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Software Engineering

IMS 2020

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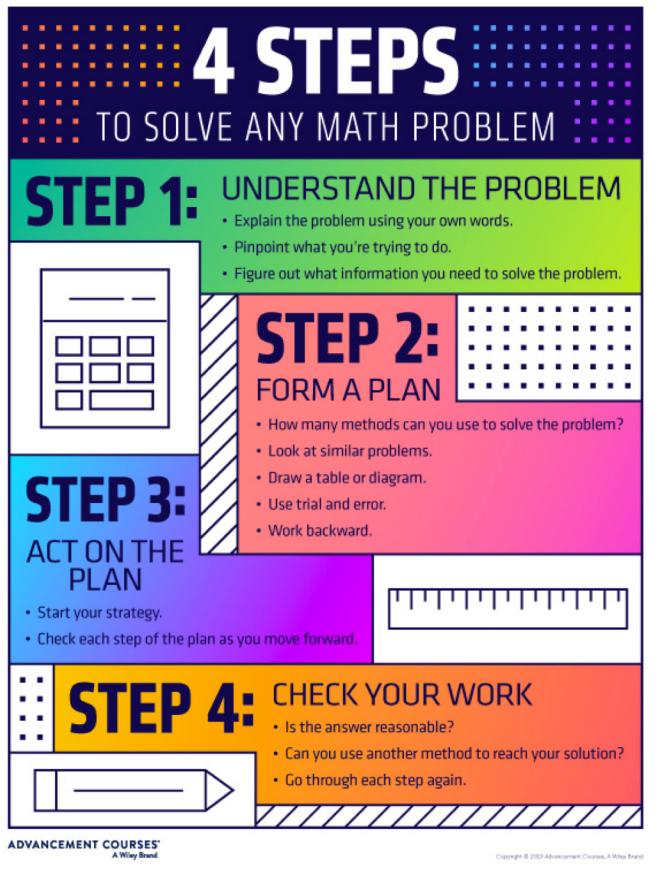
Software Engineering

- NATO-conference in 1968
 - **Problem:** "Software crisis"
 - **Aim:** Reliability and productivity in line with traditional engineering disciplines
 - **Solution:** Formalize the different phases of software development (software process)





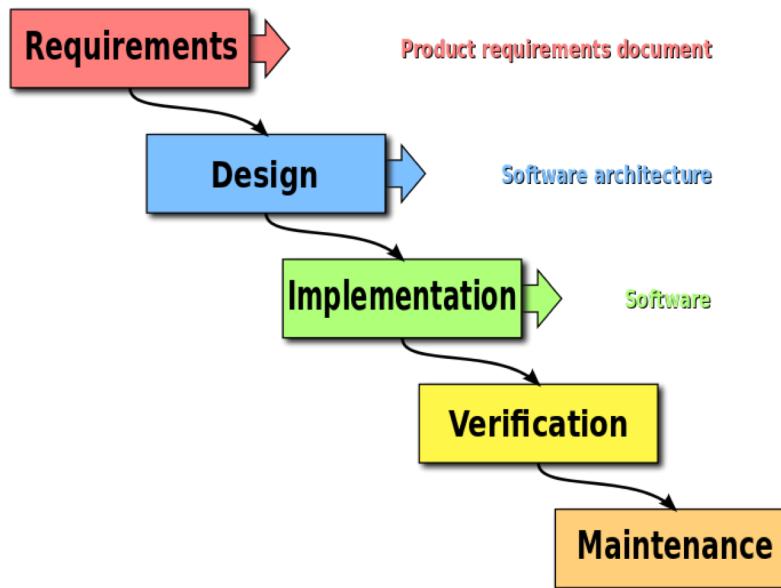
Main steps of a software process



1. Specification
(Requirements analysis)
2. Development (Design,
Implementation)
3. Validation (Integration,
Testing)
4. Evolution (Deployment,
Maintenance)



The Waterfall Model (classic)



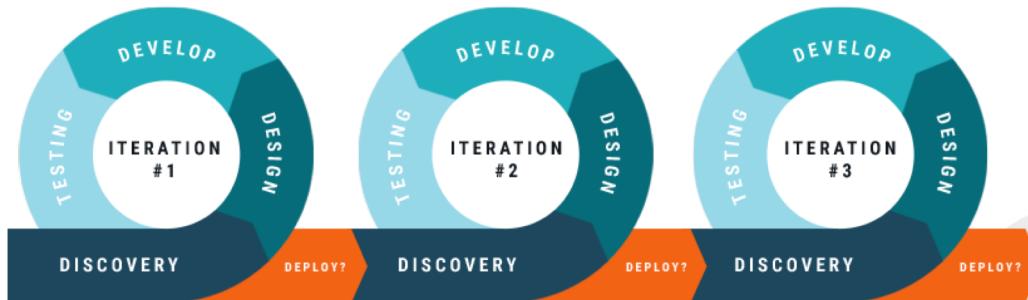
- Sequential model
- Documentation!
- No feedback or flexibility



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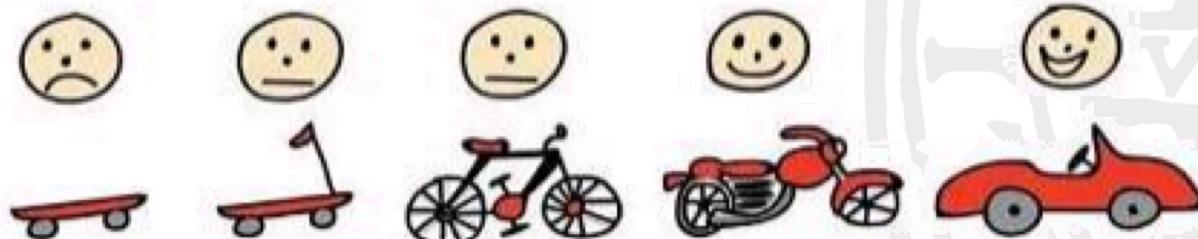
Iterative and incremental development

- **Iterative:** Revise existing solutions



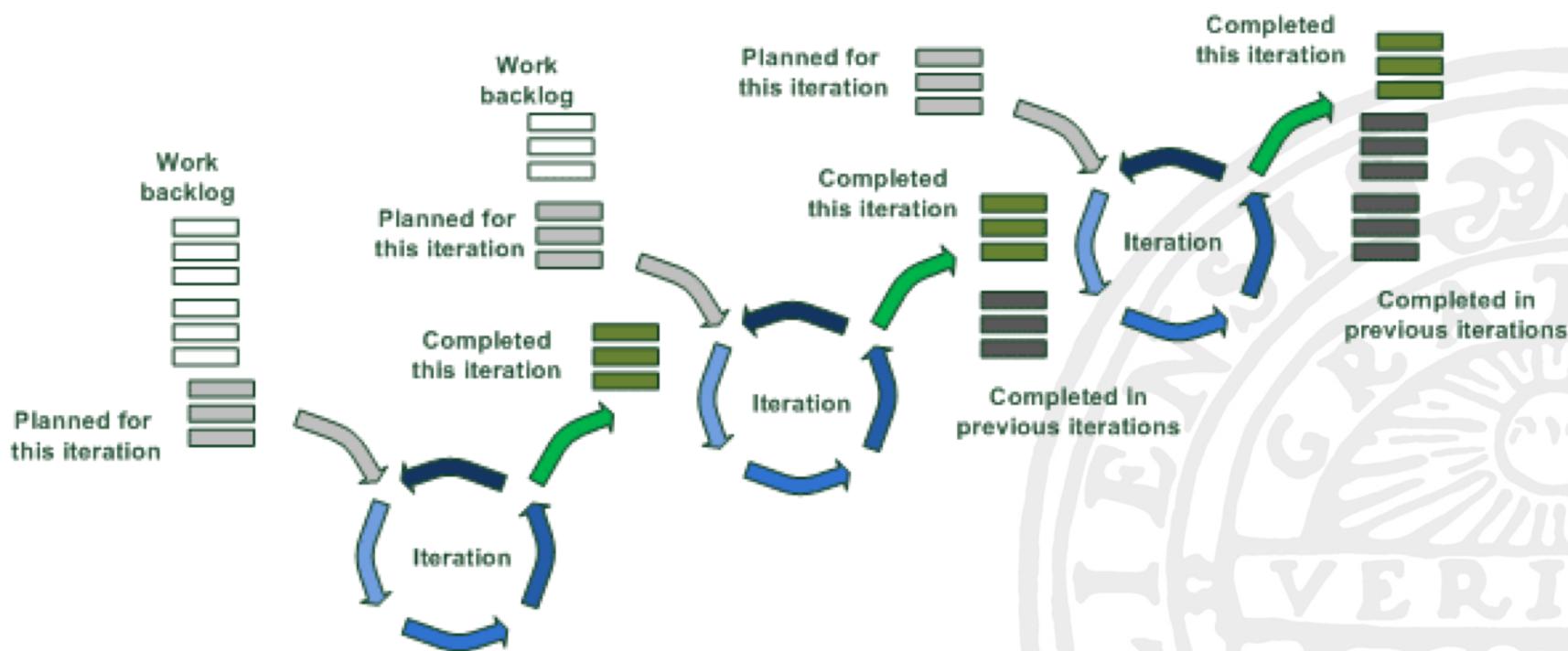
- **Incremental:** Develop a solution for an increasing subset of requirements

Like this!





Iterative and incremental development



(Rational) Unified Process

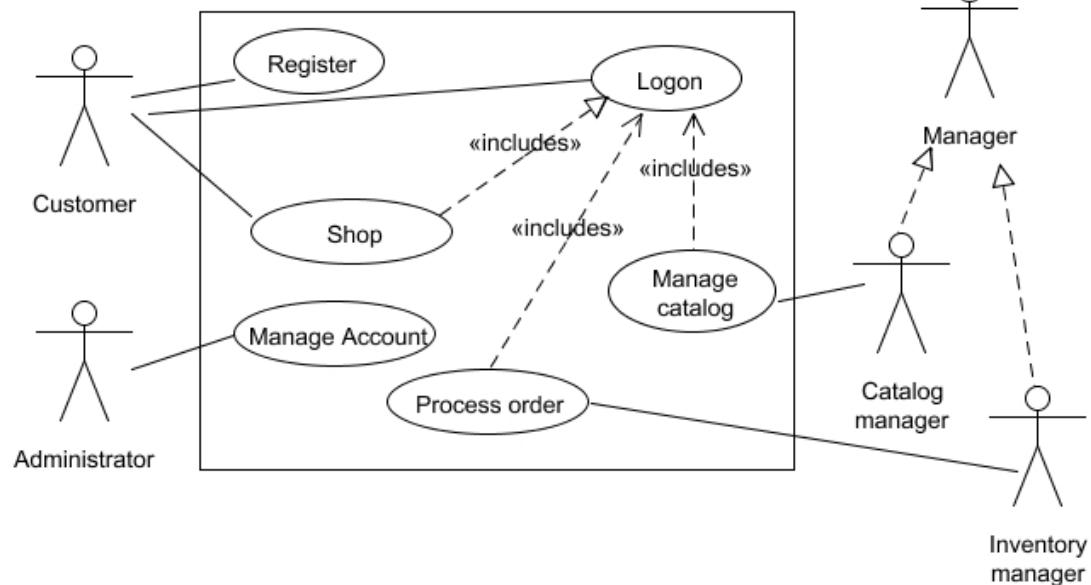
- Iterative and incremental
 - Each iteration
 - consists of four phases; Inception, Elaboration, Construction, Transition
 - produces a functional system (Rapid prototyping)
- Use-case driven
- Architecture centered (Models, UML)

Use-cases

- Example: e-book store
 - Customers can browse and order books, music and software.
 - The systemet should
 - Provide information about available products
 - Handle customer registration
 - Handle orders and delivery
 - Update available products, customer register, etc.

Use-cases (2)

- Identify (external) actors
 - Customers
- Identify (key) scenarios
 - Shop
 - Register



Use case: Shop

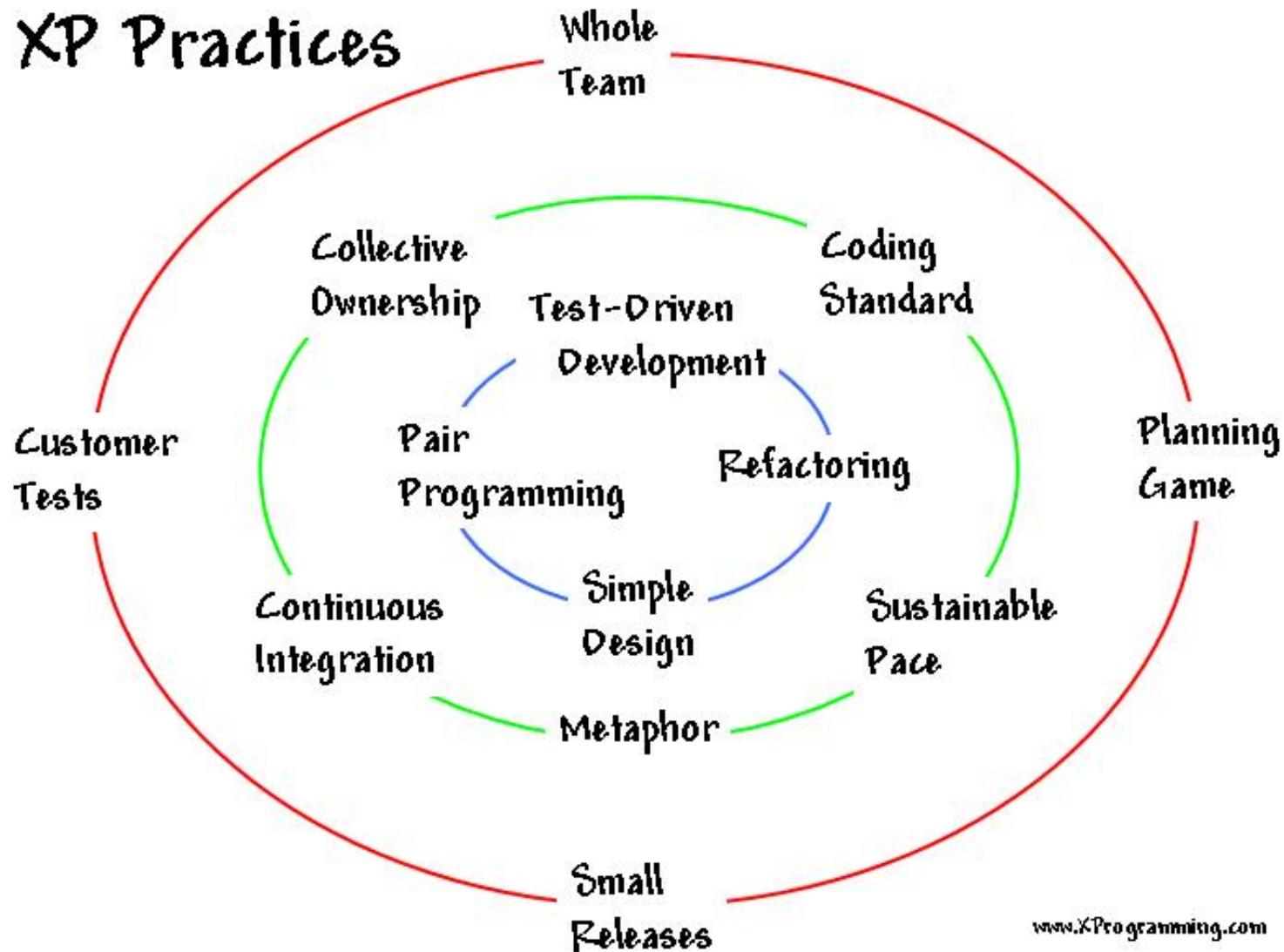
Log on	Welcoming message, ID + passwd, please!
Enter ID + passwd	Check ID + passwd Display new items
Loop: Browse, search	Show item info (save statistics)
Select	Add to shopping cart
Done! Go to cashier	Show shopping cart
Accept order	Choose payment method, please!
Accept payment method	Check payment Process order

Agile Software Development

- 2001: Agile Alliance and Manifesto
- Values
 - **Individuals and interplay** over methods, processes and tools
 - **Functional software** over extensive documentation
 - **Customer collaboration** over contract negotiations
 - **Adjustment to changes** over following a static plan
- Examples
 - Extreme Programming (XP)
 - Scrum

Extreme programming

XP Practices





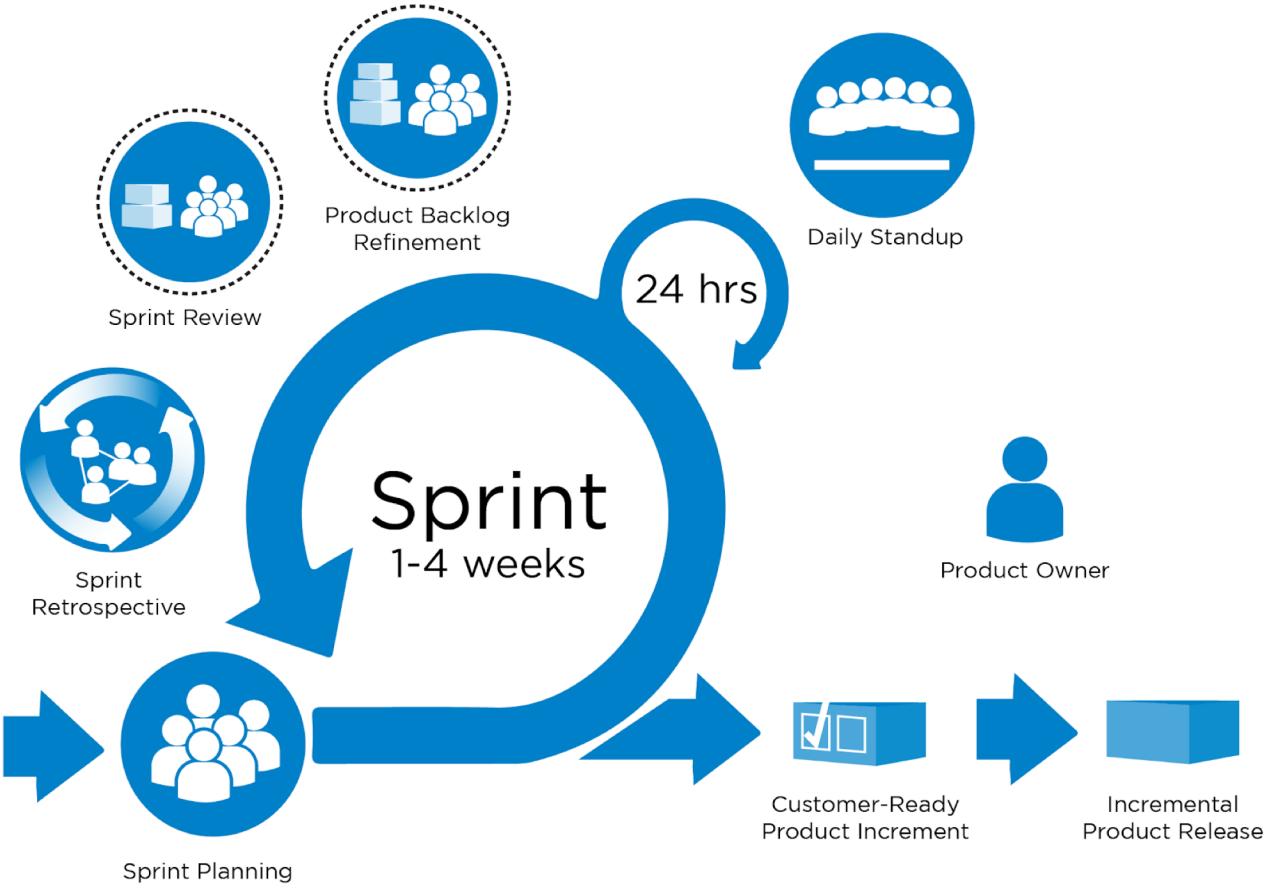
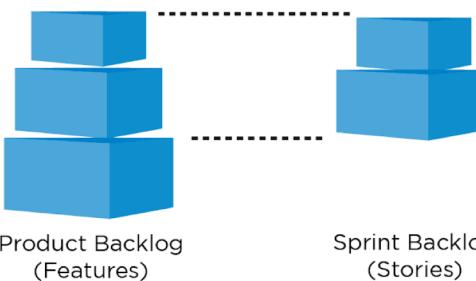
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Scrum

- Focus on project management, team members are assigned roles
- Short iterations (sprint)
- Daily meetings (stand-up)



How Scrum Works





After the break...

- Khalid will introduce some tools that can make project management and collaboration easier...



Team task

- How do you want to work (software process)?
- Will you assign team roles (e.g., project leader)?
- What practices do you plan to use?
- Will you have regular meetings? How often? If not, who is responsible for arranging meetings when needed?
- Physical or online meetings?
- How will you communicate (outside meeting time)?



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