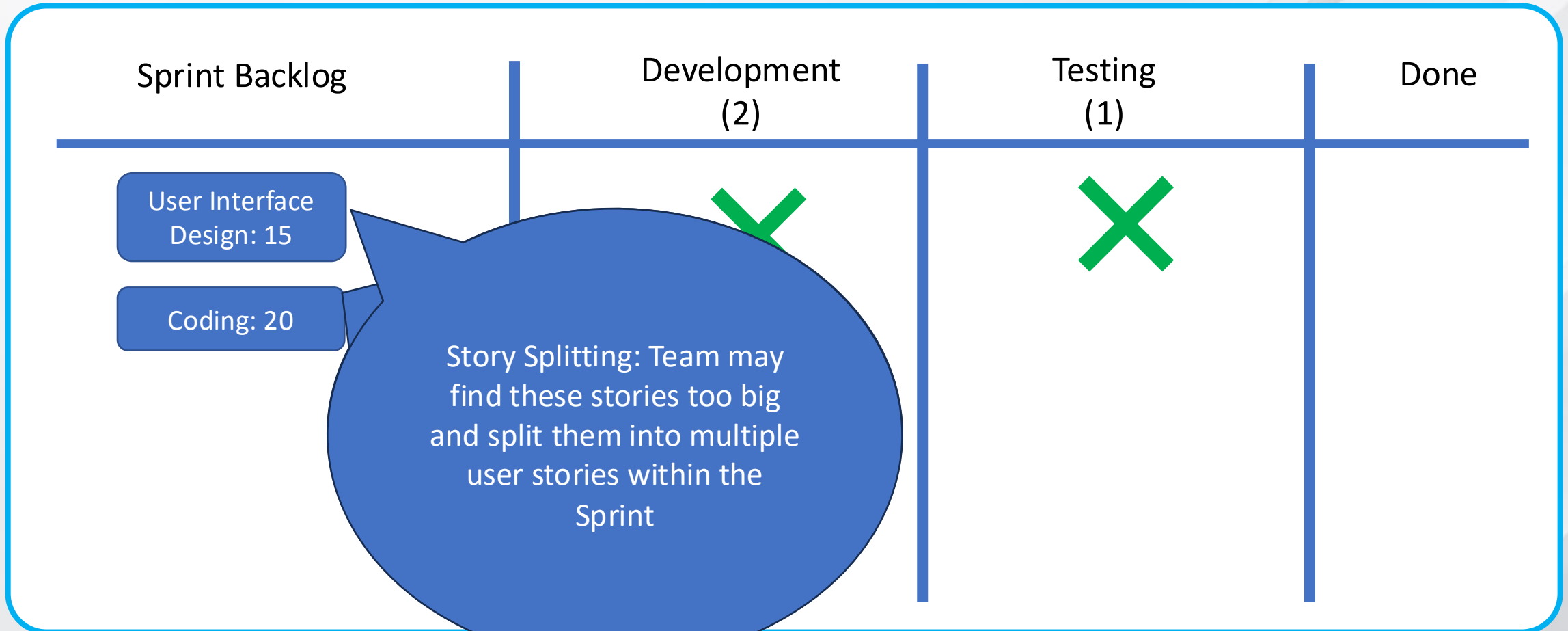
Id	Backlog Item	Assigned to Sprint	Status	Size (In Story Points)
1	Design		Open	15
2	Coding		Open	20
			TOTAL	35

- We start taking stories in priority order from the Product Backlog to Sprint Backlog
- We stop when the Sprint has user stories around the velocity threshold

Sprint Management - Sprint 1 Kanban Board

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Day: 10



Sprint 1 Review



Team makes a demo



Finished Work:

User Interface Design and C



Customer

Feedback:

Customer wants to change Shape of Buttons
Customer wants Two memory Buttons to store
results so that they can be recalled in other
calculations

Sprint 1 Retrospective



Scrum Master facilitates
review of the sprint



Team identifies what went
good and what can be
improved

Feedback:

Development Team can take 3 tasks instead of 2
at the same time

Testing team can take 2 tasks instead of 1 at the
same time

Velocity 35 is too much, we need to limit it to 30

Product Backlog Refinement After Sprint 1

Id	Backlog Item	Assigned to Sprint	Status	Size (In Story Points)
1	Design	1	CLOSED	15
2	Coding	1	CLOSED	20
3	Add		Open	3
4	Subtract		Open	3
5	Multiply		Open	3
6	Divide		Open	3
7	Change Button Shape		Open	5
8	Add 2 Memory Buttons		Open	15
9	Sin		Open	5
10	Cos		Open	5

Id	Backlog Item	Assigned to Sprint	Status	Size (In Story Points)
11	Tan		Open	5
12	Sec		Open	5
13	Csc		Open	5
14	Cot		Open	5
15	Polynomial		Open	20
16	Rational		Open	20
17	Exponential		Open	50
18	Logarithmic		Open	40
19	Radical		Open	15
20	Mean		Open	13

Id	Backlog Item	Assigned to Sprint	Status	Size (In Story Points)
21	Median		Open	8
22	Mode		Open	8
23	Std. Deviation		Open	20
24	Variance		Open	13
25	Count		Open	3
26				
27				
28				
29				
40				
			Total	307

Writing New User Stories

User Story #24 (Change Buttone Shape)

As a **User**

I want to **have squared with round corners button shape**

So that **It is easier on the eye**

Acceptance Criteria

- Button should be a square with round corners.

User Story #25 (Memory Functions)

As a **User**

I want to **save up to two results**

So that **I can use them in other calculations later Function**

Acceptance Criteria

- The user should be able to save result by pressing one of two memory buttons.
- The user should be able to retrieve result by pressing on the memory button again

Sprint 2: Sprint Planning Meeting

- As per team feedback **Velocity = 30 Story points/Sprint**

Product Backlog

Id	Backlog Item	Assigned to Sprint	Status	Size (In Story Points)
1	Design		Closed	15
2	Coding		Closed	20
3	Add		Open	3
4	Subtract		Open	3
5	Multiply		Open	3
6	Divide		Open	3
7	Change Button Shape		Open	5
8	Add 2 Memory Buttons		Open	15
9	Sin		Open	5
10	Cos		Open	5
11	Tan		Open	5
12	Sec		Open	5

Sprint 2 Backlog

Id	Backlog Item	Assigned to Sprint	Status	Size (In Story Points)
1	Add		Open	3
2	Subtract		Open	4
3	Multiply		Open	3
4	Divide		Open	3
5	Change Button Shape		Open	3
6	Add 2 Memory Functions		Open	15
			TOTAL	32

Sprint Management - Sprint 2 Kanban Board

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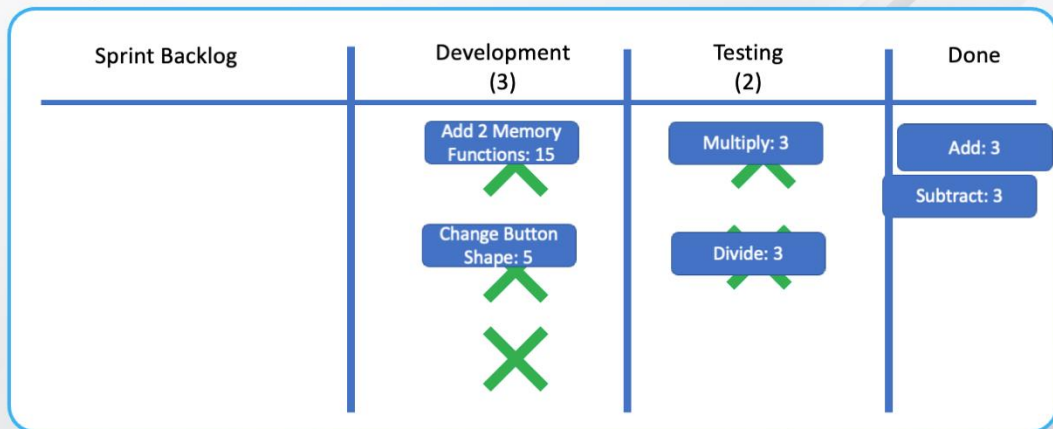
Day: 10

Sprint Backlog	Development (3)	Testing (2)	Done
Add: 3	X	X	
Subtract: 3			
Multiply: 3	X	X	
Divide: 3			
Change Button Shape: 5	X		
Add 2 Memory Functions: 15			

Daily Scrum Meeting (10-15 min.)

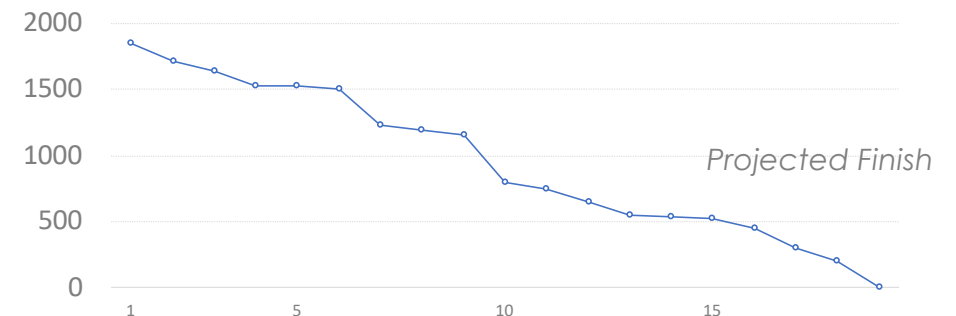
- Led by Scrum Master, asks every team member:
 - What did you do yesterday?
 - Where are you blocked?
 - What are you going to do today?
- Decision-Making and Problem Solving to ensure Sprint finishes its objectives

Day: 10



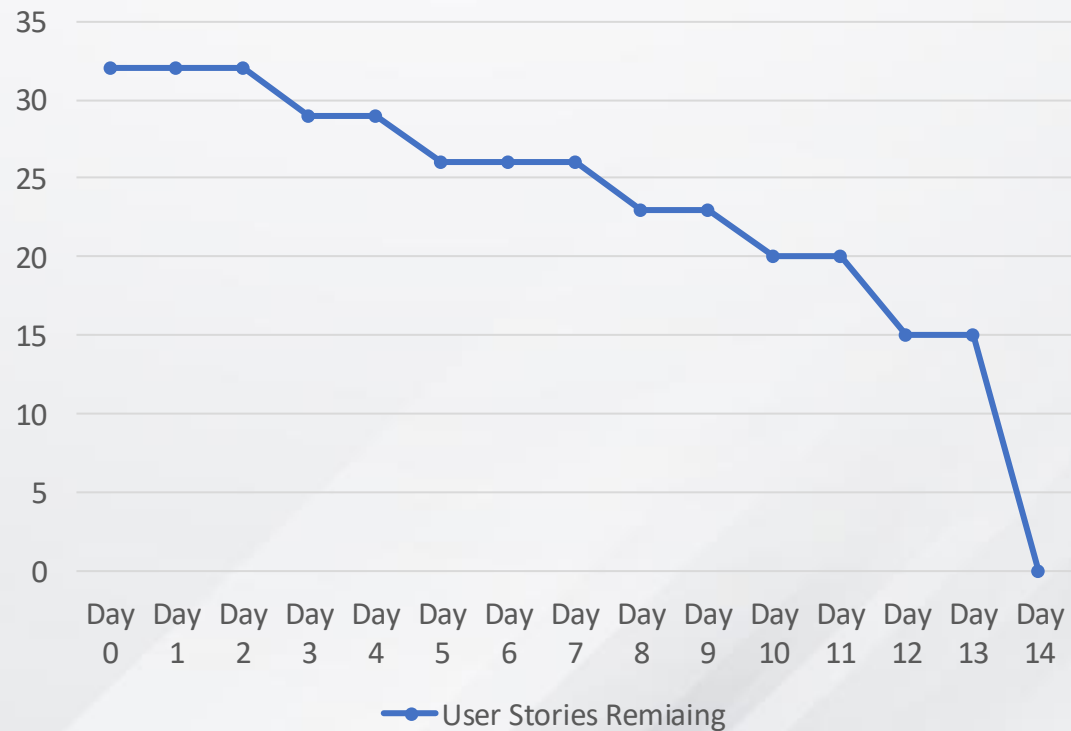
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Burndown Chart

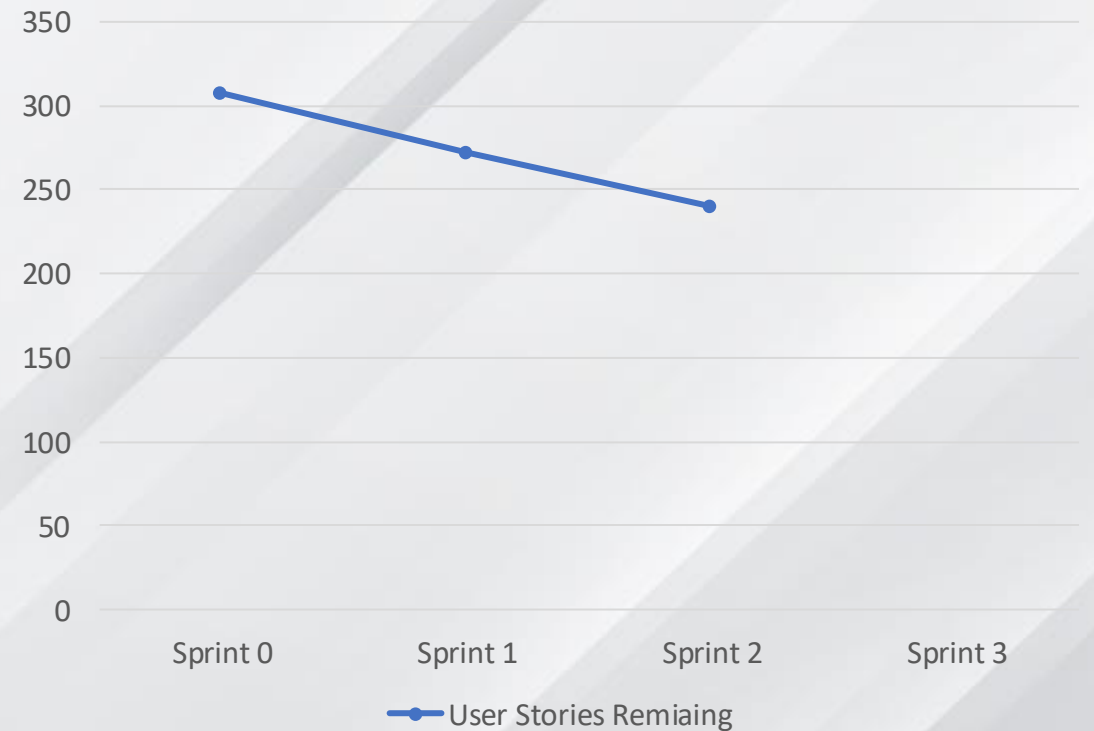


Sprint Burndown Chart vs. Project Burndown Chart

Sprint 2 Burndown Chart



Project Burndown Chart



Sprint 2 Review



Team makes a demo



Finished Work:
Arithmetic functions, button



Customer

Feedback:

Proceed with Release 1
Customer Identified minor bug to be resolved
that won't impact release 1.
Customer wants to add more than two numbers
in one calculation

Sprint 2 Retrospective



Scrum Master facilitates
review of the sprint



Team identifies what went
good and what can be
improved

Feedback:

Calculated average velocity $(35+32/2) = 33.5$
Decided to develop user manual (should be
added as a user story)

Product Backlog Refinement After Sprint 2

Id	Backlog Item	Assigned to Sprint	Status	Size (In Story Points)
1	Design	1	CLOSED	15
2	Coding	1	CLOSED	20
3	Add	2	CLOSED	3
4	Subtract	2	CLOSED	3
5	Multiply	2	CLOSED	3
6	Divide	2	CLOSED	3
7	Change Button Shape	2	CLOSED	5
8	Add 2 Memory Buttons	2	CLOSED	15
9	Sin		Open	5
10	Cos		Open	5

Id	Backlog Item	Assigned to Sprint	Status	Size (In Story Points)
11	Tan		Open	5
12	Sec		Open	5
13	Csc		Open	5
14	Cot		Open	5
15	Solve Minor Bug		Open	3
16	Polynomial		Open	20
17	Rational		Open	20
18	Exponential		Open	50
19	Logarithmic		Open	40
20	Add more than 2 numbers		Open	8

Id	Backlog Item	Assigned to Sprint	Status	Size (In Story Points)
21	Radical		Open	15
22	Mean		Open	13
23	Median		Open	8
24	Mode		Open	8
25	Std. Deviation		Open	20
26	Variance		Open	13
27	Count		Open	3
28	User Manual		Open	13
29				
40				
			Total	331

Key Points

Review Lectures 2 and 4 for definitions for this lecture exam

Scrum has very minimal documents (product Backlog, Sprint Backlog) and uses many visual tools (Kanban Board, Burndown Charts, Velocity Charts)

Scrum is characterized by fast problem solving and decision making in sprint planning, daily scrum, sprint review and retrospective

As all Agile frameworks, Scrum is flexible and adapts to changing needs

Scrum involves the customer and focus on delivering high priority, high value features first

Preparation for discussion panel:

- Check this link for several case studies on applying Scrum Methodologies.

[“Examples of Scrum Case Studies”](#)

- Watch the video for a case study on applying Scrum [“Scrum in 20 mins... \(with examples\)”](#)
- Watch the video for Scrum Workflow [“Scrum Master Tutorial | Google Project Management Certificate”](#)



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For Discussion Panel

Preparation for discussion panel:

- Watch the video for Scrum Example [“8 Practical Examples & Case Study | Scrum Master Course | Speedily Tech”](#)
- Read the following Scrum Case Study [“How to Develop an Agile Project Proposal with Use Case Analysis: A Local Grocery Store Example”](#)



Chapter 06

For Discussion Panel

Before next lecture:

- Hybrid Life Cycles:
- Read the Article ["Hybrid Life Cycles"](#)



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For Next Lecture



Thank You