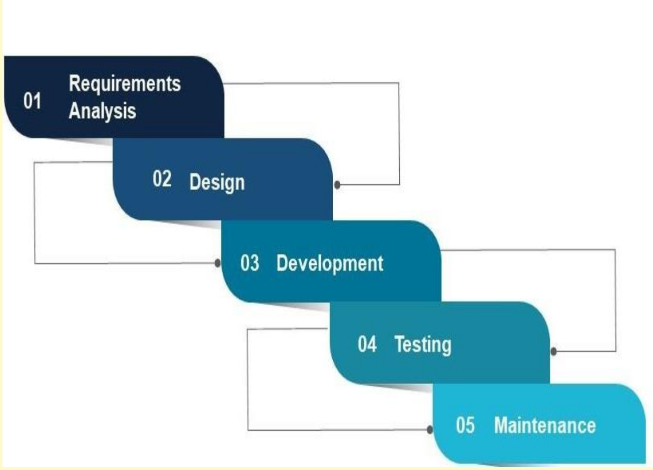
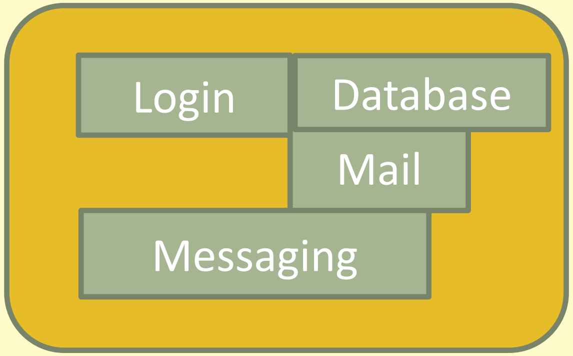
CSE 470 – Agile Methodology

BRAC University

Why we need Agile




Login

Database

Mail

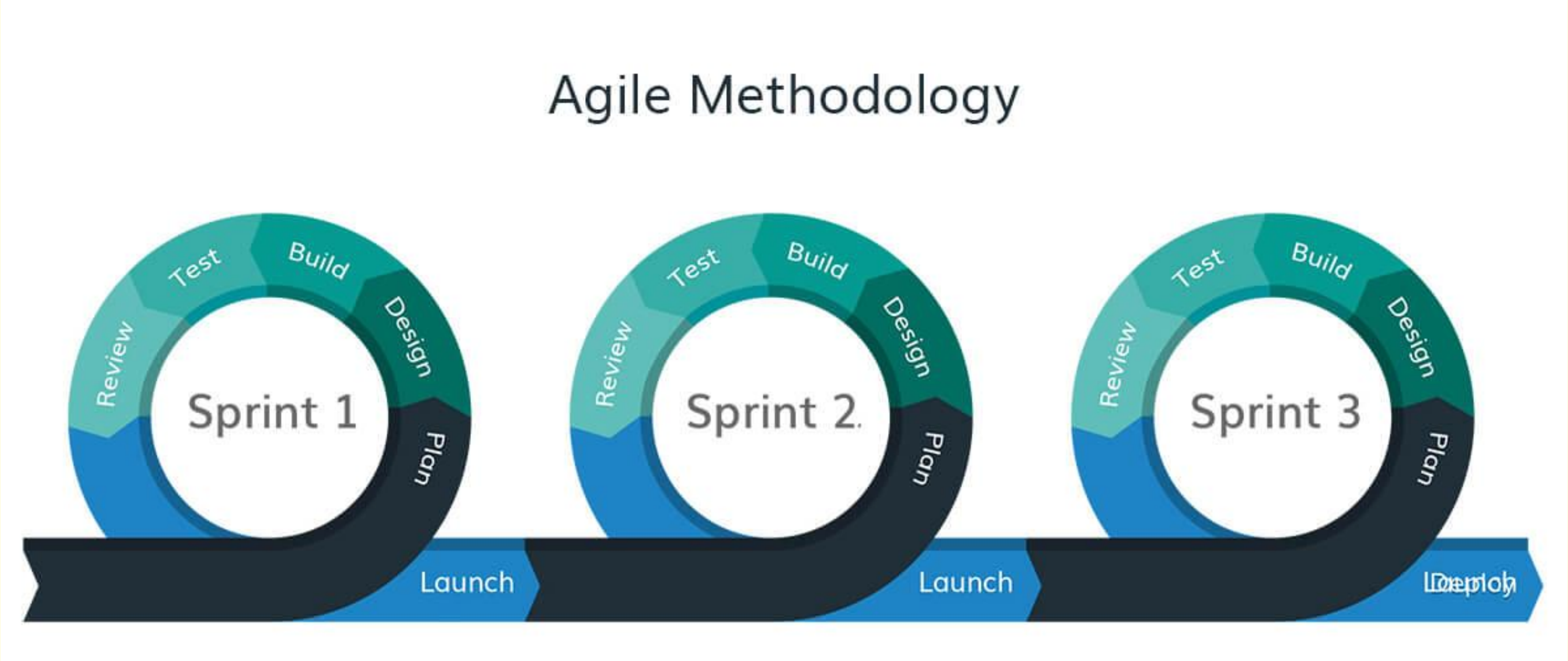
Messaging

1. Monolithic Software: The ready product comes at the end of the process. Nowadays, the requirement of software changes frequently, even it can change a number of times in a day.

2. For live systems, like Amazon, Facebook a few seconds of downtime can cause a lot. Changes in such cases needs to be smooth enough so that customers interaction do not interrupt.

What is ‘Agility?’

- Agile is a set of principles and values. It is a practice to be followed.
- Agile is a combination of Iterative and Incremental process models with focus on **process adaptability and customer satisfaction by rapid delivery of working software**.



Agile Manifesto

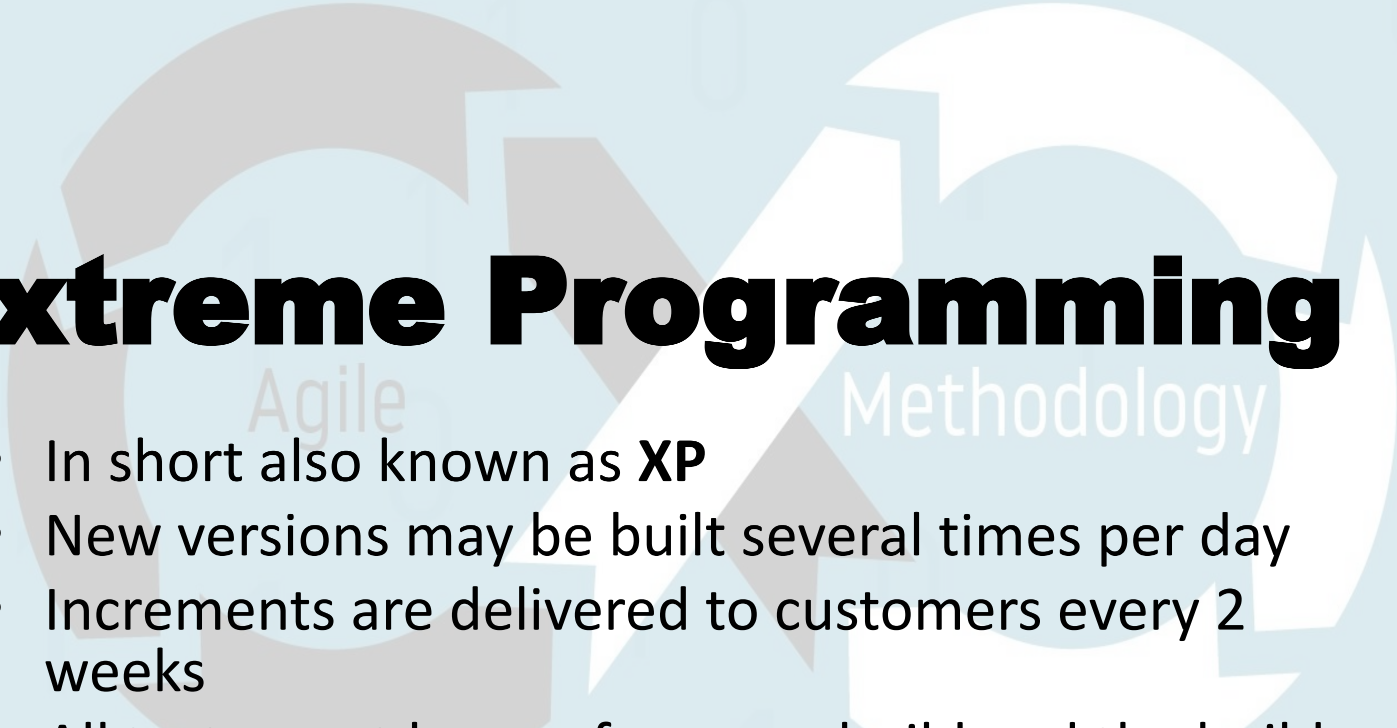
We are uncovering better ways of developing software by doing it and helping others do it.

Individuals and interactions	*over*	***processes and tools***
Working software	*over*	***comprehensive documentation***
Customer collaboration	*over*	***contract negotiation***
Responding to change	*over*	***following a plan***

Agile Methodologies

- Extreme Programming
- Agile Unified Process
- Scrum

Extreme Programming



- In short also known as **XP**
- New versions may be built several times per day
- Increments are delivered to customers every 2 weeks
- All tests must be run for every build and the build is only accepted if tests run successfully.

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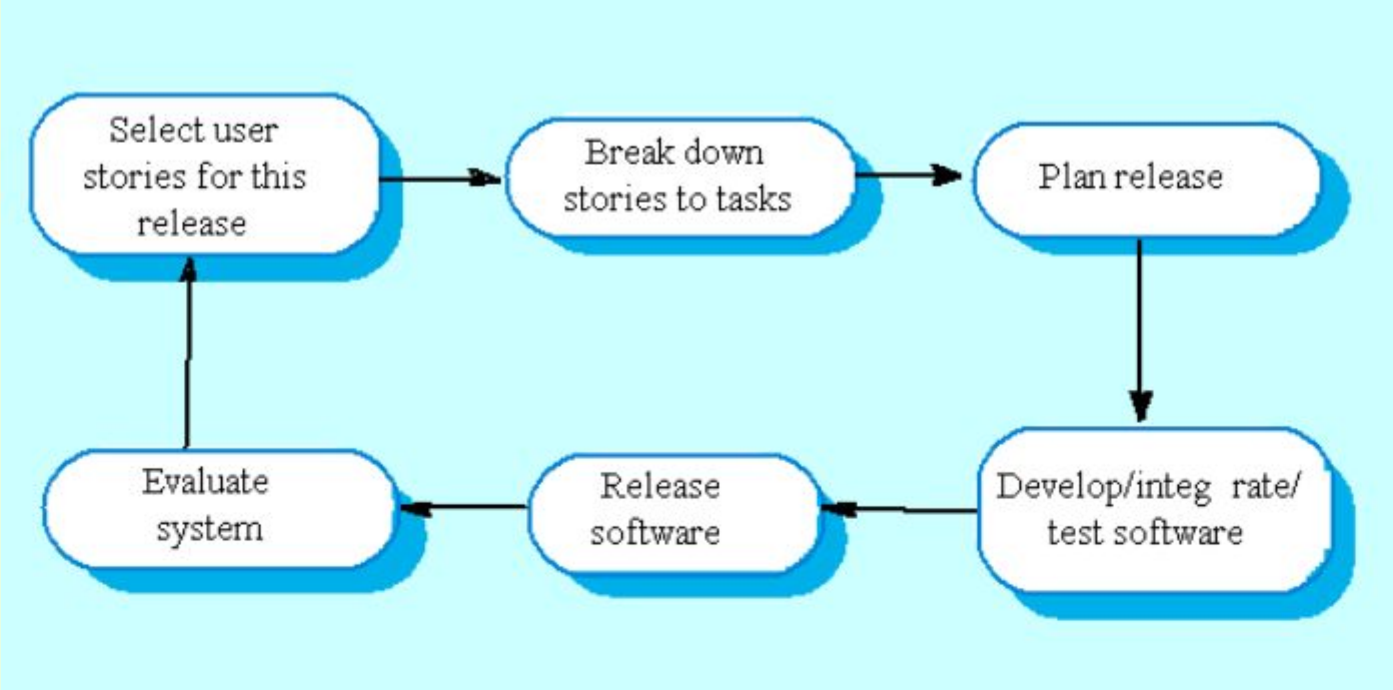
XP Workflow



Select user stories for this release

Break down stories to tasks

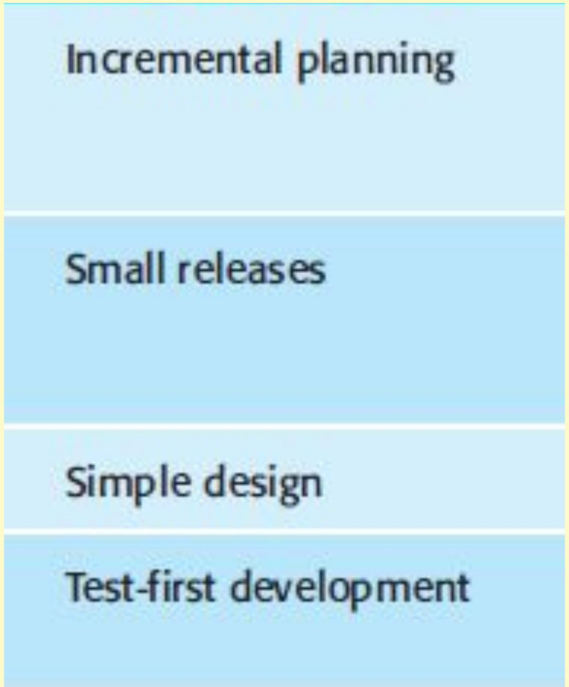
Plan release

Develop/integ rate/ test software

Release software

Evaluate system

XP Principle or Practice

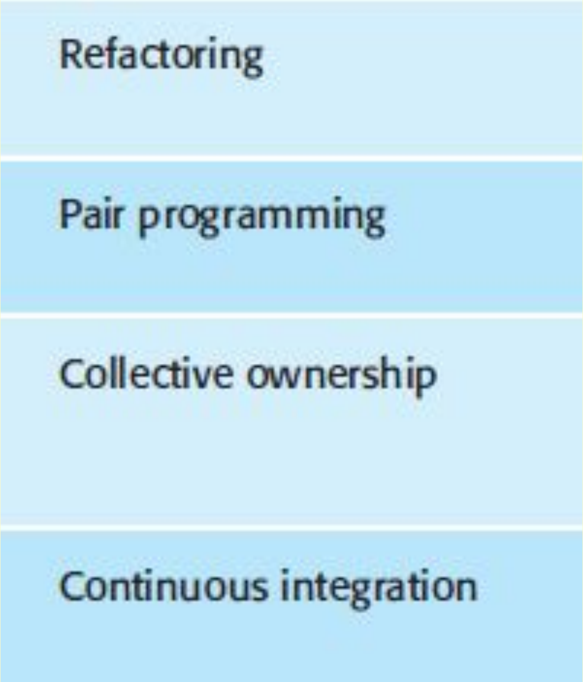


Incremental planning

Small releases

Simple design

Test-first development

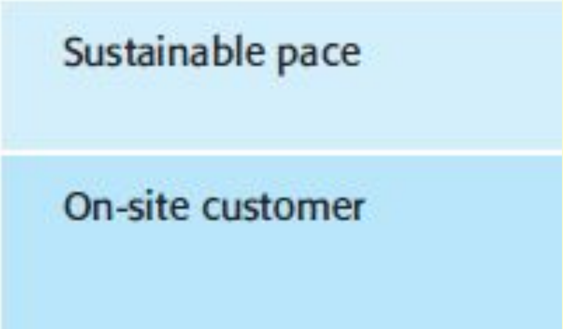


Refactoring

Pair programming

Collective ownership

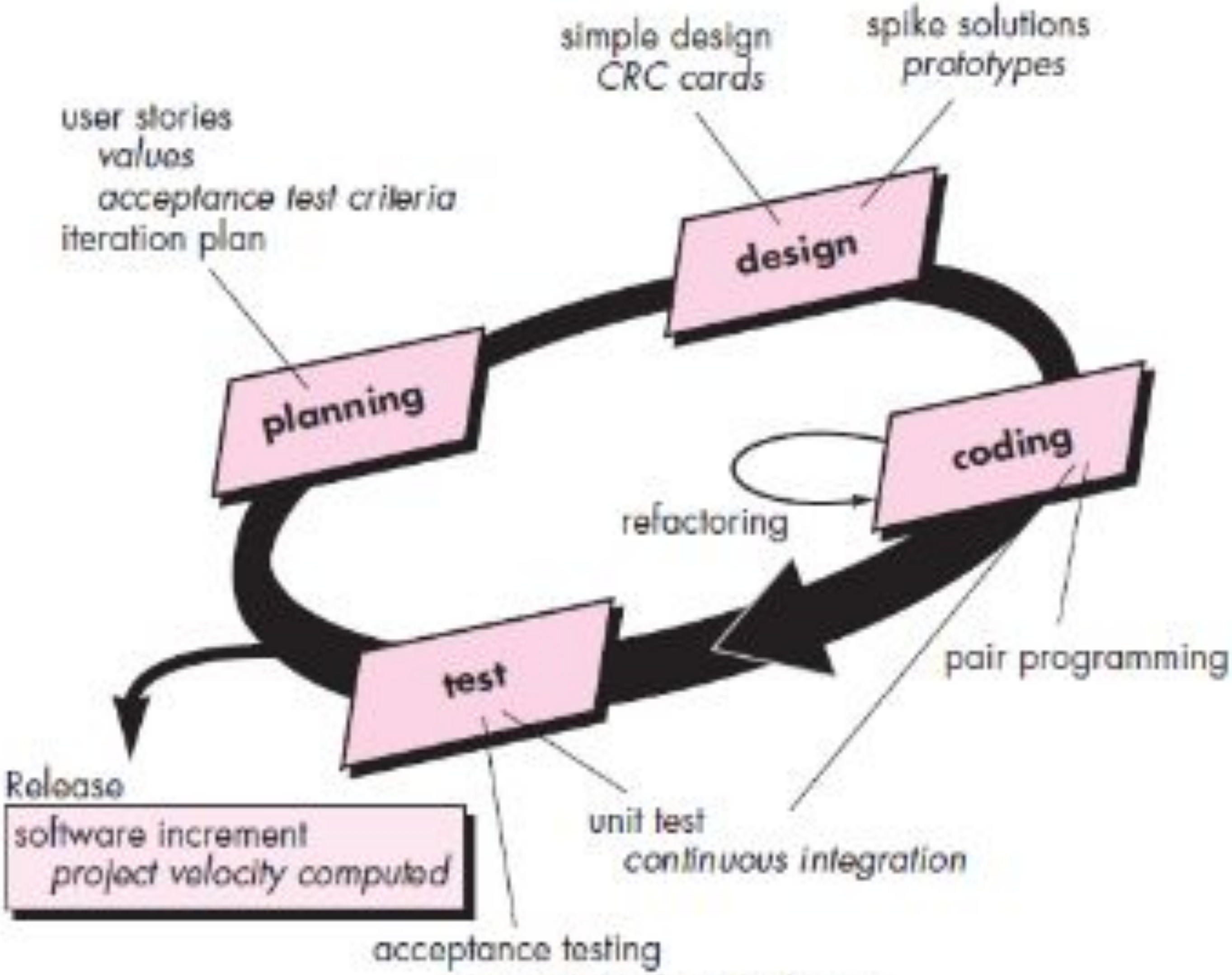
Continuous integration



Sustainable pace

On-site customer

Extreme Programming Project



CRC - class-responsibility collaborator

Pair Programming

- Two people code in share, they switch roles from observer to -navigator frequently
- Observing code produces better code, so less business cost.
- Support each other, better chance for learning.

We already used that variable name for a different variable.

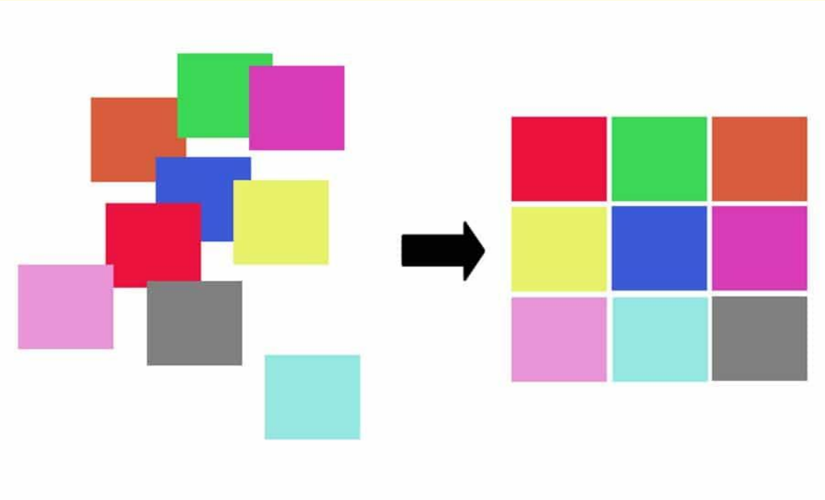
Unit Testing

- Writes unit test for each method to identify problems and resolve it
- Test First Development (TDD) is used to ensure better code quality and less error. It refers to write test code first and after that write the development code.

```
Assert.AreEqual(
    GetTimeOfDay(),
    "Morning" );
```

Refactoring

- It’s a technique for restructuring existing code by changing its internal structure without changing its external behaviour.
- Refactoring includes reducing duplicate codes, breaking long classes/methods into small ones, appropriate variable naming and many more.
- It is done for requirement change, improving design and easy extendibility of software.



Agile Unified Process

- Another Agile Software Development Methodology
- Agile Unified Process (AUP) is a simplified version of the Rational Unified Process (RUP).

AUP Phases

Inception

- Try to identify the business scope of the project, initial requirements and potential solution of the problem.

Elaboration

- Design and prove the solution architecture, more requirements can be extracted

Construction

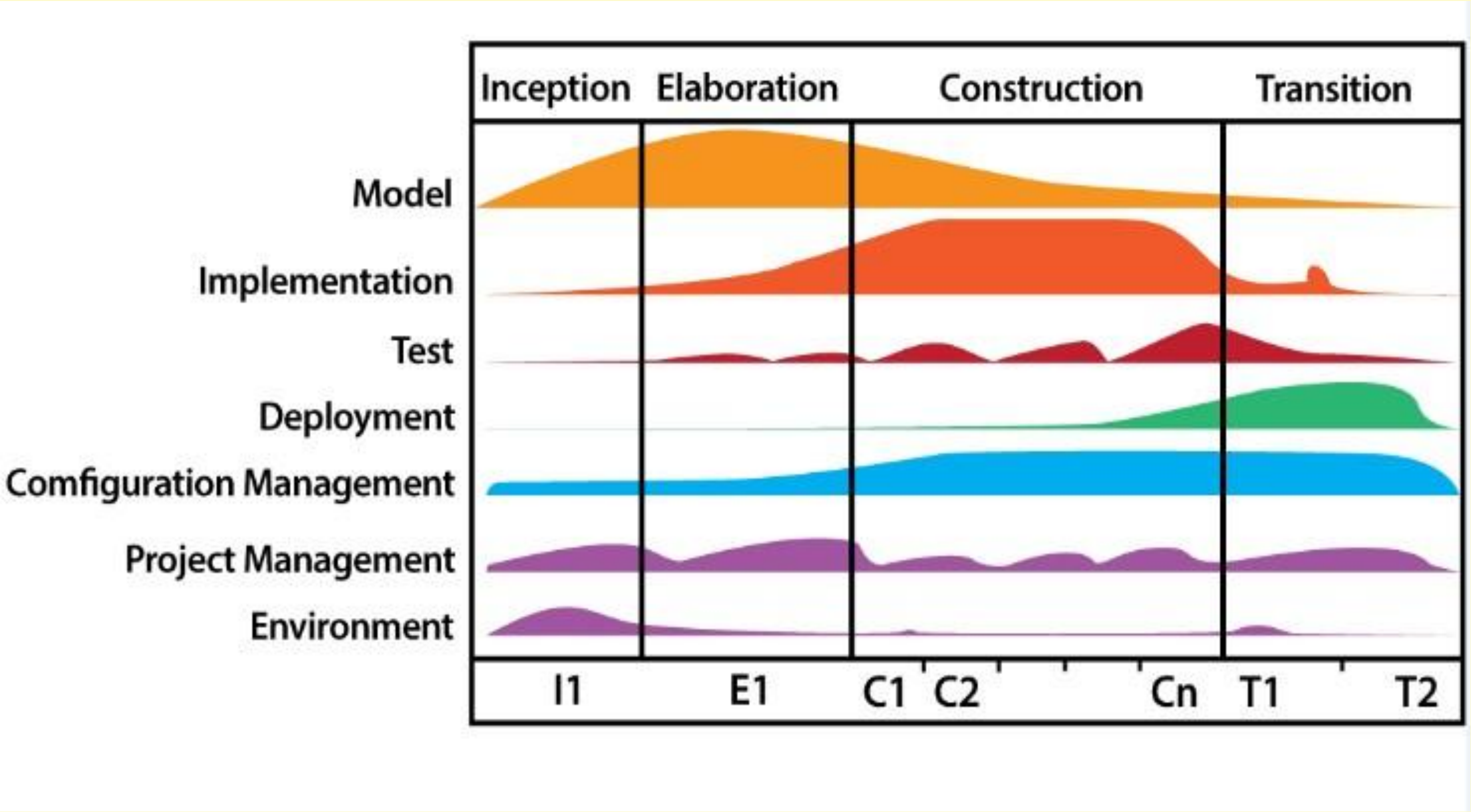
- Continuous implementation and testing (specially unit testing) in form of iterations

Transition

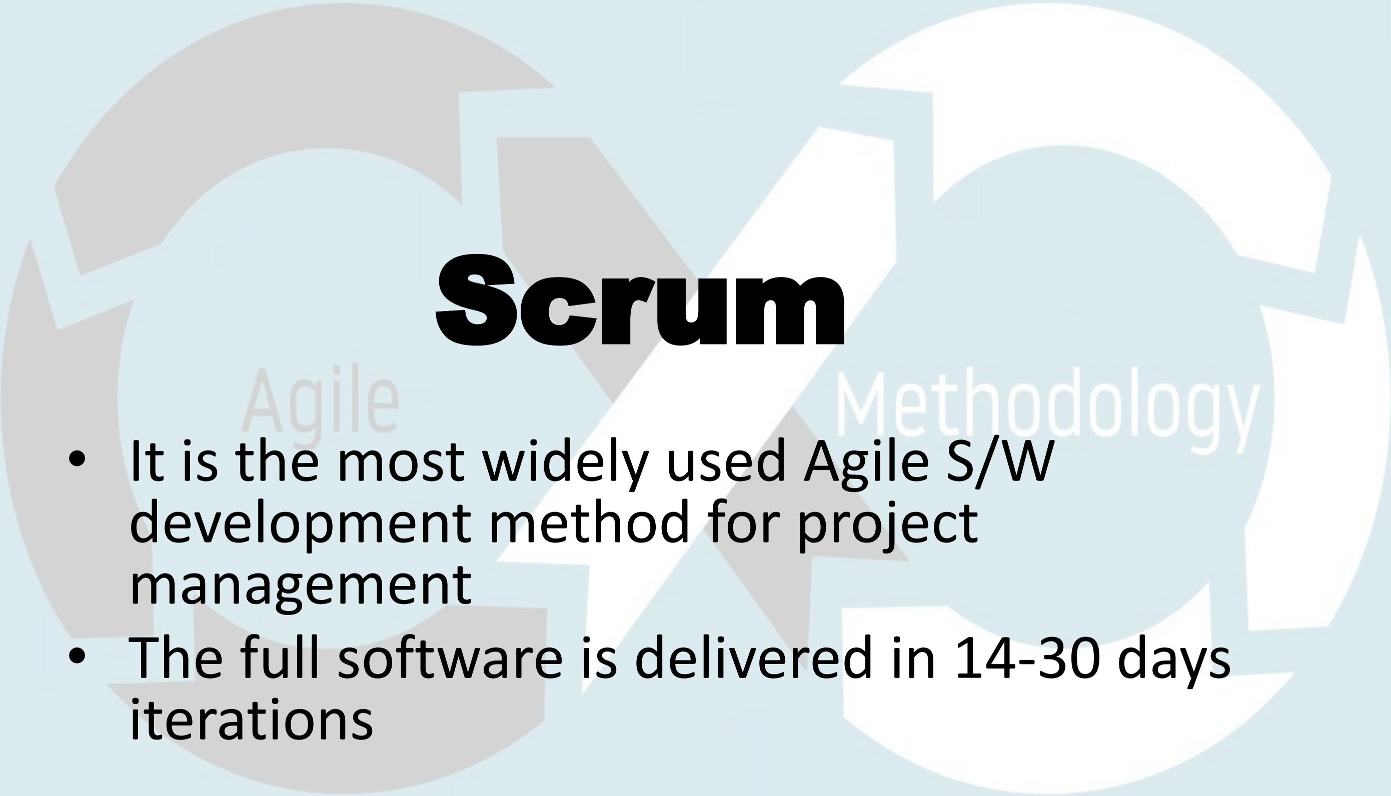
- Lastly, deploy the system in production environment and adjust feedbacks.

AUP Disciplines

- **Model**
- **Implementation**
- **Test**
- **Deployment**
- **Configuration Management**: Manage access to project artifacts/versions. This includes not only tracking artifact versions over time but also controlling and managing changes to them.
- **Project Management**: Direct the activities that take place within the project. This includes managing risks, directing people (assigning tasks, tracking progress, etc.), and coordinating with people and systems outside the scope of the project to be sure that it is delivered on time and within budget.
- **Environment:** Support the rest of the effort by ensuring that the proper process, guidance (standards and guidelines), and tools (hardware, software, etc.) are available for the team as needed.

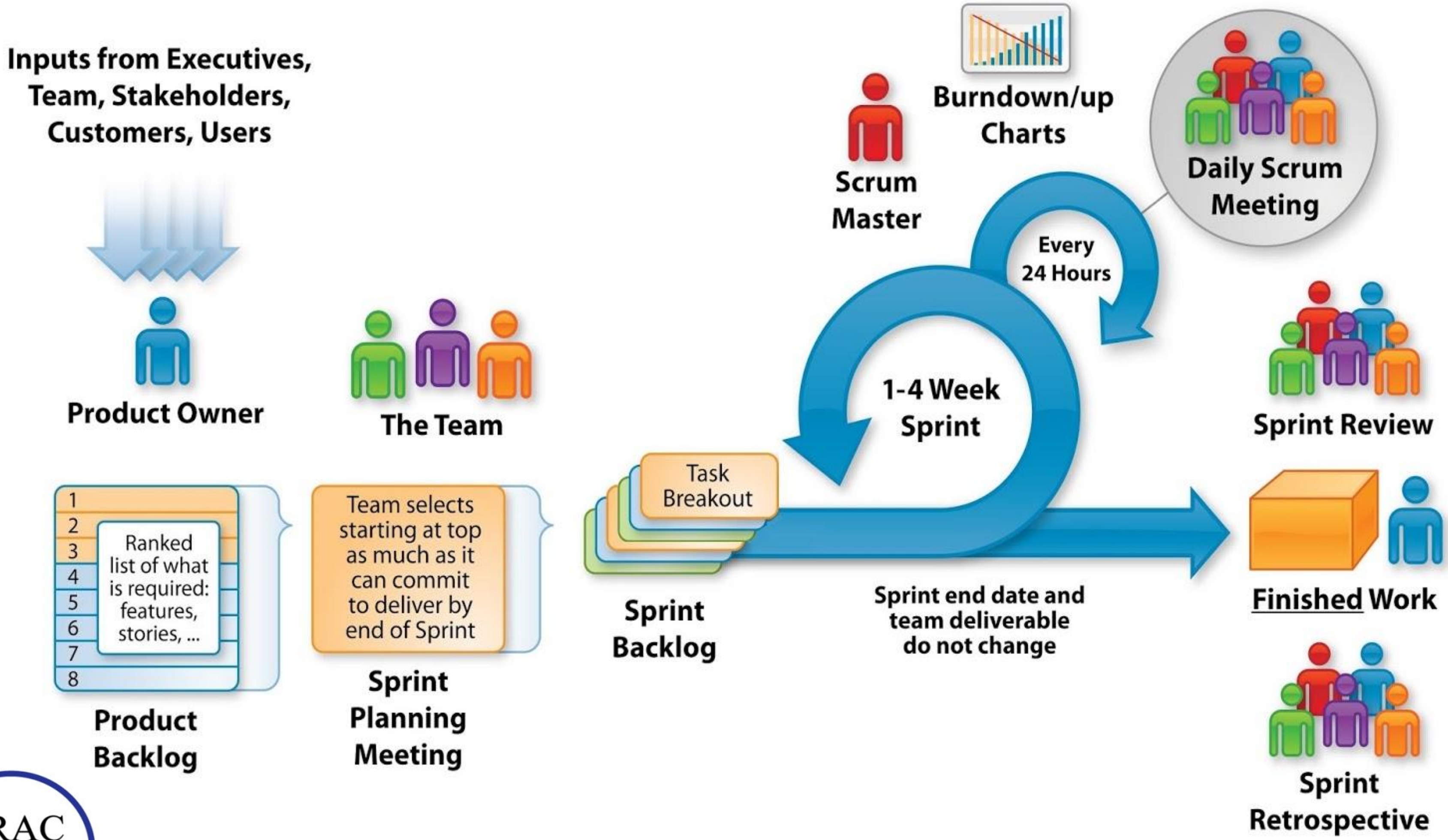

Inception
Elaboration
Construction
Transition
Model
Implementation
Test
Deployment
Comfiguration Management
Project Management
Environment
I1
E1
C1
C2
Cn
T1
T2

Scrum



- It is the most widely used Agile S/W development method for project management
- The full software is delivered in 14-30 days iterations

The Agile - Scrum Framework



Inputs from Executives, Team, Stakeholders, Customers, Users

Product Owner

The Team

1
2
3
4
5
6
7
8

Ranked list of what is required: features, stories, ...

Product Backlog

Team selects starting at top as much as it can commit to deliver by end of Sprint

Sprint Planning Meeting

Task Breakout

Sprint Backlog

Scrum Master

Burndown/up Charts

Daily Scrum Meeting

Every 24 Hours

1-4 Week Sprint

Sprint end date and team deliverable do not change

Sprint Review

Finished Work

Sprint Retrospective

Scrum Framework

Roles

- Product owner
- Scrum Master
- Team

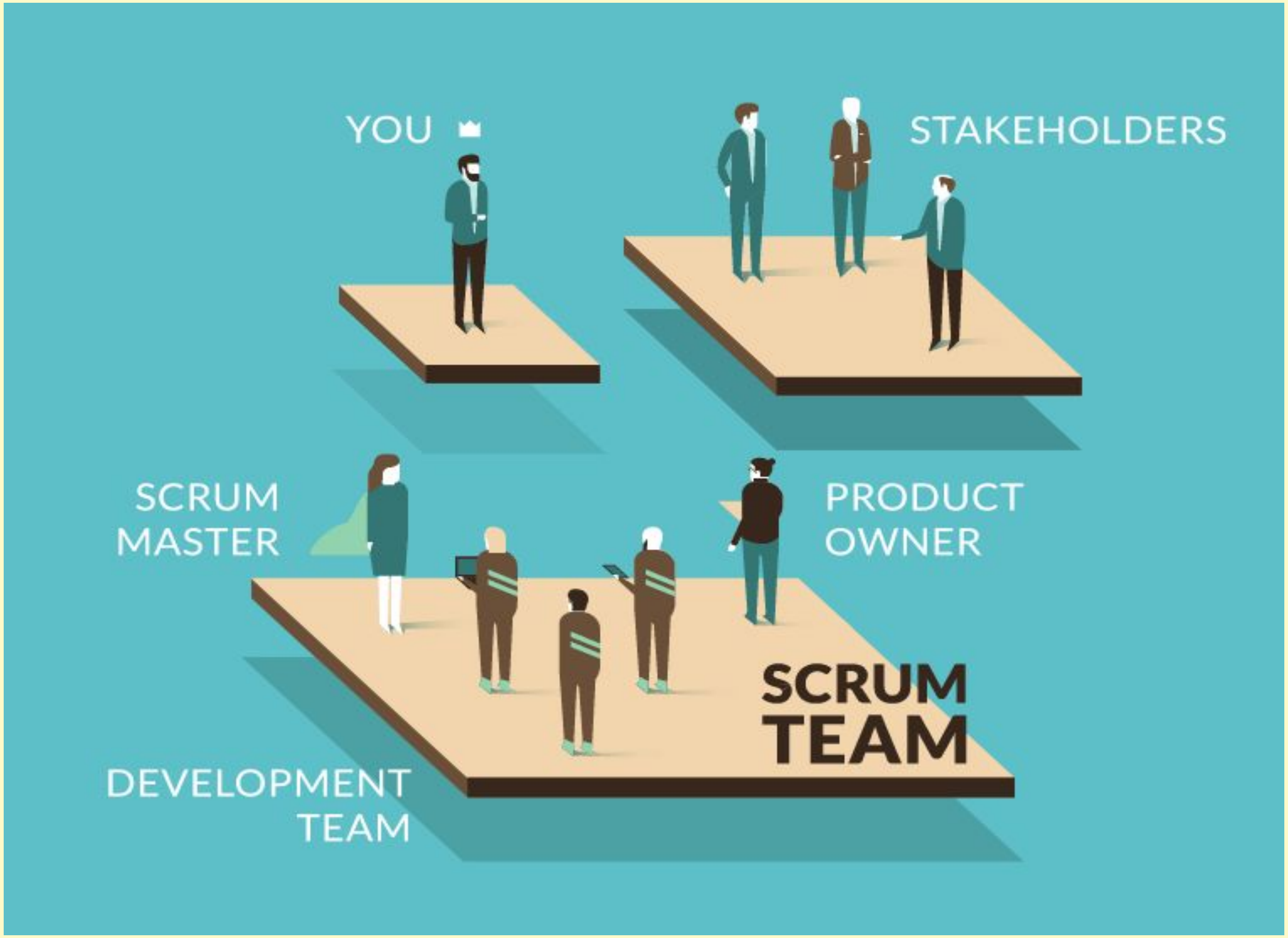
Ceremonies

- Sprint planning
- Sprint review and Sprint retrospective
- Daily scrum meeting

Artifacts

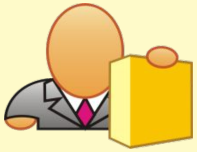
- Product backlog
- Sprint backlog
- Burndown charts

Scrum Roles


YOU
STAKEHOLDERS
SCRUM MASTER
PRODUCT OWNER
SCRUM TEAM
DEVELOPMENT TEAM

Scrum Roles

- Product Owner
  - Possibly a Product Manager or Project Sponsor
  - Decides features, release date, prioritization, $$$



- Scrum Master
  - Typically a Project Manager or Team Leader
  - Responsible for enacting Scrum values and practices
  - Remove impediments / politics, keeps everyone productive

- Project Team
  - 5-10 members; Teams are self-organizing
  - Cross-functional: QA, Programmers, UI Designers, etc.
  - Membership should change only between sprints

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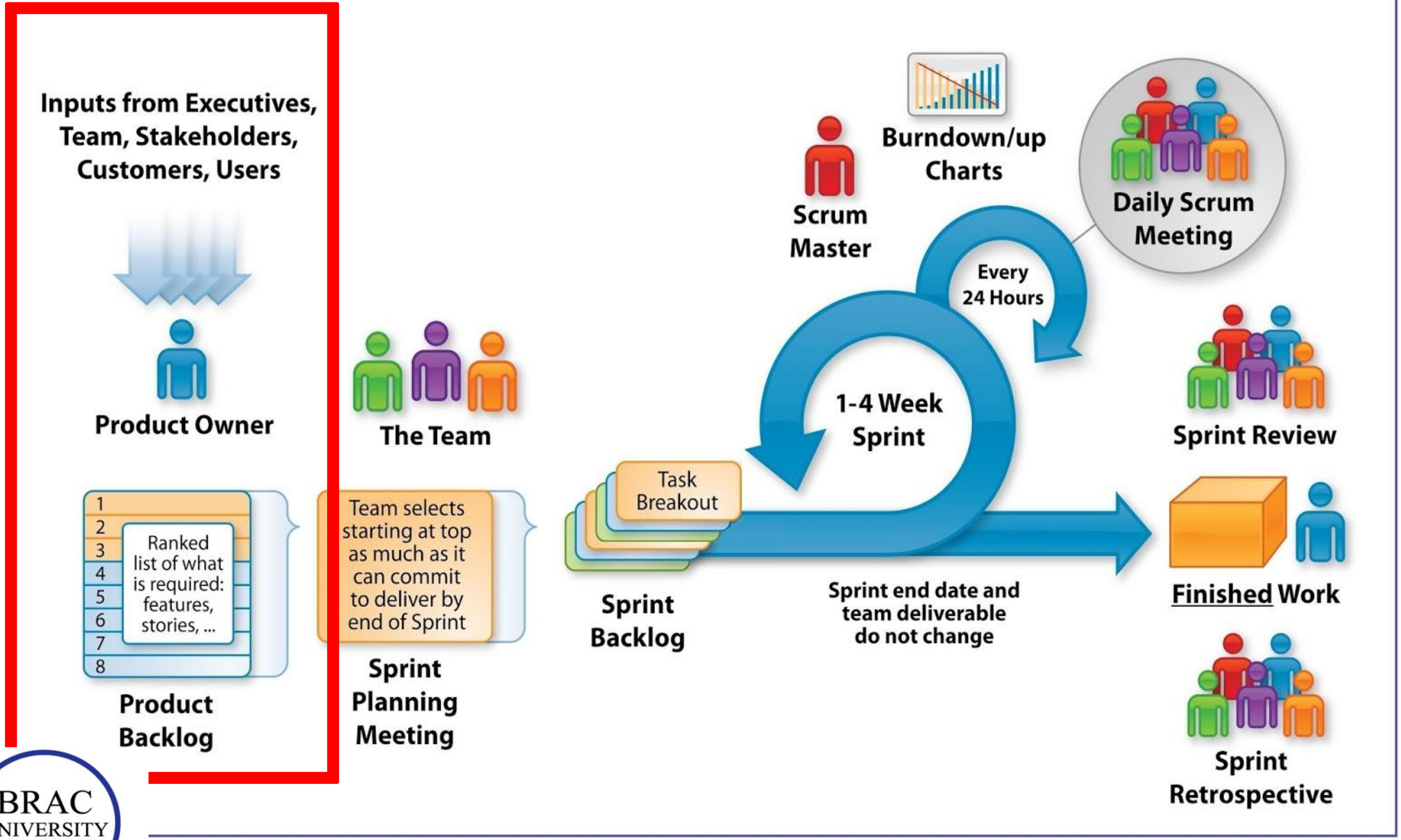
The Agile - Scrum Framework



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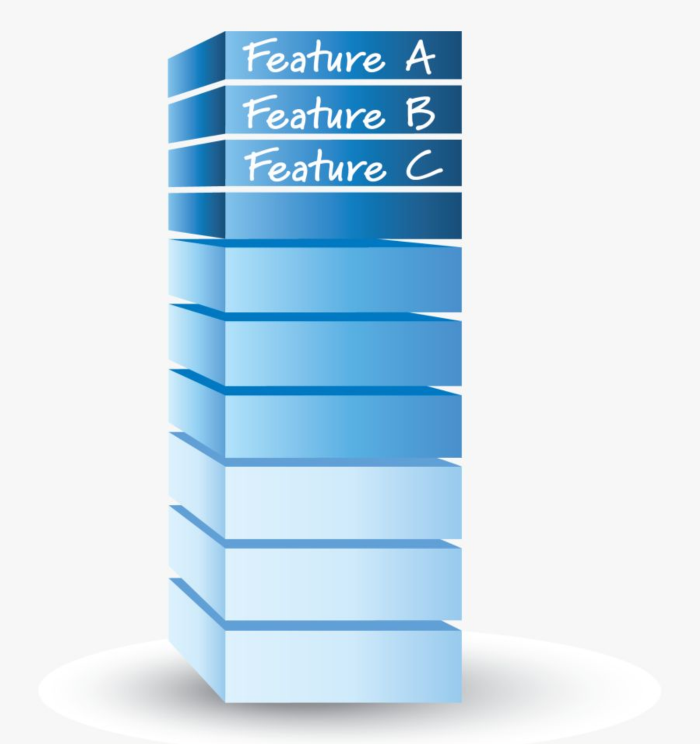
Artifact - Product Backlog



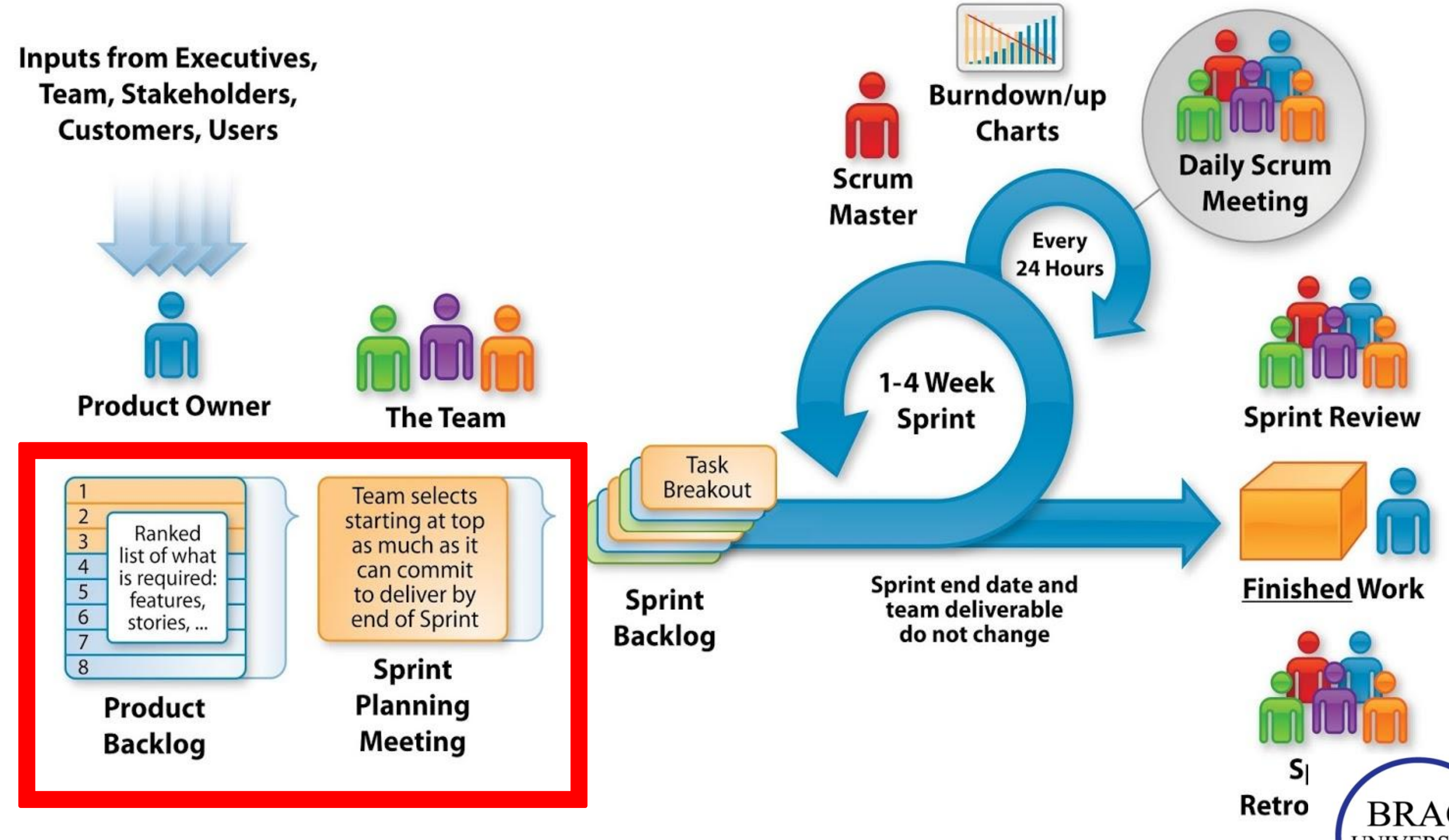
This is the product backlog

- The requirements
- A list of all desired work on project
- Ideally expressed as a list of user stories along with "story points", such that each item has value to users or customers of the product
- Prioritized by the product owner
- Reprioritized at start of each sprint

Artifact - Product Backlog

Feature	Backlog item	Estimate
A	Allow a guest to make a reservation	3 (story points)
B	As a guest, I want to cancel a reservation.	5
C	As a guest, I want to change the dates of a reservation.	3
D	As a hotel employee, I can run RevPAR reports (revenue-per-available-room)	8
E	Improve exception handling	8
…	...	30
…	...	50

The Agile - Scrum Framework



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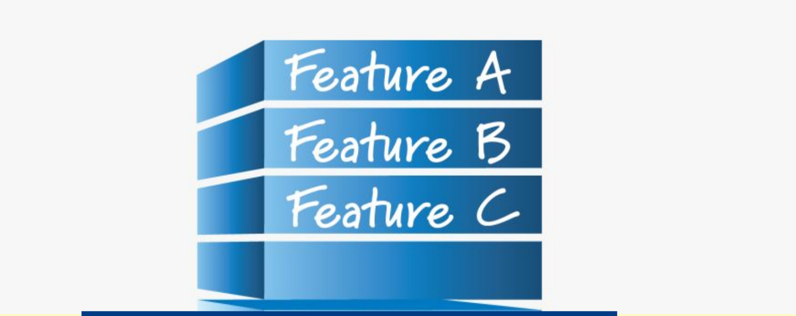
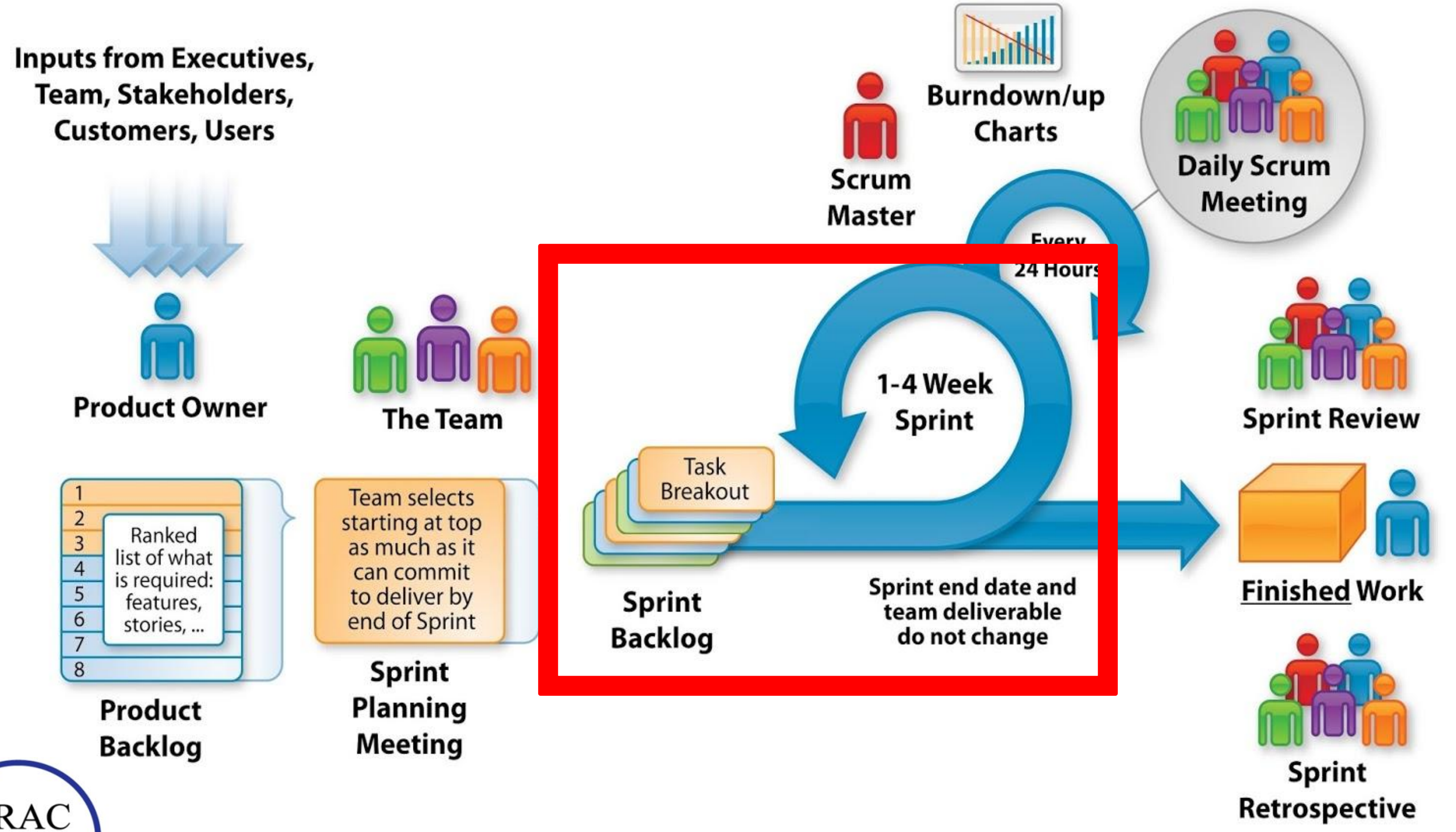
Artifact - Sprint Backlog



This is the sprint backlog

- High priority features are selected based on points from product backlog.
- These features will be covered within that 14 days time slot called as **sprint**.
- Estimated work remaining is updated daily
- Any team member can add, delete change sprint backlog

The Agile - Scrum Framework



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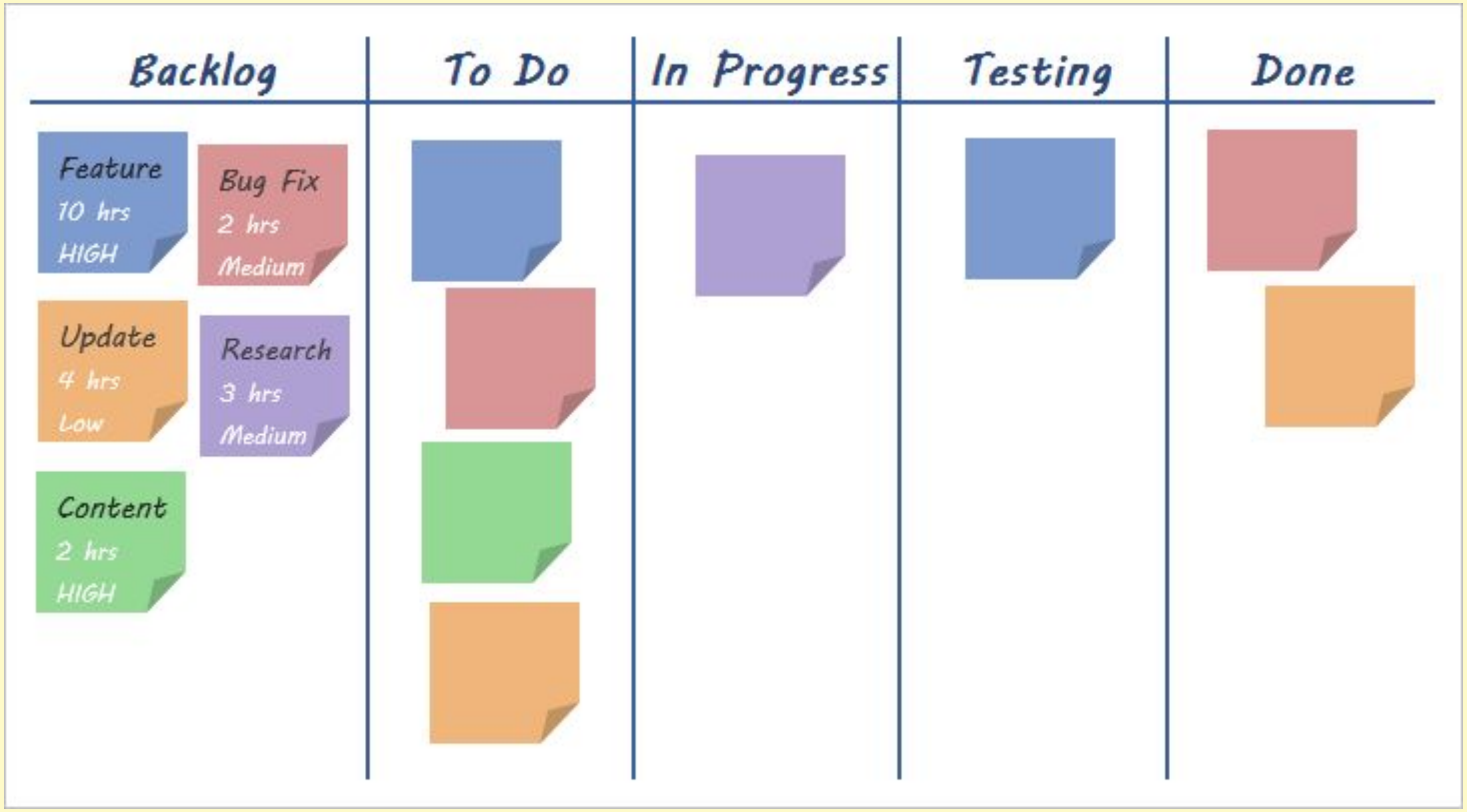
Artifact - Sprint Board

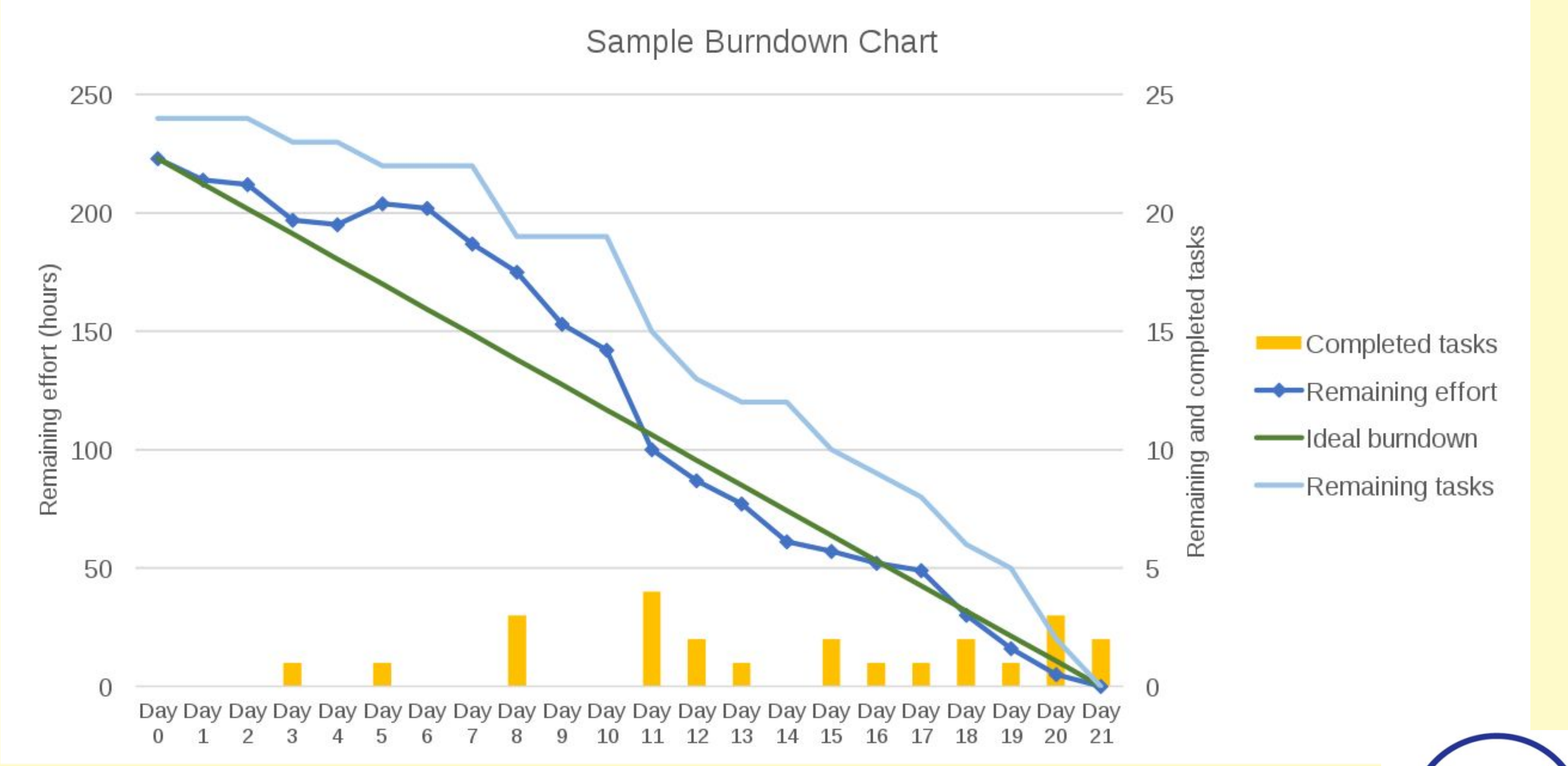


Artifact – Burndown Chart

- A display of what work has been completed and what is left to complete
  - one for each developer or work item
  - updated every day
  - (make best guess about hours/points completed each day)

- *variation:* Release burndown chart
  - shows overall progress
  - updated at end of each sprint

Artifact – Burndown Chart



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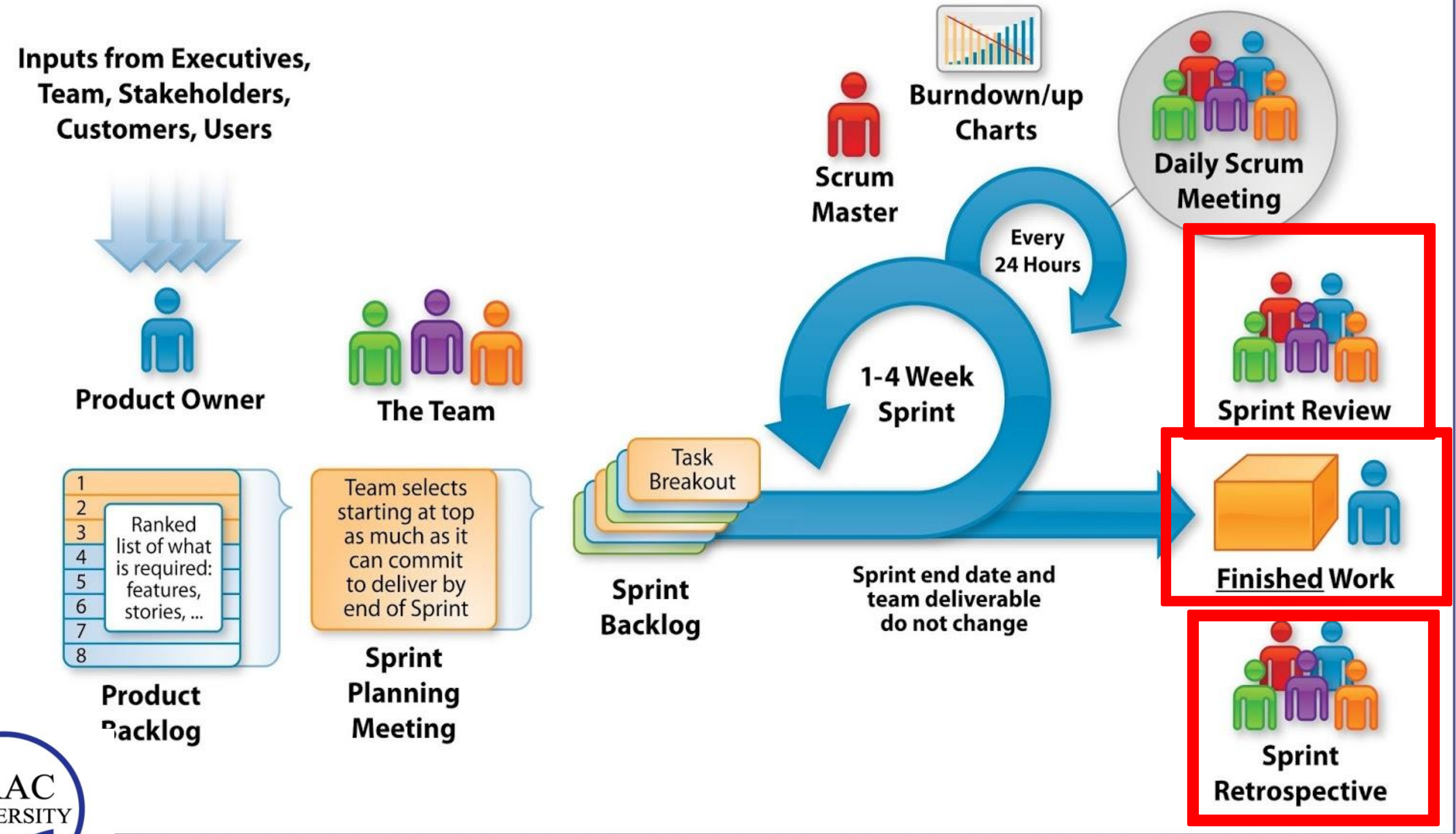
The Agile - Scrum Framework



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Ceremony - Daily Scrum Meeting

- Parameters
  - Daily, ~15 minutes, Stand-up
  - Anyone late pays a $1 fee
- Not for problem solving
  - Whole world is invited
  - Only team members, Scrum Master, product owner, can talk
  - Helps avoid other unnecessary meetings
- Three questions answered by each team member:
  1. What did you do yesterday?
  2. What will you do today?
  3. What obstacles are in your way?

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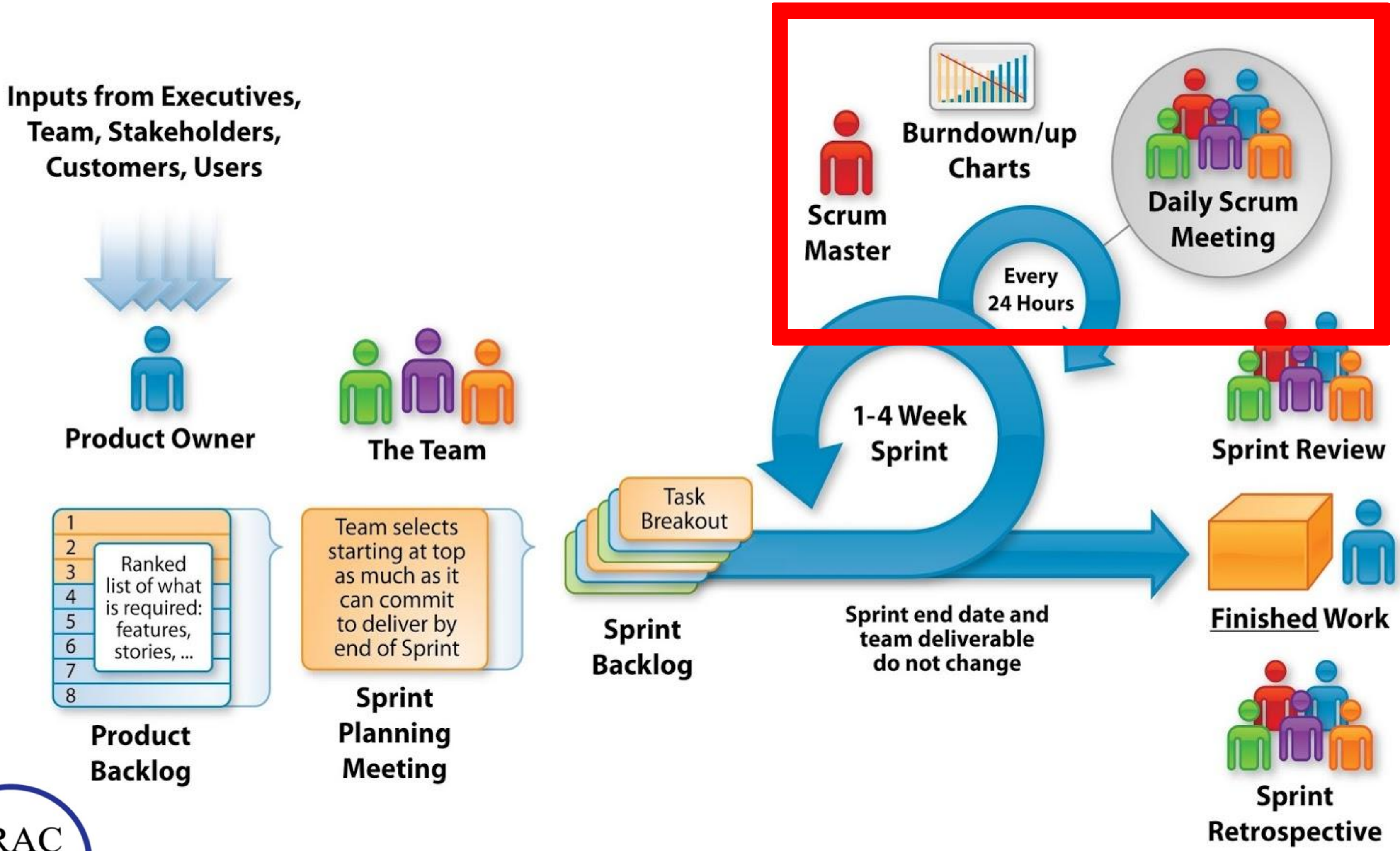
The Agile - Scrum Framework



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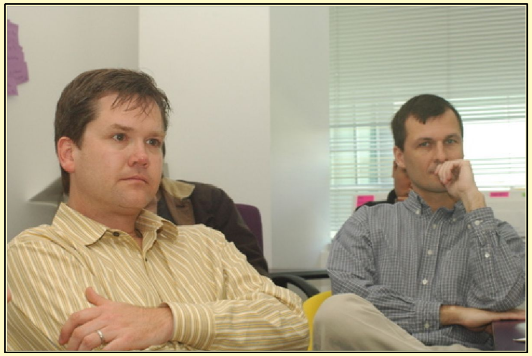
Ceremony - Sprint Review

- Team presents what it accomplished during the sprint
- Typically takes the form of a demo of new features or underlying architecture
- Informal
  - 2-hour prep time rule
  - No slides
- Whole team participates
- Invite the world



Ceremony – Sprint Retrospective

- Identify the scopes of improvement for better result in next sprints
- What worked well, what went wrong are also discussed

Summary

- We have learnt three types of agile principles used in the industry.