Planning with the Big Picture in Mind

COMP3120/8110

Tuesday 17 March 2020

Dr Sabrina Caldwell
The Australian National University
Research School of Computer Science
Acton, ACT, Australia

Course representatives

Reminder: COMP8110 Course Representative is **Yixin Cheng**

I have appointed two Course Representatives for COMP3120:

COMP3120: Runxiang Huang, Zefan Wu

Please support your Course Representative when they seek your views on the course and how it is working/not working for you.

Assignment #1 due next week

You (in your groups) have now created initial key message(s) and in workshops this week you are learning more about how to improve them.

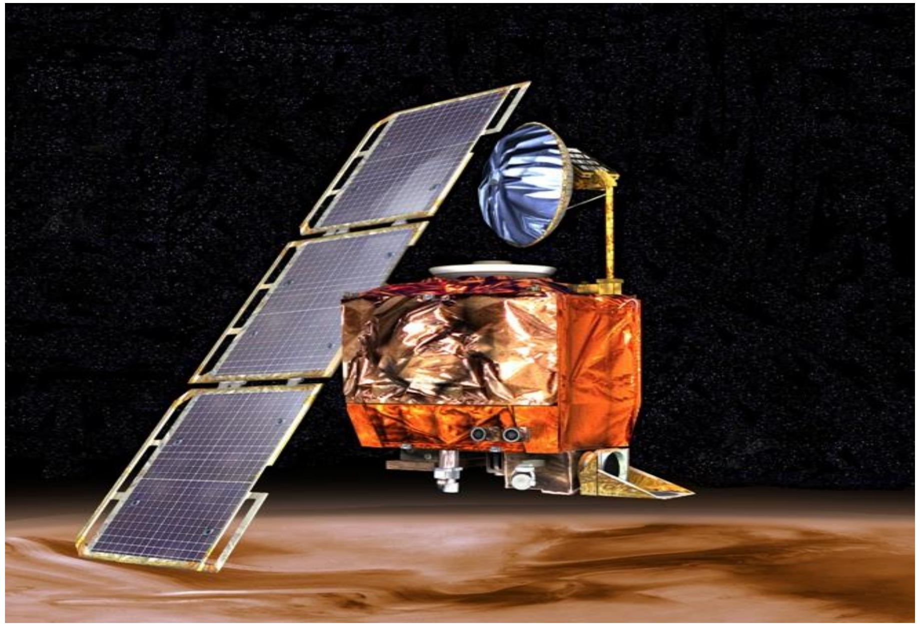
Assignment #1 is due Friday Week 5 at 5pm.
Submission link for Assignment #1 will open at the beginning of Week 5.
One submission per group.

Peer assessment will be done through Wattle.
I will discuss how this will work next week.
Peer assessment are due on Tuesday 9am Week 6.
Submission link will open at 6pm Friday Week 5
One submission per student.

Spirit rover June 2003
Opportunity rover July 2003
Perseverance rover February 2021

Rover Finds Conditions Once Suited for Ancient Life on Mars
Rover Finds Strong Evidence Meridiani Planum Was Wet

Why do projects fail? – Technical reasons



1999 NASA's Mars Climate Orbiter
$125 Million cost
10 month journey
Entered Mars atmosphere too low
and fast and disintegrated

Software 1 computes thrust force needed in units of *pounds*
Software 2 accepts number from Software 1 in units of *newtons*

1 **newton** of force = .2249 **pounds** of force

⬆ (metric)

⬆ (English)

Why do projects fail? Not understanding requirements

Hartford Coliseum

1978

Roof fell in only 6 *hours* after 4,746 basketball spectators left the coliseum

What went wrong?

Many things, including the use of computer science to work out the minimum required materials for the expected load, and a computer analysis that left out the torsional stress requirements.

Why do projects fail? Management reasons

‘ObamaCare’
US$1.5 Billion Government Project

CGI Federal

Paid $88M

Website < 1% successful

Serge Godin
Founder, Billionaire

Need a 2016 plan? Act fast to beat the deadline

What went wrong? “**sloppy software foundation** possibly due to the haste with which code was written.” and “with so **many contractors**, everyone could technically fulfill the requirements in their statement of work, and the thing can still not work in the end.” Washington Post, 2013[1]

[1] https://www.washingtonpost.com/news/wonk/wp/2013/10/16/meet-cgi-federal-the-company-behind-the-botched-launch-of-healthcare-gov/?utm_term=.c938b4e4adf3

Software Development PM Approaches

3 basic types of software development:

Traditional (Waterfall)

Incremental

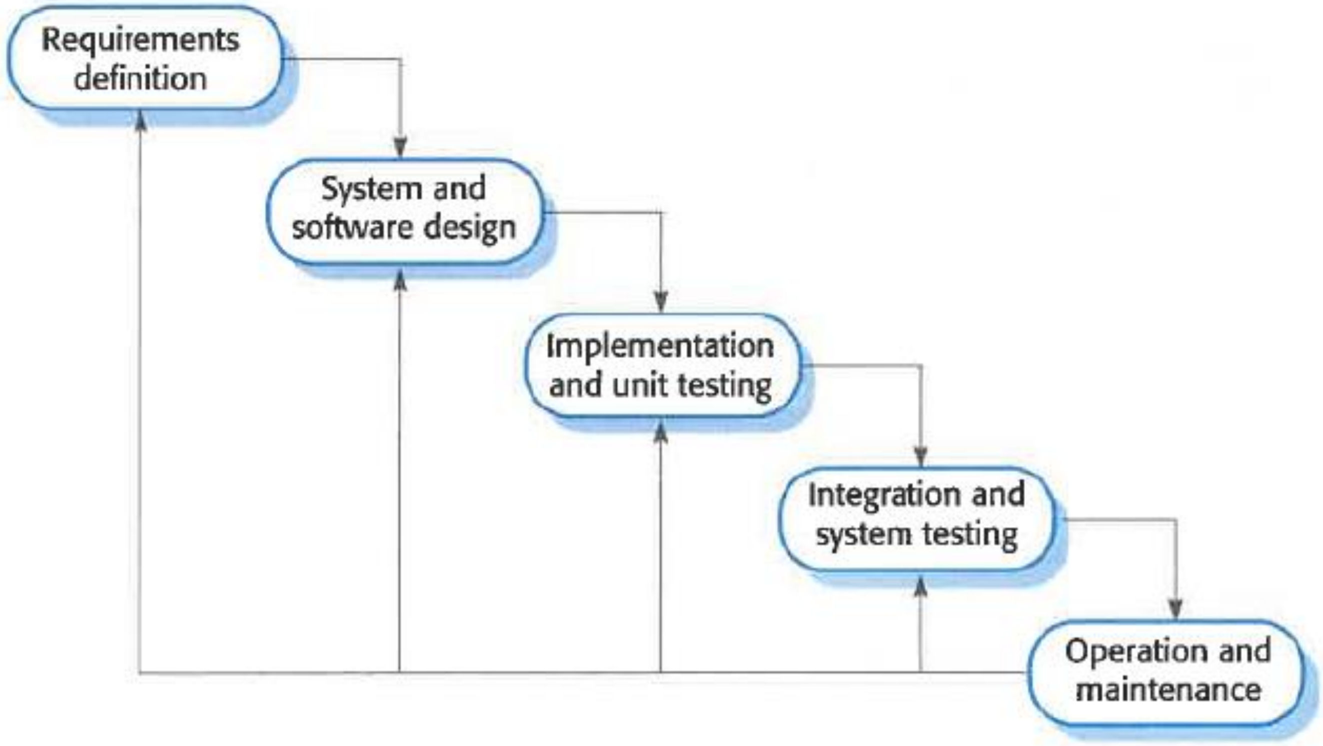
Integrative

Software Development PM Approaches

Traditional (Waterfall)

Inflexibility and rework risks only beneficial / justifiable in developing software systems such as:

- systems embedded in hardware
- safety and security critical systems
- large, multi-developer systems


Requirements definition
System and software design
Implementation and unit testing
Integration and system testing
Operation and maintenance

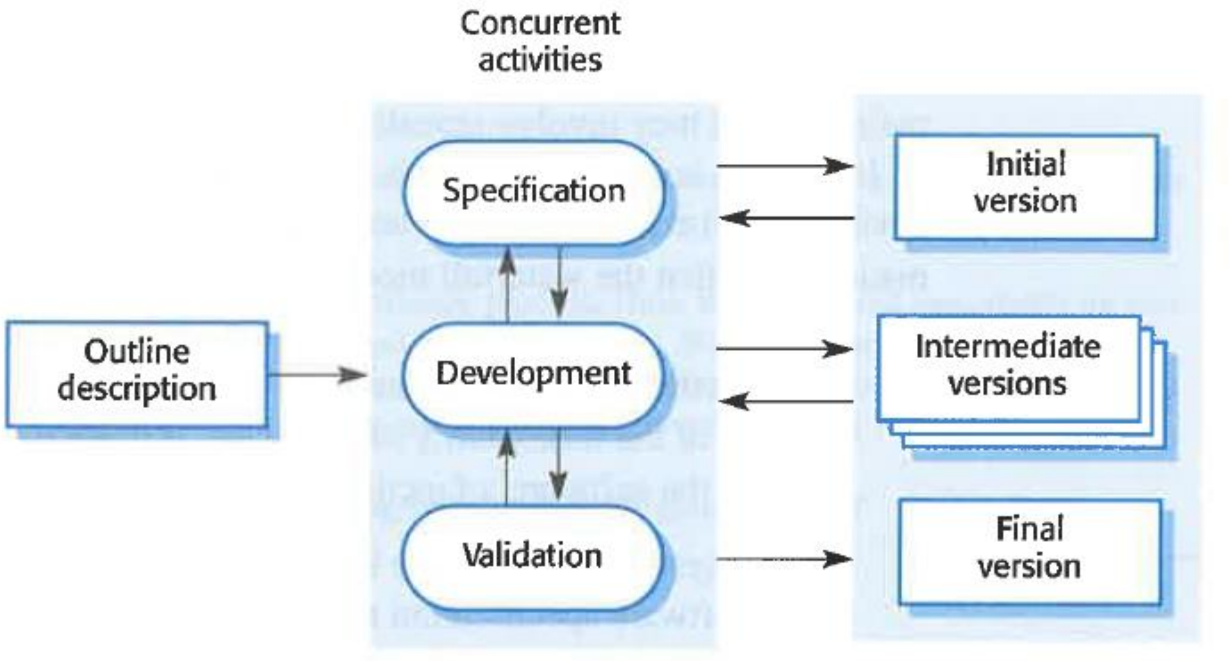
Source: Ian Sommerville (2016) Software Engineering p. 47

Avoid using traditional development where teams can communicate informally and requirements change quickly.

Incremental

Three major advantages over traditional development:

- reduced cost of implementing requirements changes
- better customer engagement and feedback
- early delivery of usable software



Source: Ian Sommerville (2016) Software Engineering p. 50

But…

Process can be less visible - more developing and less documenting

and system structure can get 'messy' so regular refactoring is needed

Software Development PM Approaches

Integrative

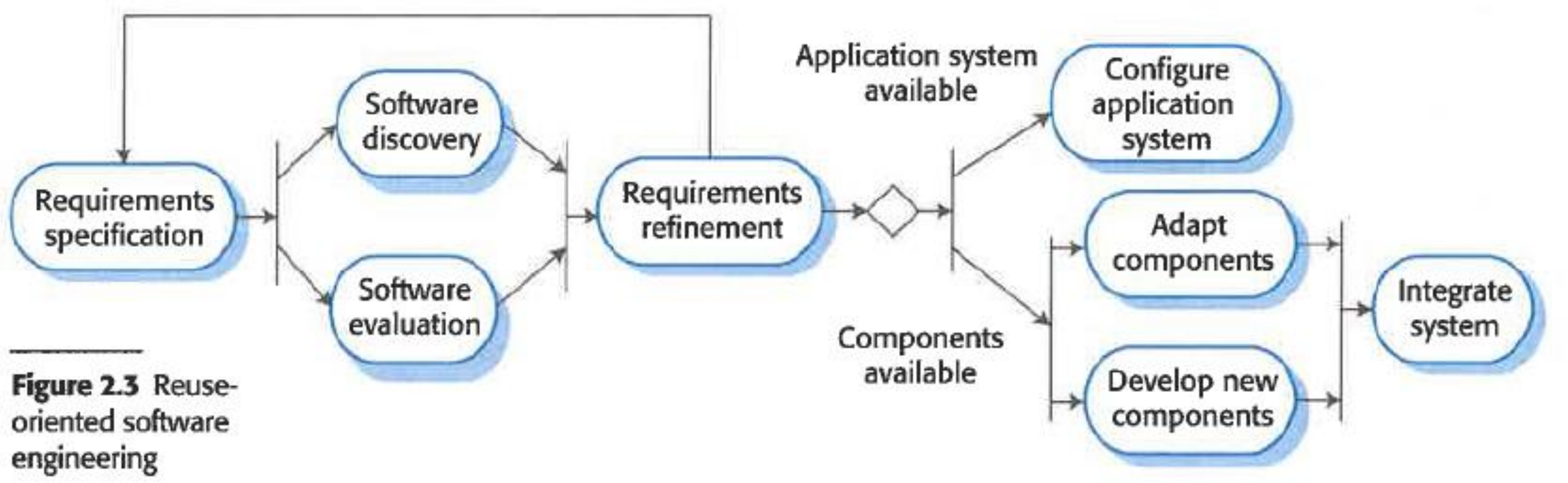


Figure 2.3 Reuse-oriented software engineering

Source: Ian Sommerville (2016) Software Engineering p. 52

Best for:

- configuring stand-alone multi-purpose applications
- collections of objects developed as a component or package for integration into a framework
- web services developed in accordance with standards for invoking over the Internet

What is Agile Project Management?

"Agile project management (APM) is the work of energizing, empowering, and enabling project teams to rapidly and reliably deliver business value by engaging customers and continuously learning and adapting to their changing needs and environments."

Frank Bomarius et al (2009)
Product-Focused Software Process Improvement

"APM is a way of managing projects to deliver customer value via adaptive planning, rapid feedback, continuous improvement and intense human interaction and collaboration".

Sanjiv Augustine (2006)
Managing Agile Projects

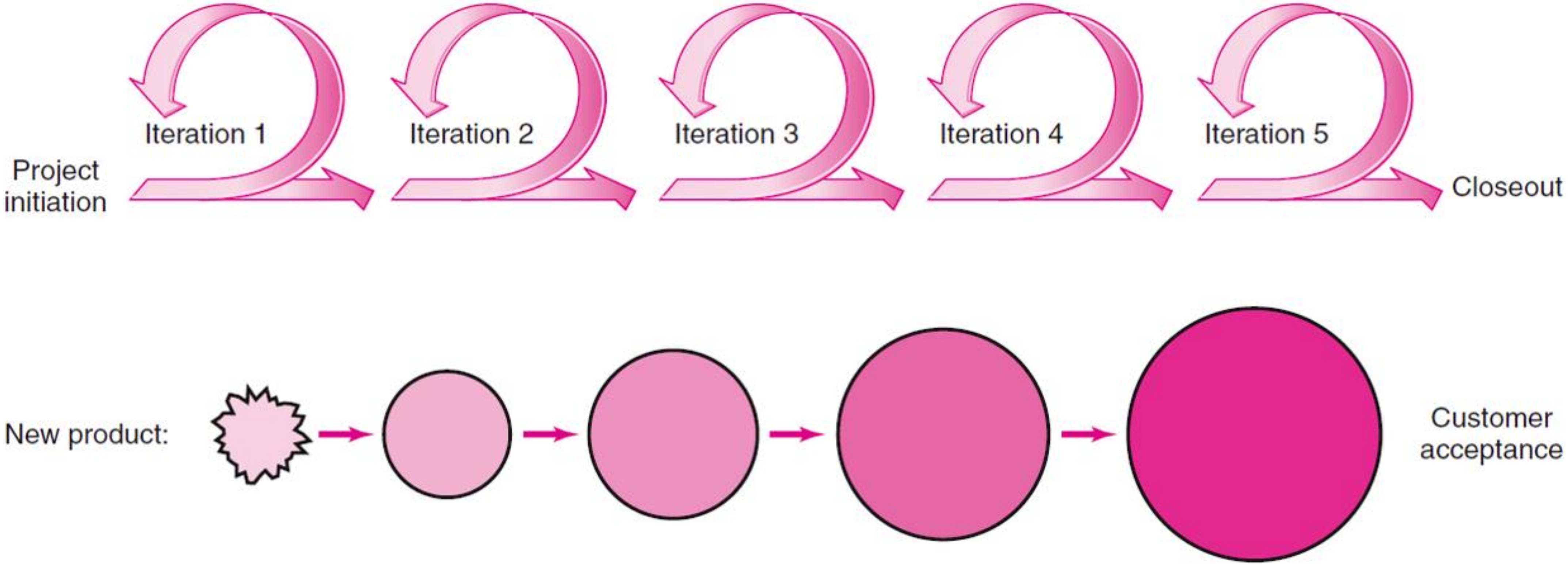
Principles of APM

- Focus on customer value
- Iterative and incremental delivery
- Experimentation and adaptation
- Self-organisation
- Continuous improvement

What is Agile Project Management?

APM is related to the **rolling wave planning** and **scheduling project methodology**.

It uses **iterations** (“time boxes”) to develop a **workable product** that **satisfies** the customer and other key stakeholders. Stakeholders and customers review progress and re-evaluate priorities to ensure alignment with customer needs and company goals.



Larson & Gray Project Management, Figure 17.2, Chapter 17

What is Agile Project Management?

APM Methodologies

APM Methodologies view a **project as a non-linear, complex adaptive system** where change is normal and take a “barely sufficient” approach to plans, process and control while focussing on delivering customer value.

The **focus** of APM is on **people and their interactions**, giving individuals the power to make quick decisions. They are adaptive rather than predictive, even self-adapting their own processes.

APM methodologies are **chaodic** – that is, there is both **chaos and order.**

Product goals are achievable but they are not predictable.
Processes aid consistency, they are not repeatable.

APM values collaboration and barely sufficient methodology, which is based on practices (**what happens in reality**) **not** processes (**what is described in manuals**).

Basics of Agile Project Management

Small releases – helps manage complexity, provides early feedback. One to three months

Iterative and incremental development – plans, requirements, design, code and tests are evolved incrementally through multiple passes or iterations. Iterations are fixed length (usually 2 weeks), which maximises feedback. The fixed scope retains stability.

Collocation – all team members, including on-site customer, are collocated. This arrangement facilitates communication & integration, encourages impromptu meetings, and design sessions.

Release plan / feature backlog – desired features are defined at a high level and ***prioritised by the customer***. Estimation is done collaboratively in a release planning game (based on game theory). Developers provide effort estimates & customers decide the business priority.

Basics of Agile Project Management

Iteration plan/task backlog – high-level features from the release plan are elaborated upon and prioritised along with their implementation tasks in an iteration plan or task backlog. Estimation is done collaboratively with developers in an iteration planning game. Developers provide effort estimates & customers decide business priority.

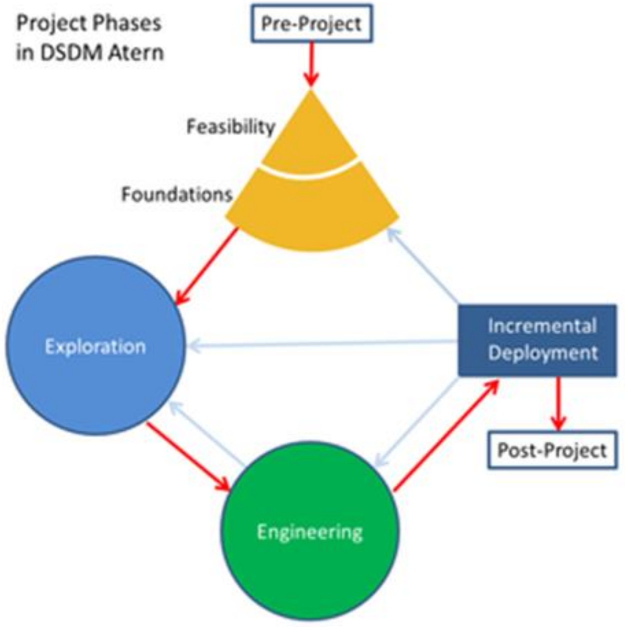
Tracking – features and tasks are tracked within an iteration. They only count as complete when they are 100% done. There is no concept of partial completion. What constitutes “done” is agreed before project starts.

Self-organising teams – team members self-organise by completing tasks collaboratively from backlogs without top-down management control.

Simple, lean and adaptable – all aspects of work, including processes, are kept simple, lean (low on waste) and adaptable to maximise customer value and to accommodate change.

Popular Agile Methodologies

Dynamic Systems Development Method (DSDM)



Crystal Methods (Crystal Clear)

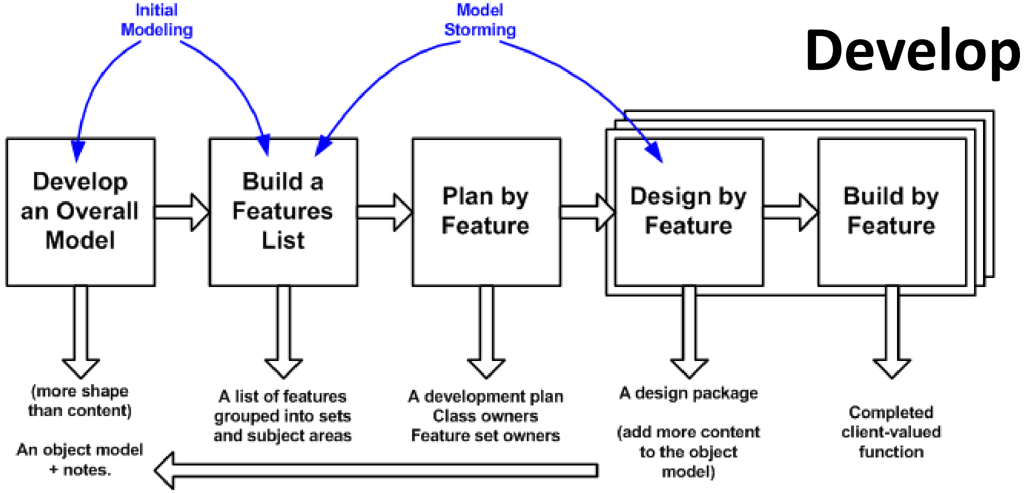
Crystal is a family of human-powered, adaptive, ultra light, 'stretch-to-fit' software development methodologies. *(Developer Alistair Cockburn)*

Lean Development (LD)

Adapted from manufacturing; can be summarized by seven principles:

Eliminate waste
Amplify learning
Decide as late as possible
Deliver as fast as possible
Empower the team
Build integrity in
See the whole

Feature-Driven Development (FDD)



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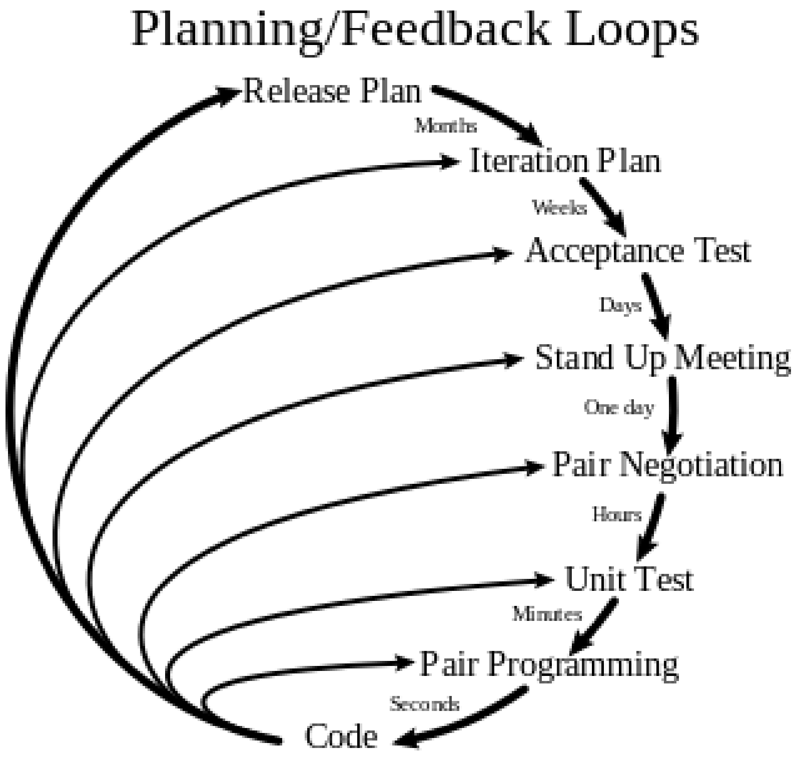
Popular Agile Methodologies

Extreme Programming (XP)



Adaptive Software Development (ASD)

speculate, *collaborate*, and *learn* cycles

Rational Unified Process (RUP)

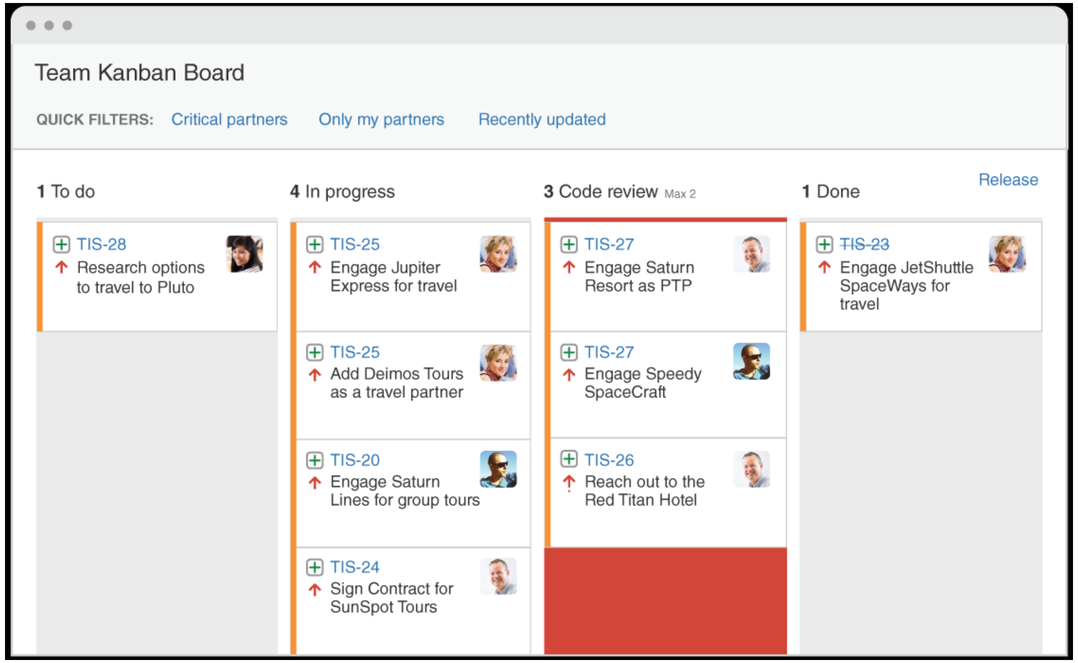
Inception - Idea for project stated. Development team determines if project worth pursuing / resources needed.

Elaboration - Project's architecture and required resources further evaluated.

Construction - Project developed and completed.

Transition - Software released to the public.

Kanban



Team Kanban Board

QUICK FILTERS: Critical partners Only my partners Recently updated

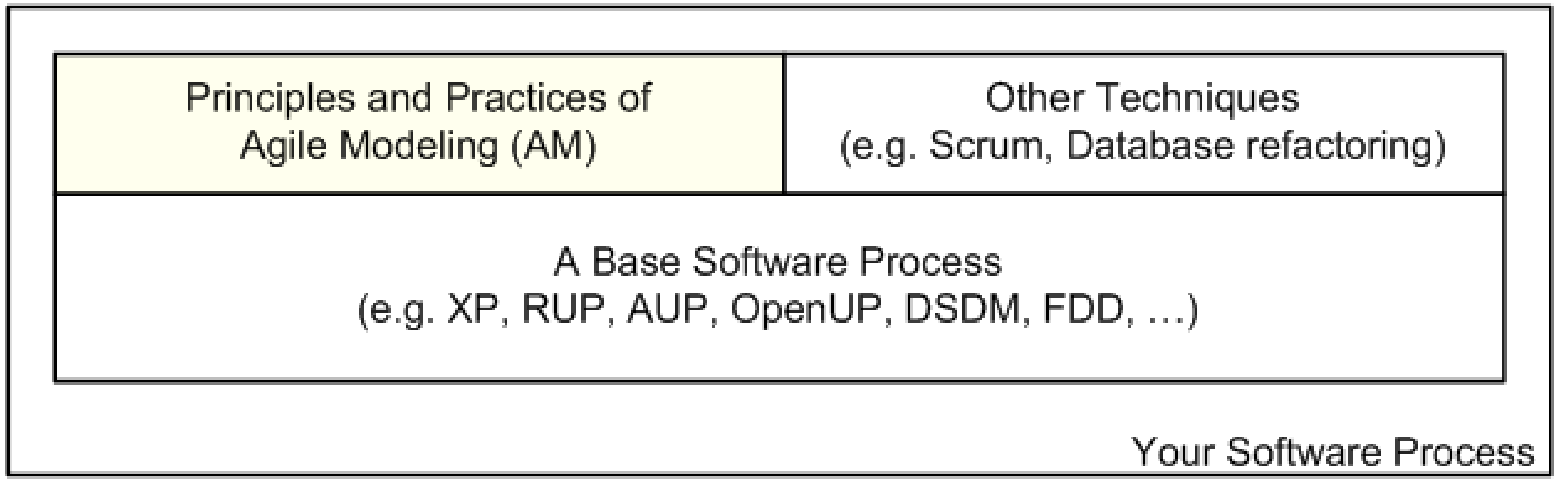
1 To do	4 In progress	3 Code review Max 2	1 Done Release
TIS-28 Research options to travel to Pluto	TIS-25 Engage Jupiter Express for travel	TIS-27 Engage Saturn Resort as PTP	~~TIS-23~~ Engage JetShuttle SpaceWays for travel
	TIS-25 Add Deimos Tours as a travel partner	TIS-27 Engage Speedy SpaceCraft	
	TIS-20 Engage Saturn Lines for group tours	TIS-26 Reach out to the Red Titan Hotel	
	TIS-24 Sign Contract for SunSpot Tours		

Popular Agile Methodologies

Rapid Product Development (PRD)

- cross-discipline seminars & impromptu meetings, entire engineering team understands all functions
- streamlined processes, flexibility in quality control systems and paperless approval systems
- robust library of reusable software code

Agile Modelling



Principles and Practices of Agile Modeling (AM)

Other Techniques (e.g. Scrum, Database refactoring)

A Base Software Process (e.g. XP, RUP, AUP, OpenUP, DSDM, FDD, …)

Your Software Process

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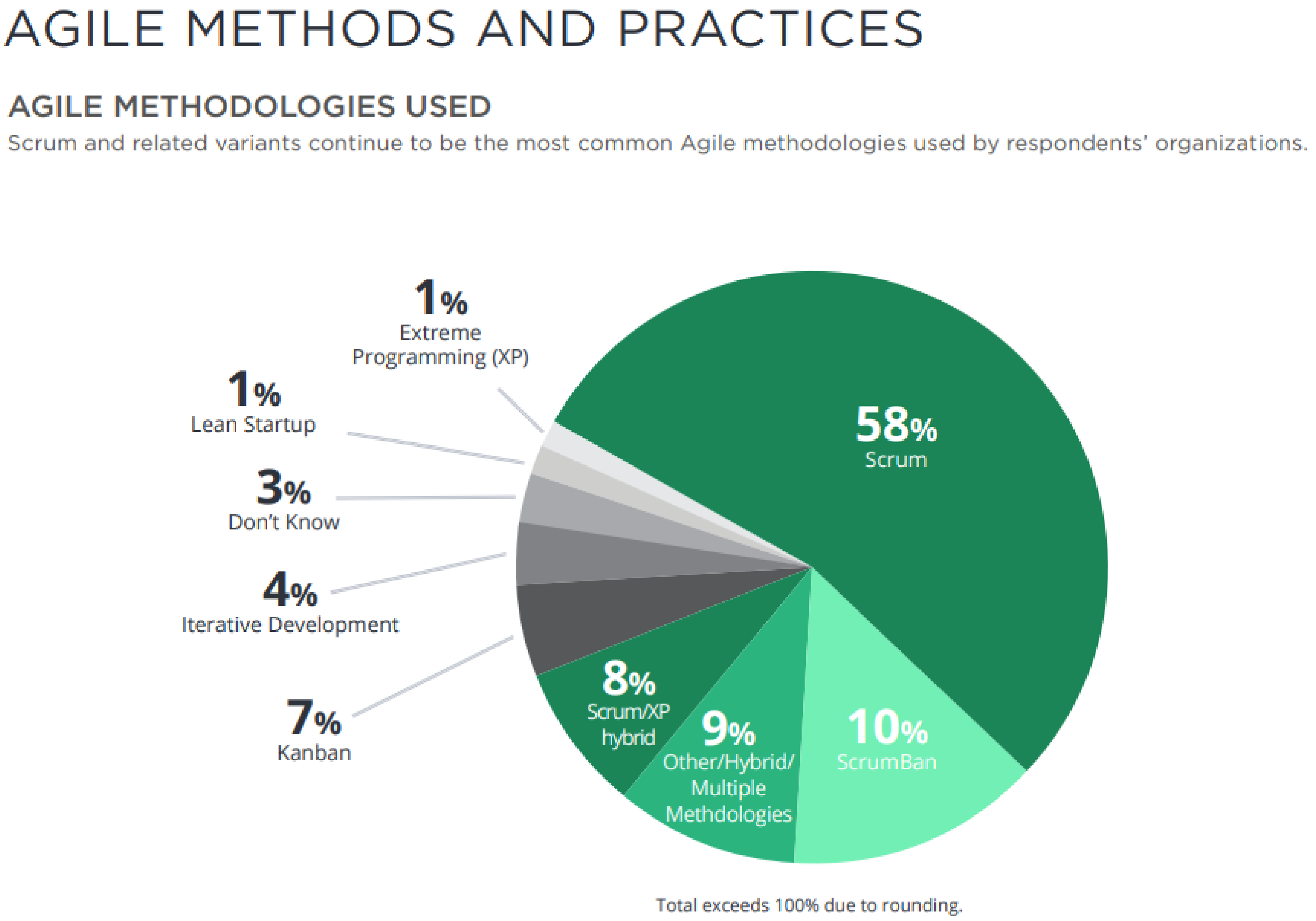
…and then there is…

Scrum

Popular Agile Methodologies



AGILE METHODS AND PRACTICES

AGILE METHODOLOGIES USED

Scrum and related variants continue to be the most common Agile methodologies used by respondents' organizations.

Total exceeds 100% due to rounding.

2020

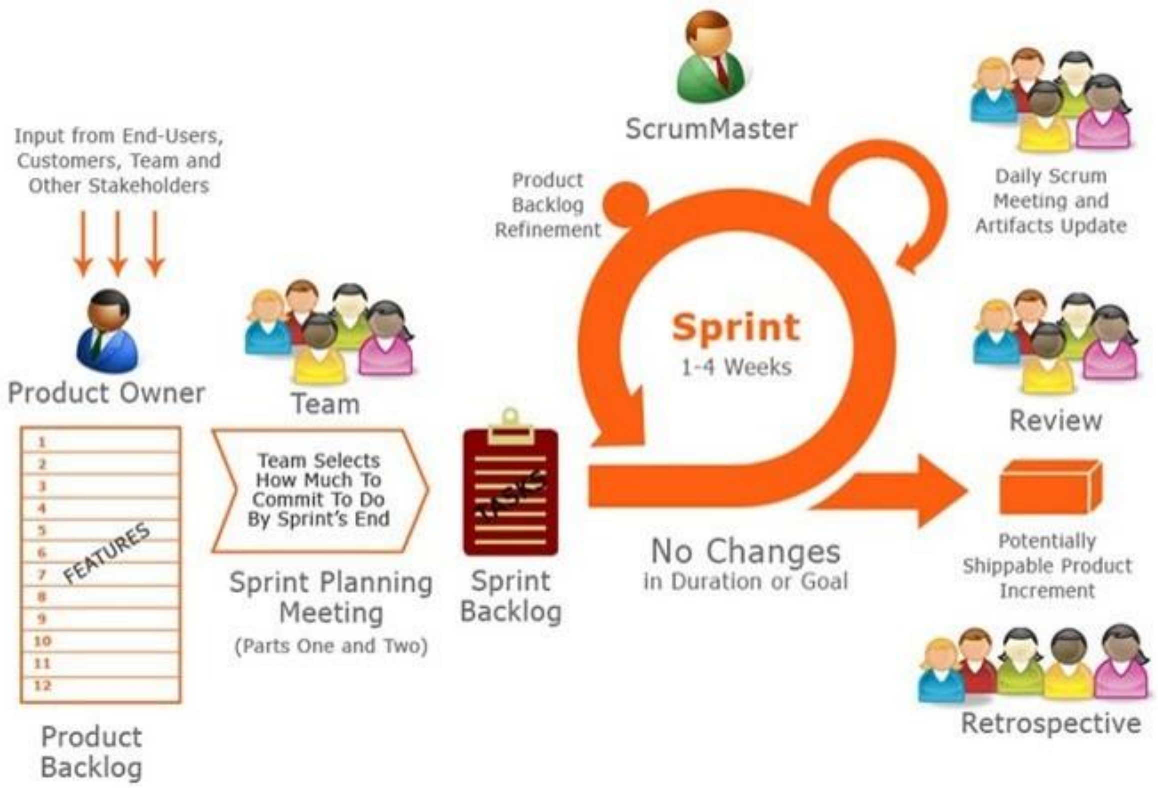
76% of the Agile methods you will encounter will be Scrum or a variant of Scrum

Agile PM in Action - Scrum Methodology

Is a holistic approach for use by a cross-functional team collaborating to develop a new product. It defines product features as deliverables and prioritizes them by their perceived highest value to the customer. Priorities are re-evaluated after each iteration (sprint) to produce fully functional features.

Scrum consists of
four iterative phases:

- analysis
- design
- build
- test


Input from End-Users, Customers, Team and Other Stakeholders
Product Owner
Team
FEATURES
1
2
3
4
5
6
7
8
9
10
11
12
Product Backlog
Team Selects How Much To Commit To Do By Sprint's End
Sprint Planning Meeting
(Parts One and Two)
TASKS
Sprint Backlog
ScrumMaster
Product Backlog Refinement
Sprint
1-4 Weeks
No Changes
in Duration or Goal
Daily Scrum Meeting and Artifacts Update
Review
Potentially Shippable Product Increment
Retrospective