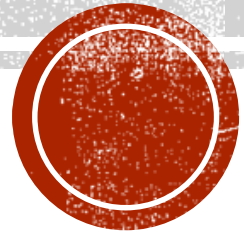
Software Engineering 2
SE1 Introduction (1)



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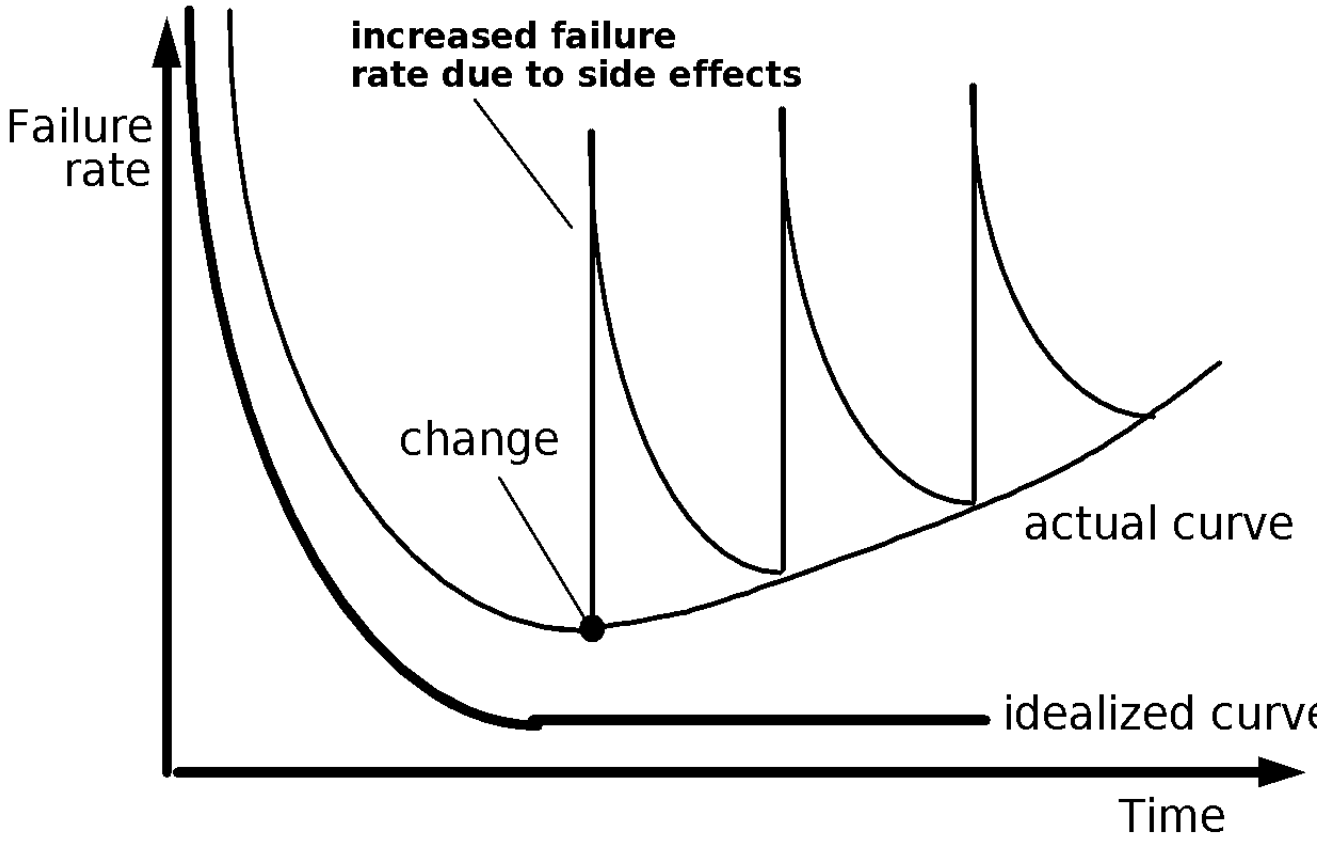
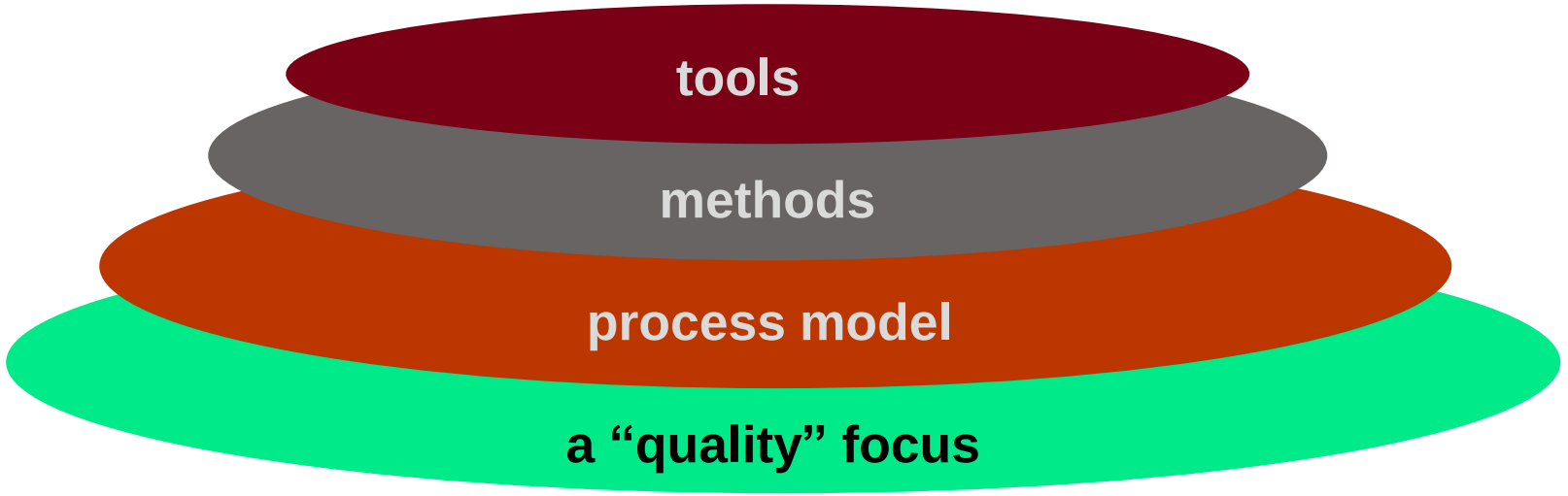
Hardware vs Software



The hardware begins to wear out
Software doesn't wear out. However, it does deteriorate with maintenance

A Layered Technology



method/process vs methodology

Level of abstraction	Example of application	Typical product
Task	Developing a first-cut class diagram	Specific version of a class diagram
Technique	Description of how to carry out a technique, e.g. UML class modelling	Any UML class diagram
Method/Process	Specific techniques used on a particular project that lead to a specific software product	A product costing system
Methodology	General selection and sequence of techniques capable of producing a range of software products	A range of business software applications

Process Models

Predictive approach

Waterfall

Process Models

Predictive approach

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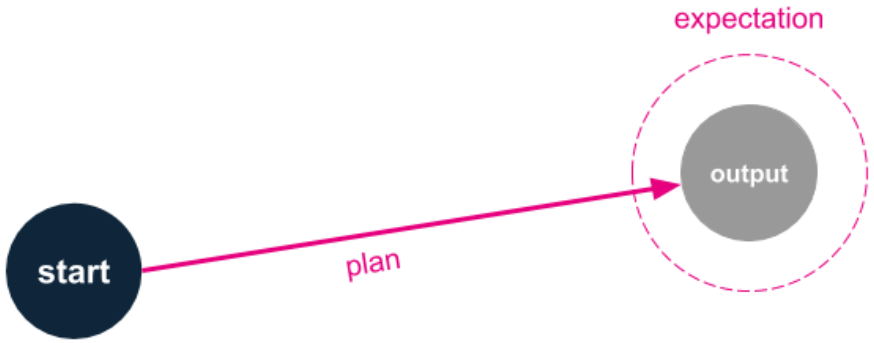
Predictive approach

Waterfall



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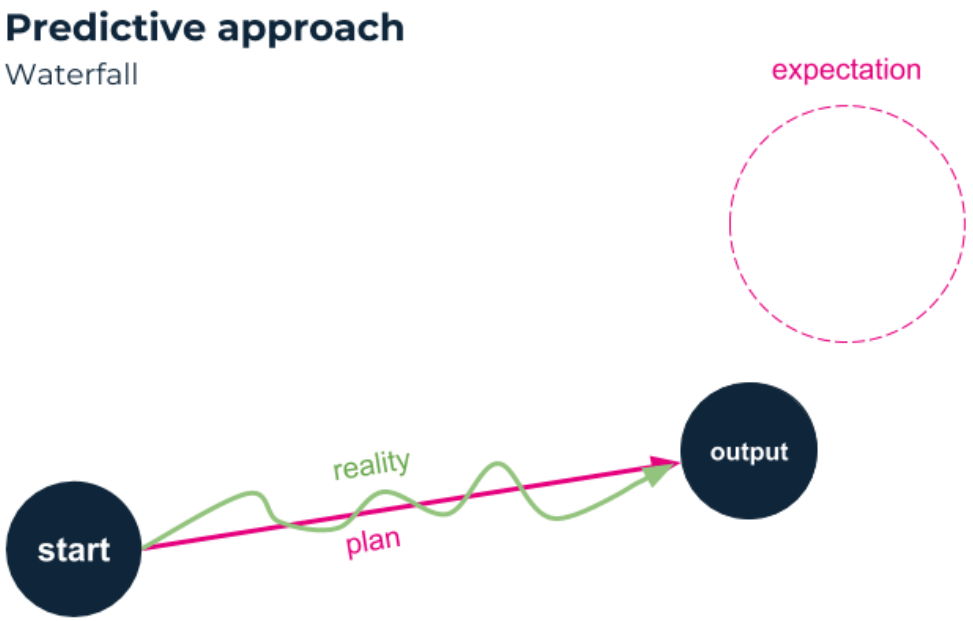
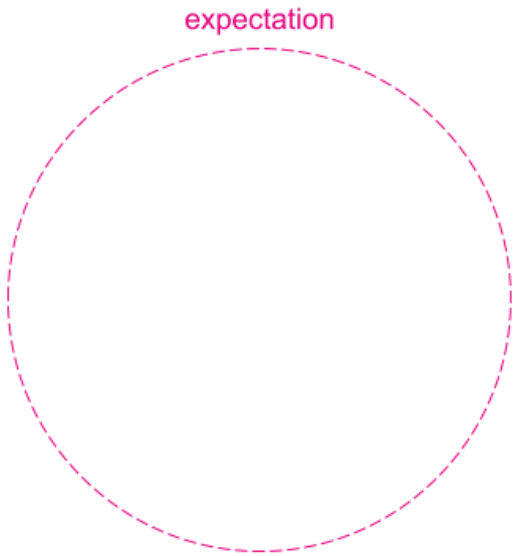


Process Models

Adaptive approach

Agile



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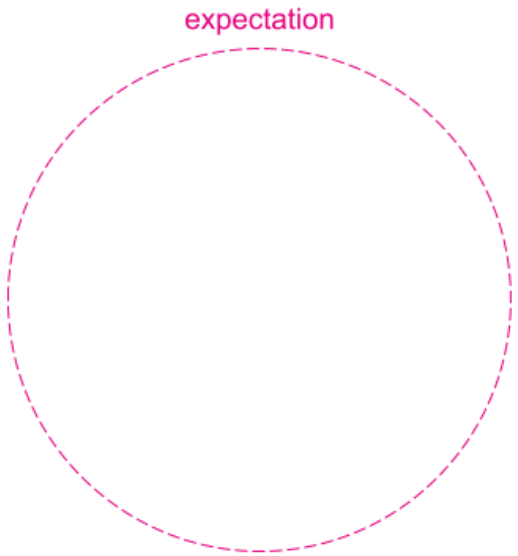

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Adaptive approach

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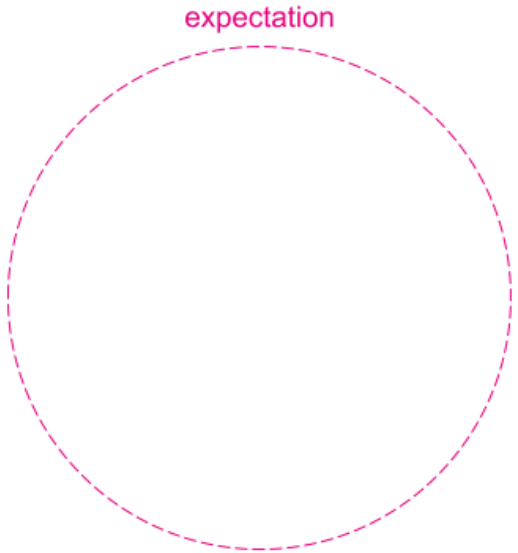

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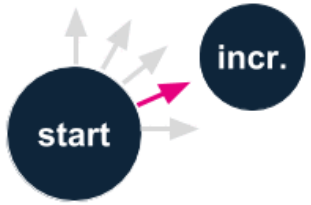

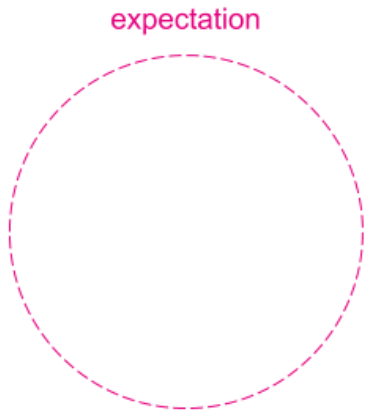

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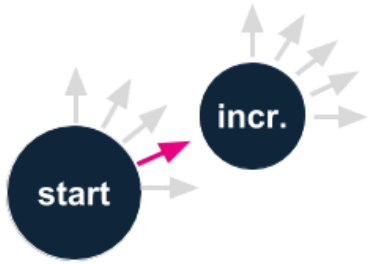

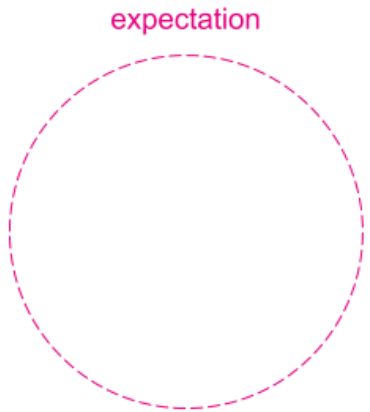

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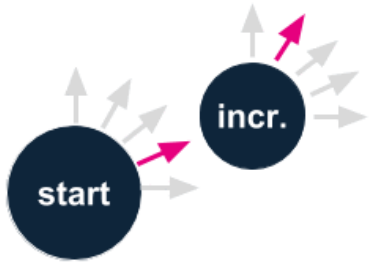

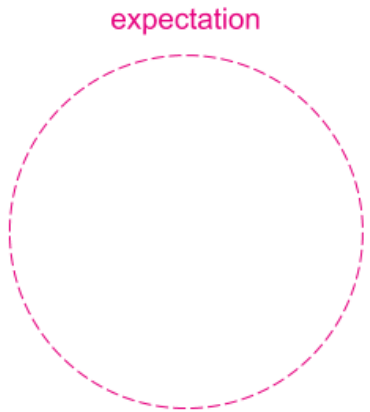

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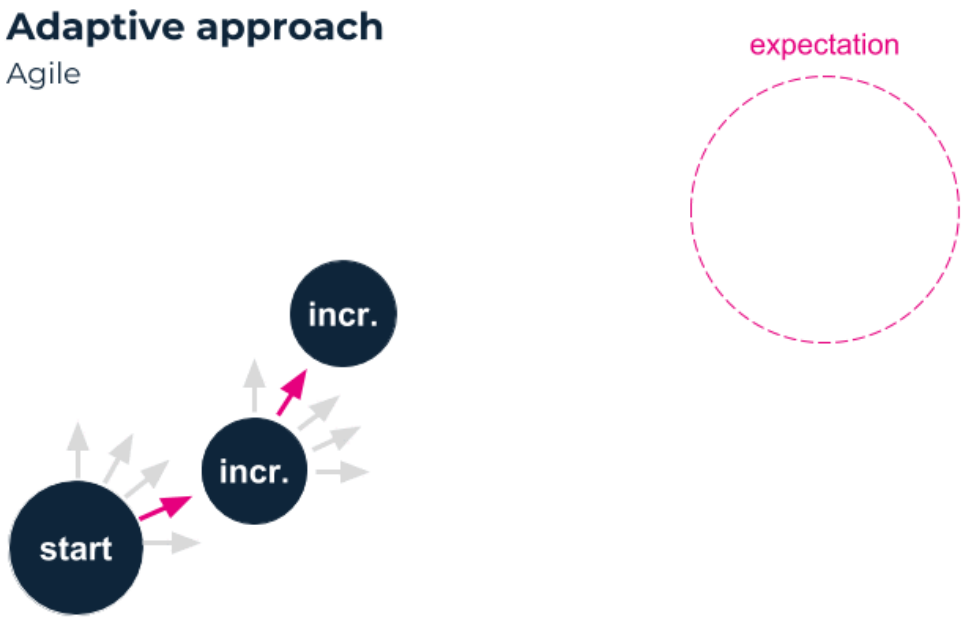

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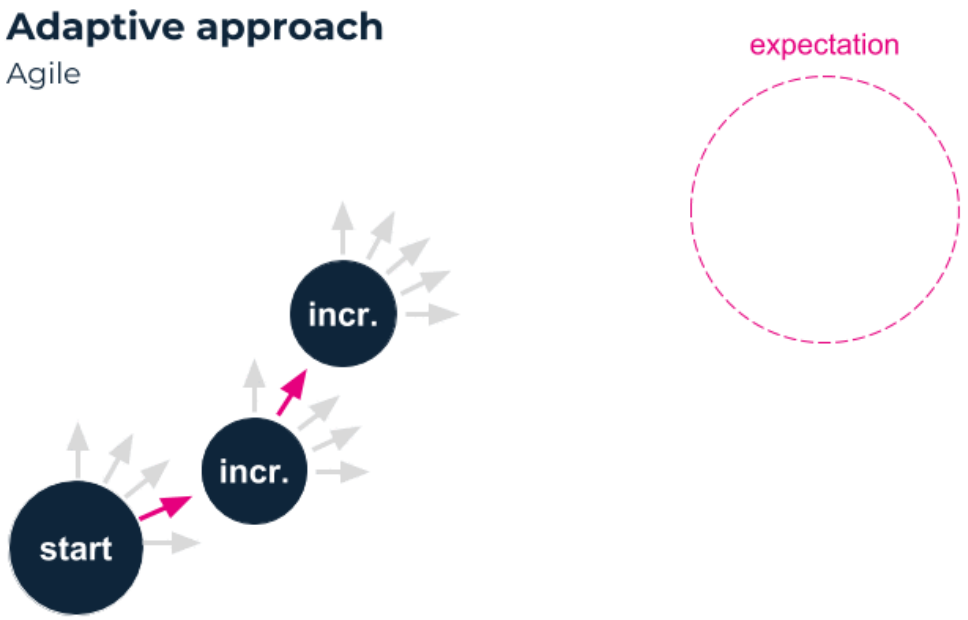

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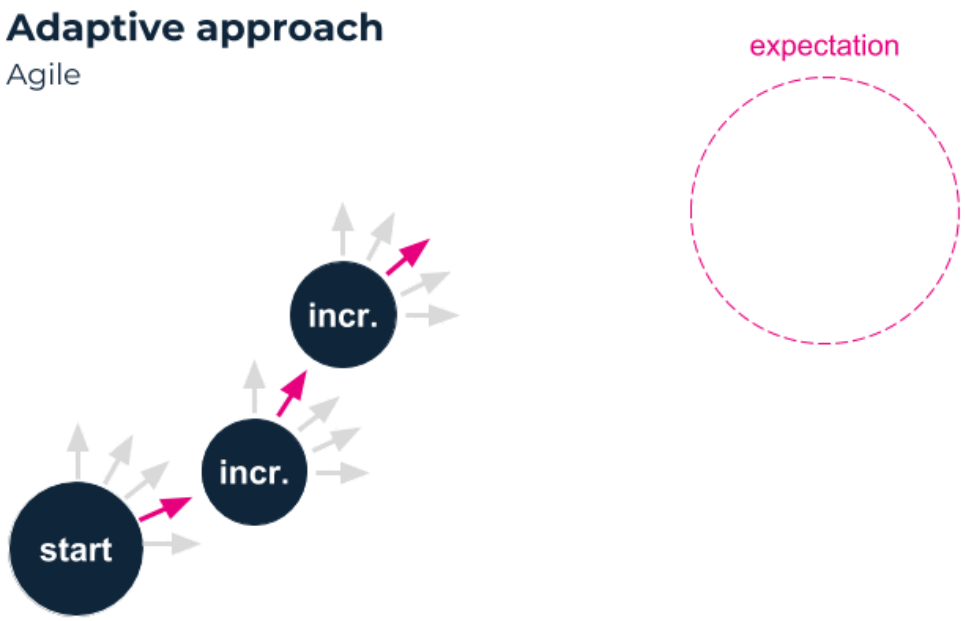

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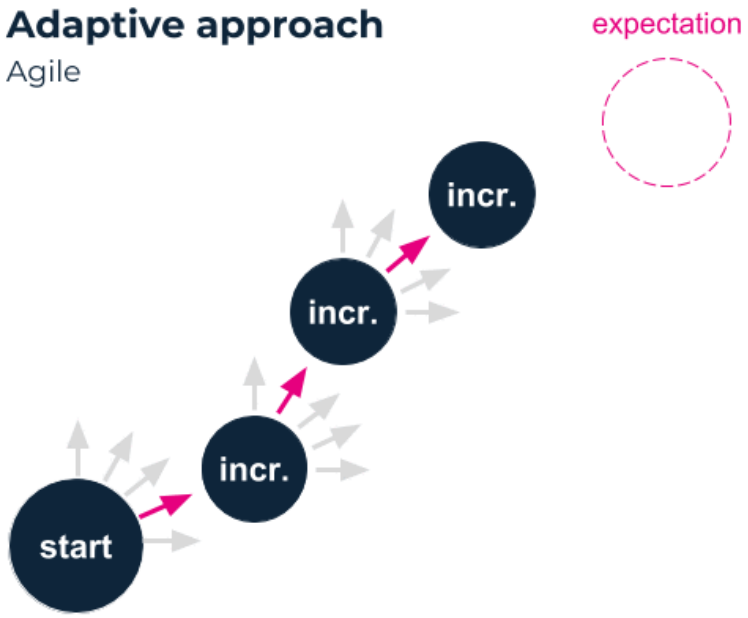

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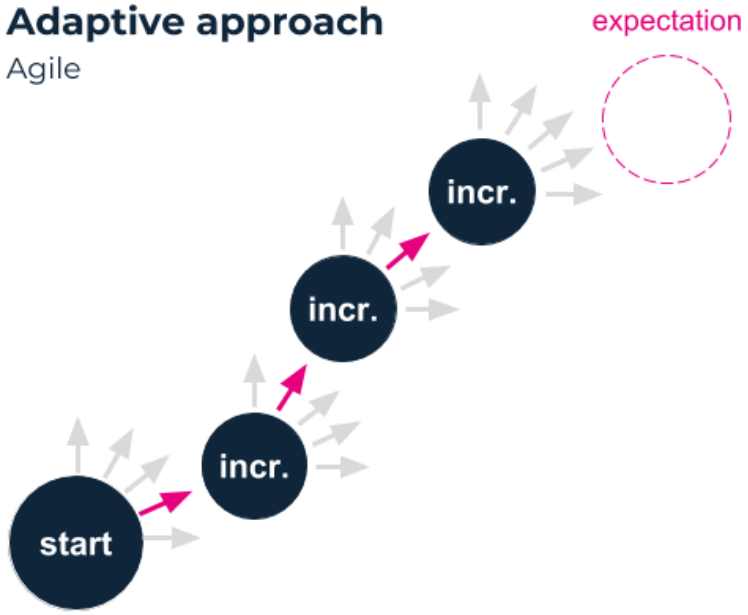

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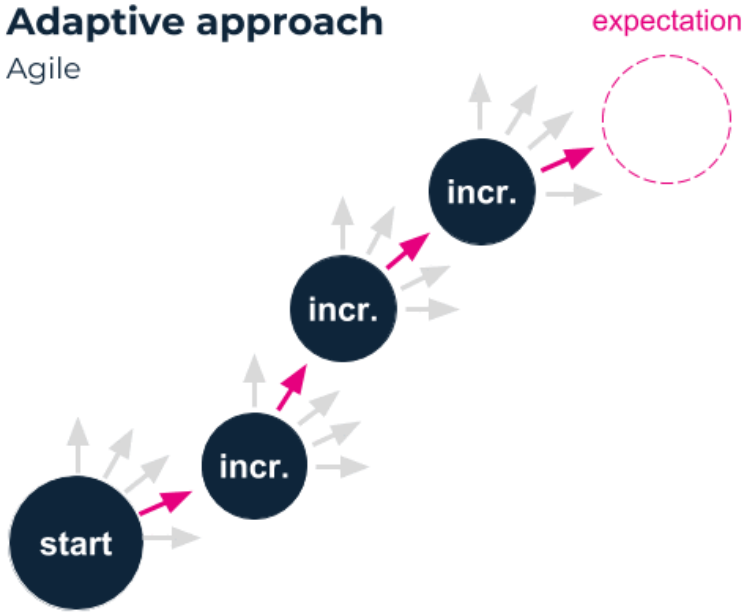

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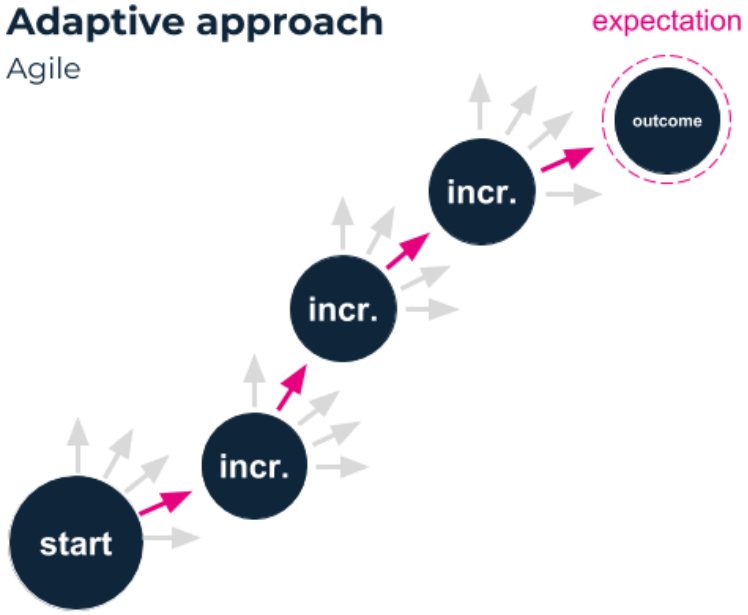

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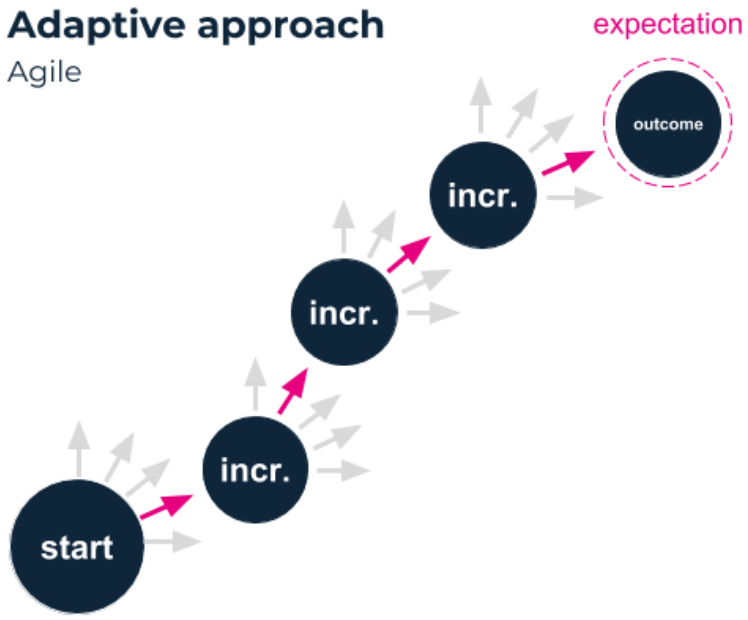
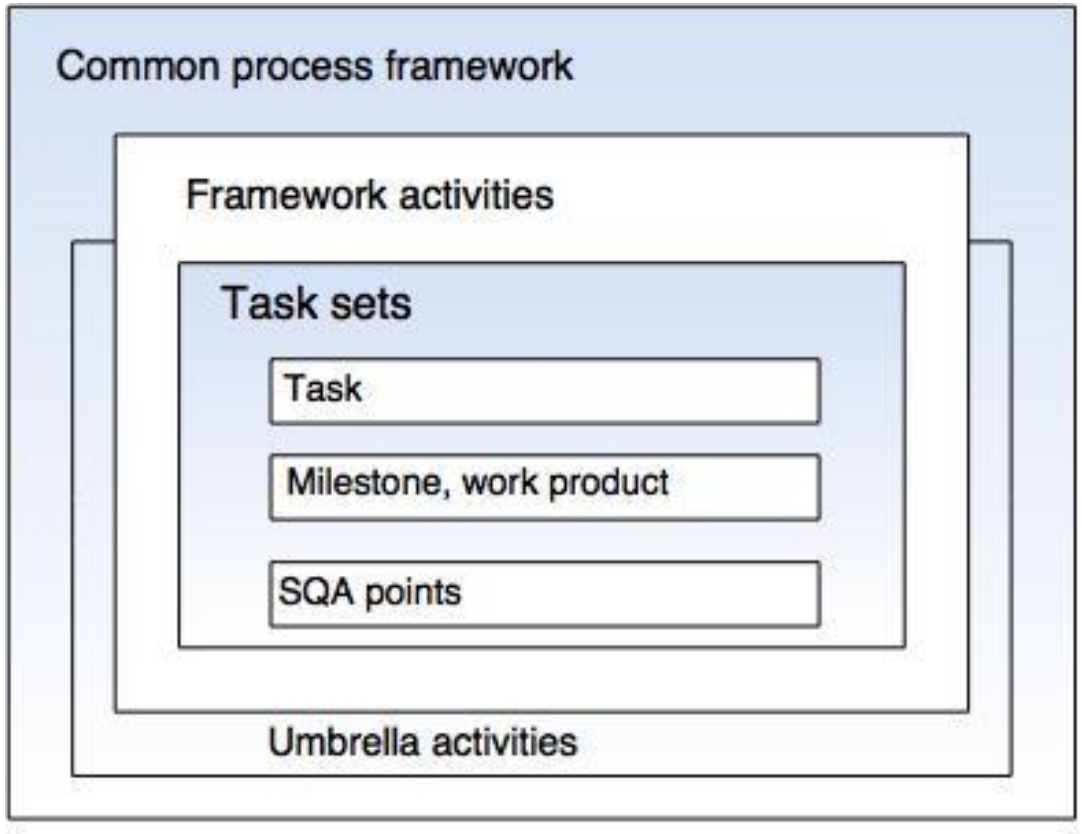


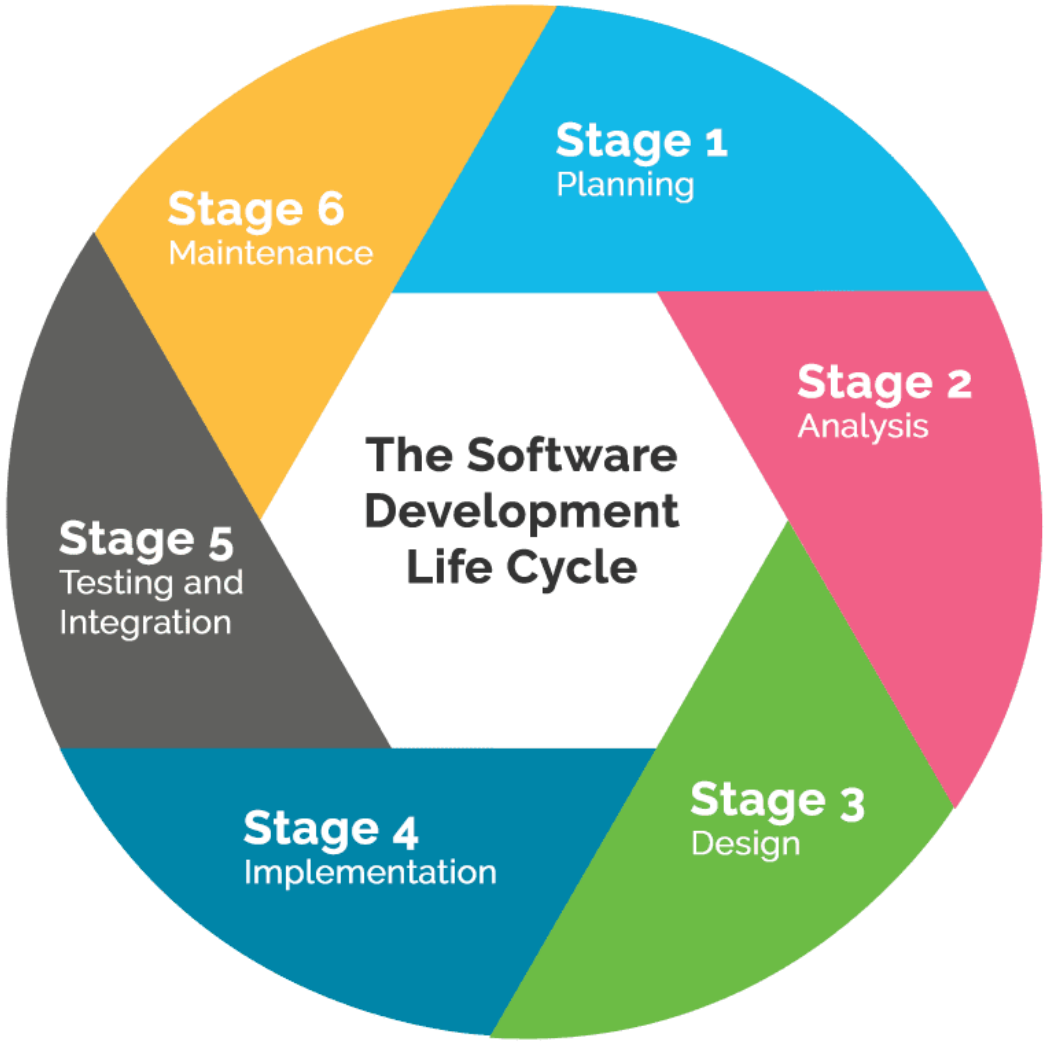
Iterative development

Incremental delivery

A Software Process Framework

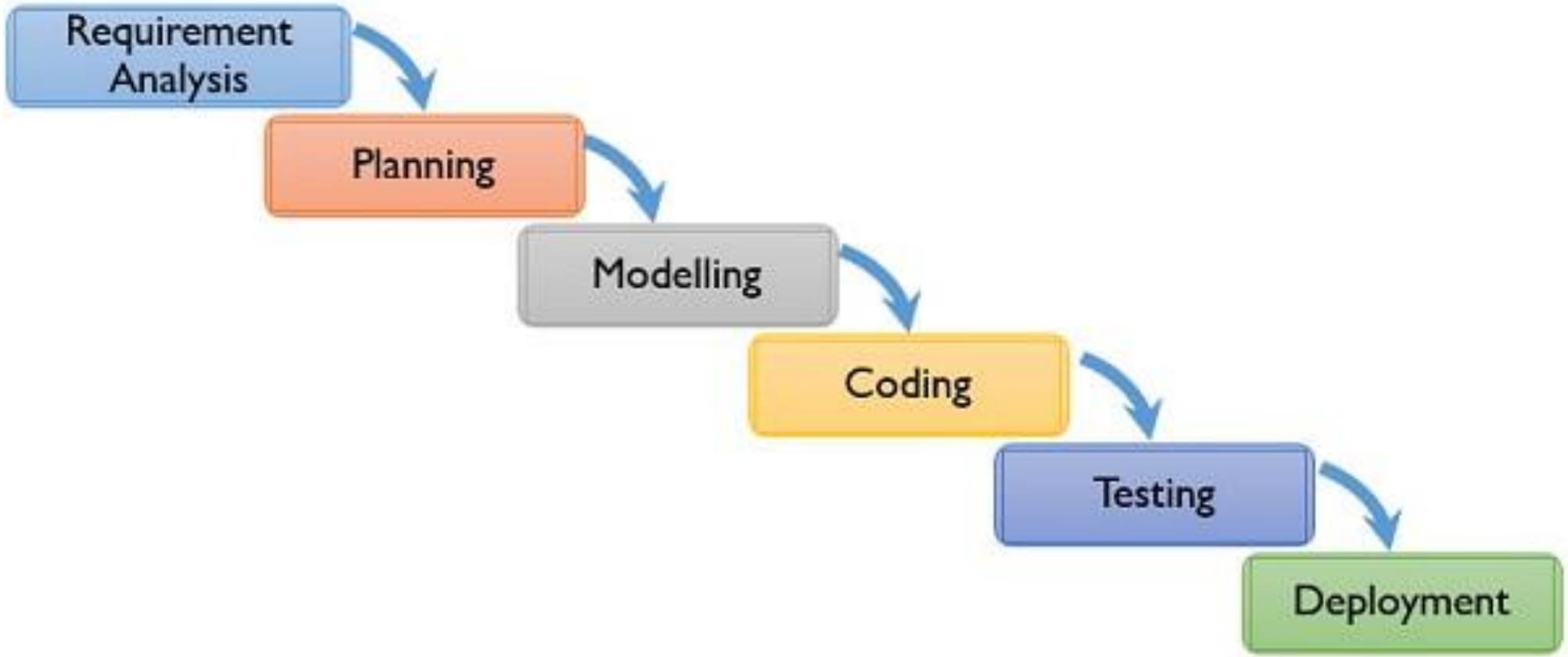


Framework Activity

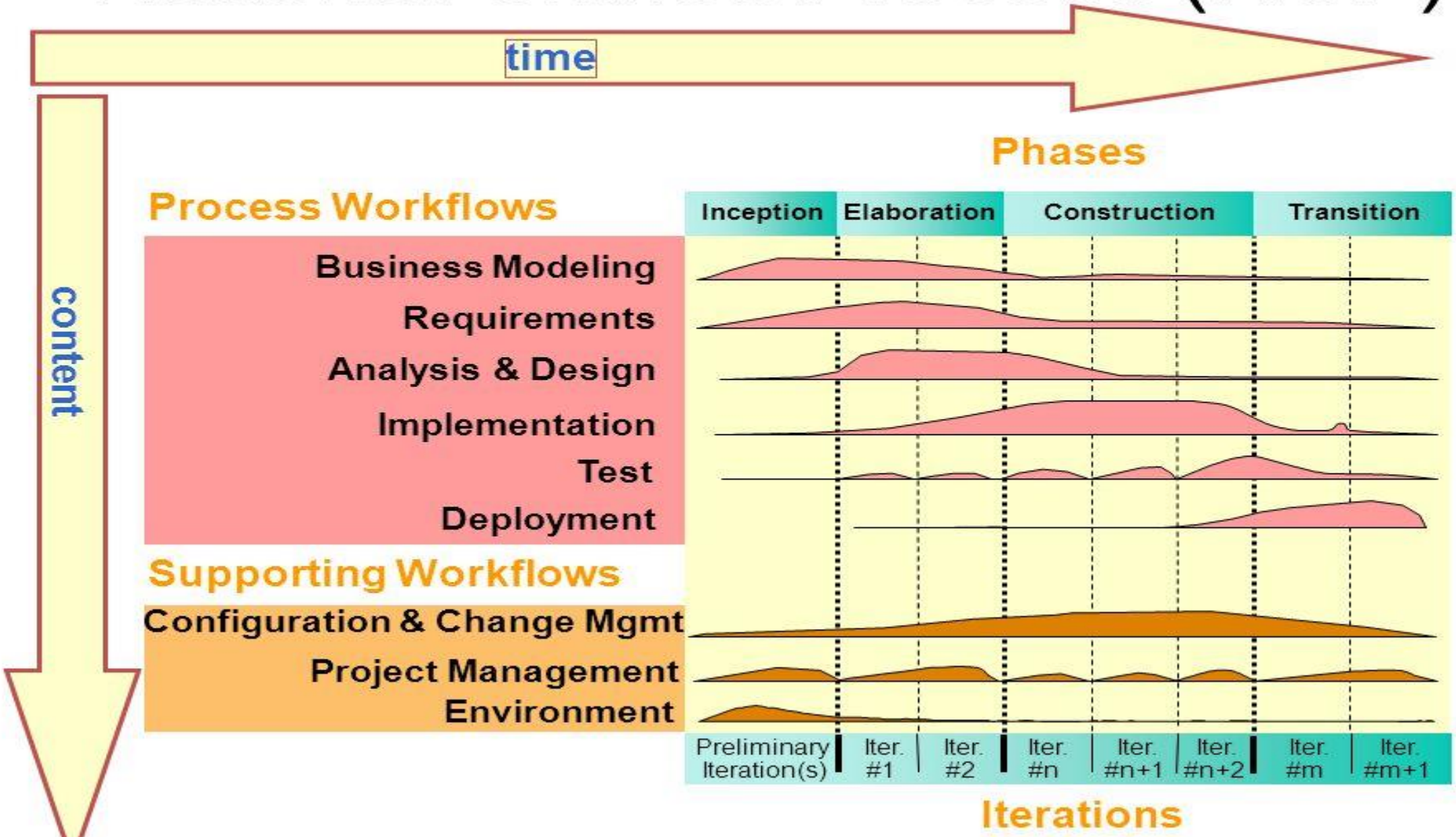


Umbrella Activities

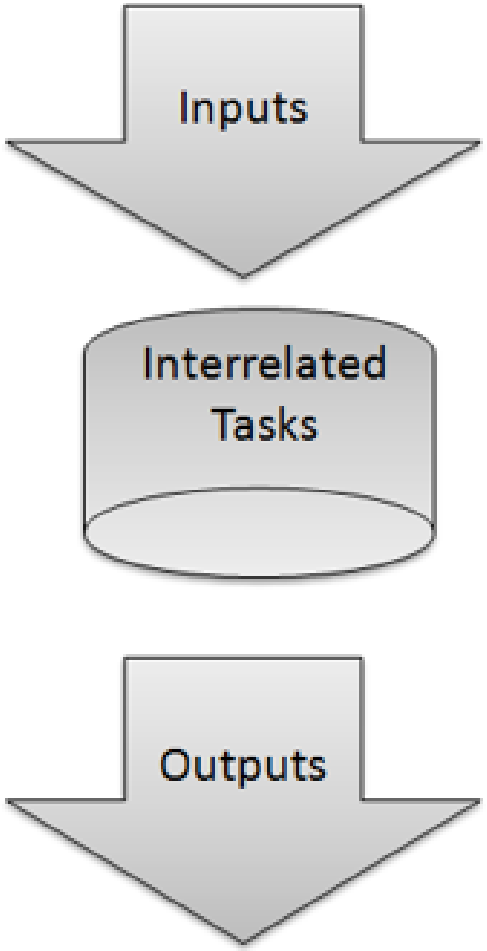
Waterfall


Requirement Analysis
Planning
Modelling
Coding
Testing
Deployment

Rational Unified Process (RUP)



Process



Methodology

- Processes
- Tools
- Techniques
- Principles
- Practices

E.g. XP

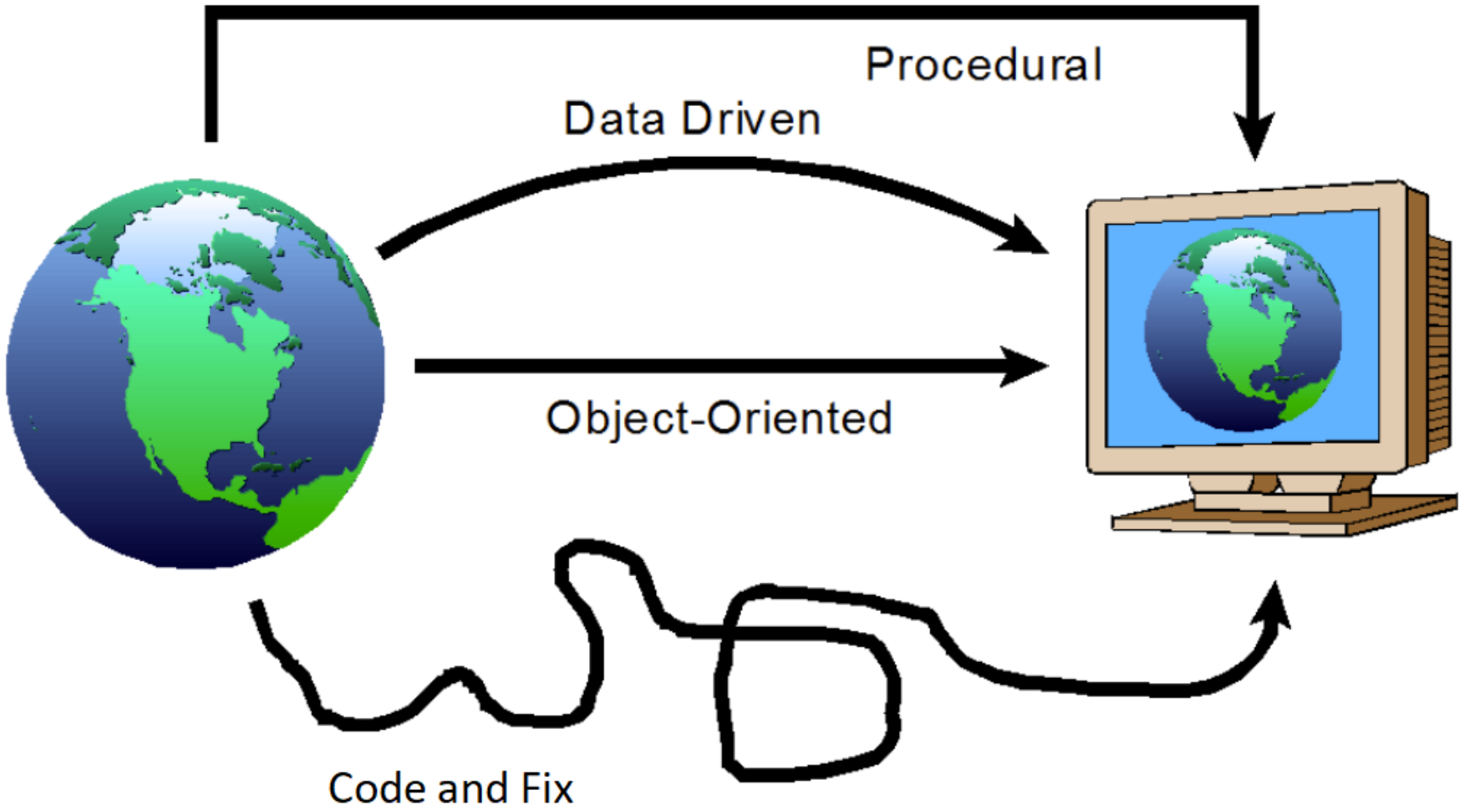
Framework

An Essential Supporting Structure

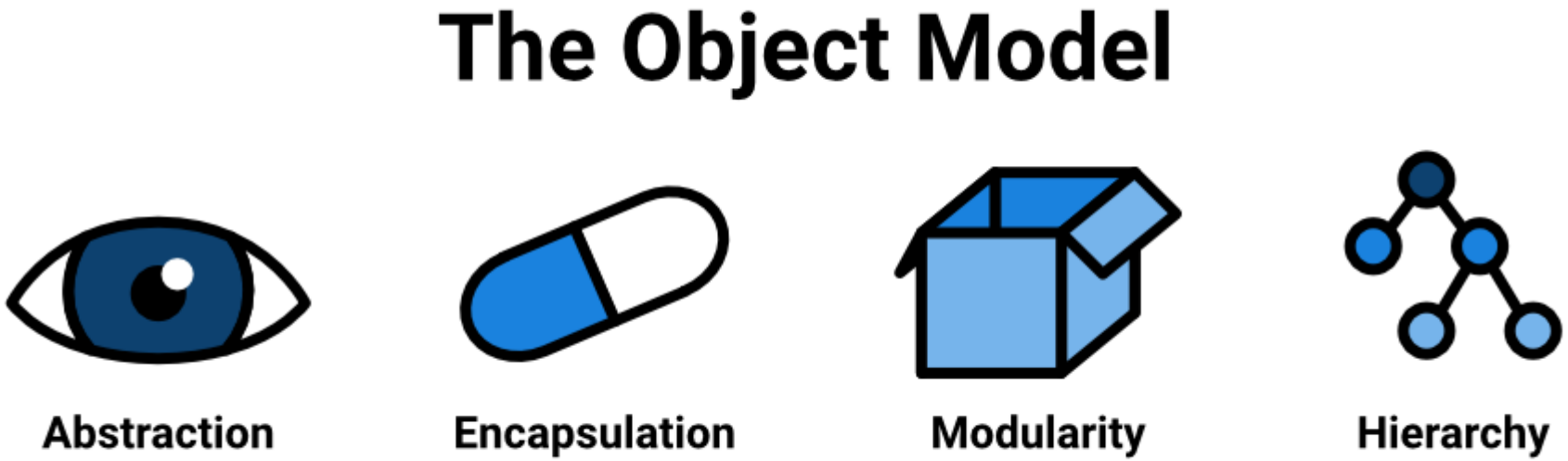
E.g. Scrum

- Scrum – Artifacts, Roles, Events, Activity and few rules
- You can derive Tools and Techniques from Methodologies such as XP

Software Development Paradigms

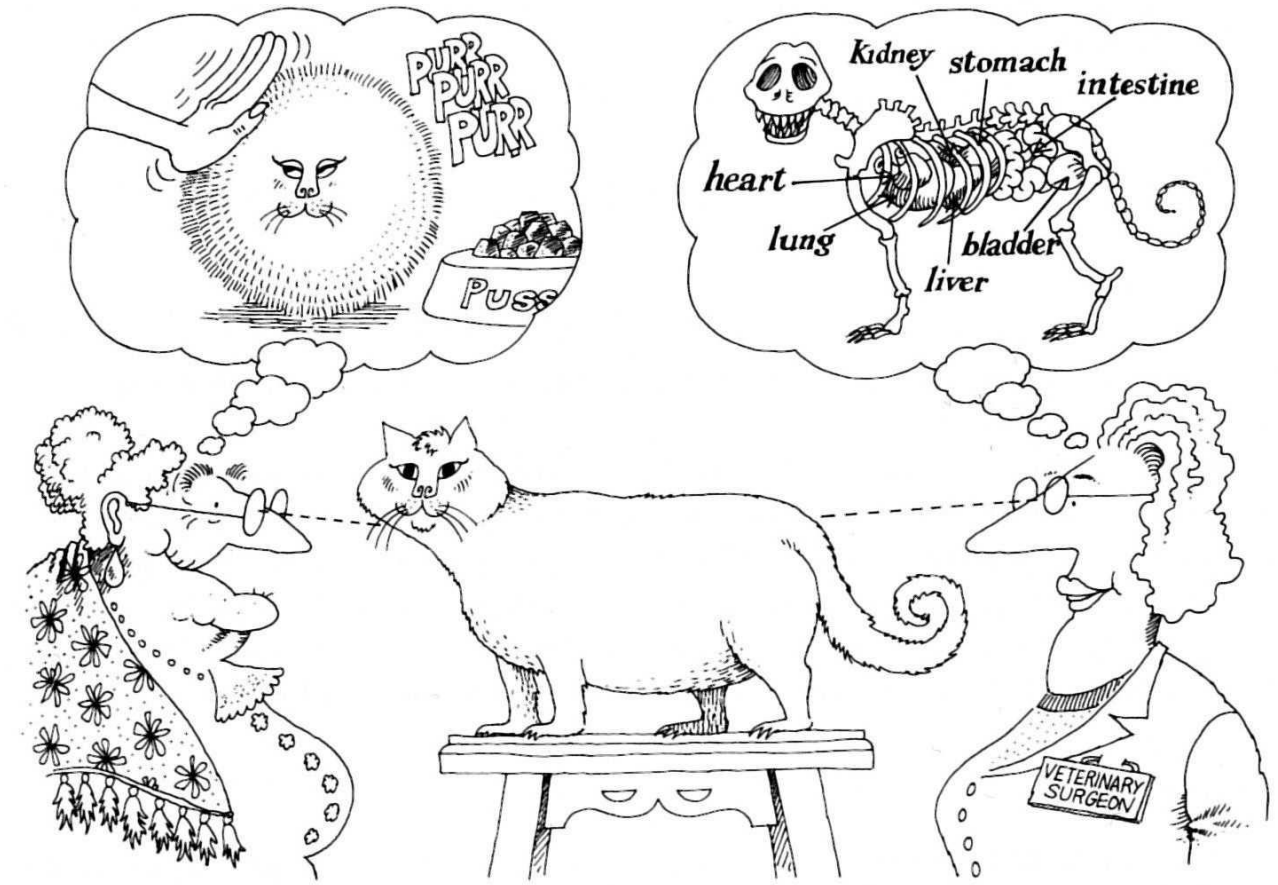


BOOCH' OBJECT MODEL



Abstraction

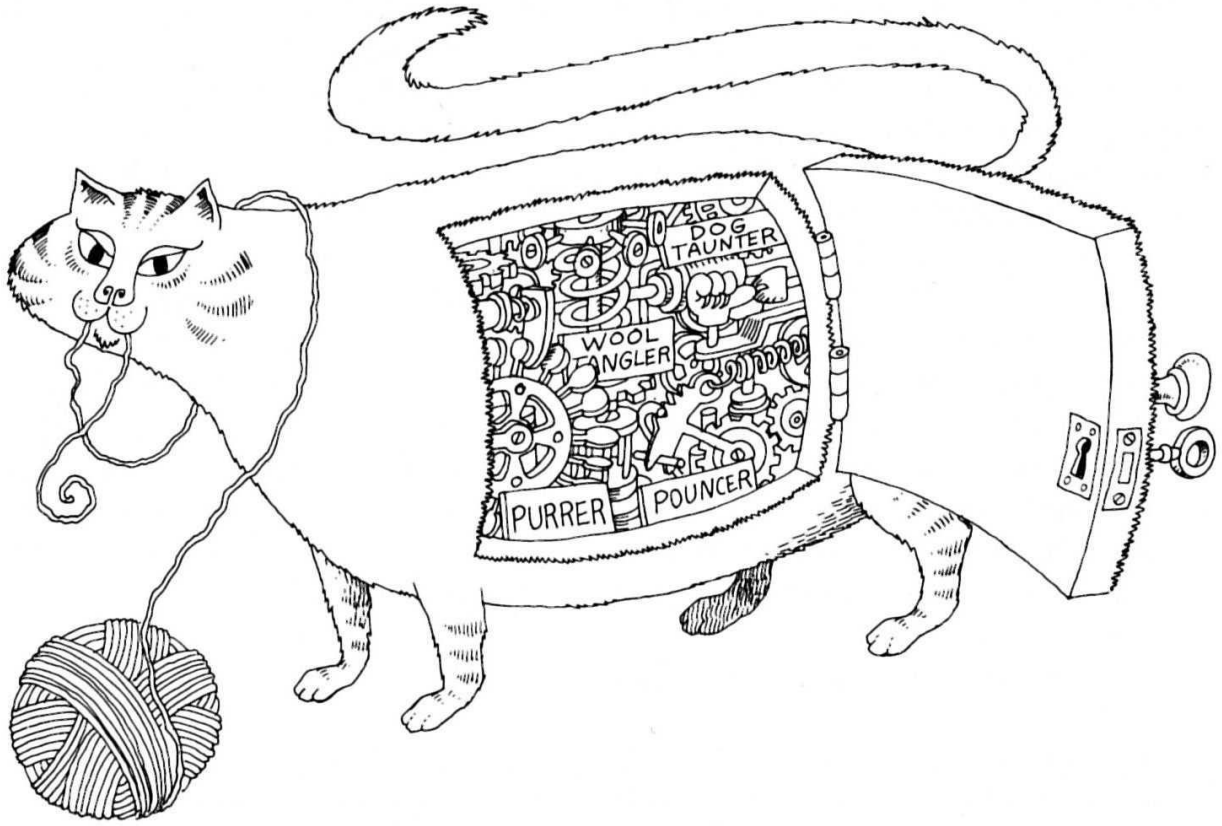
- Helps to deal with complexity by focusing on certain features and suppressing others.
- Focus on interface (outside view)
- Separate behaviour from implementation



Abstraction focuses upon the essential characteristics of some object, relative to the perspective of the viewer.

Encapsulation

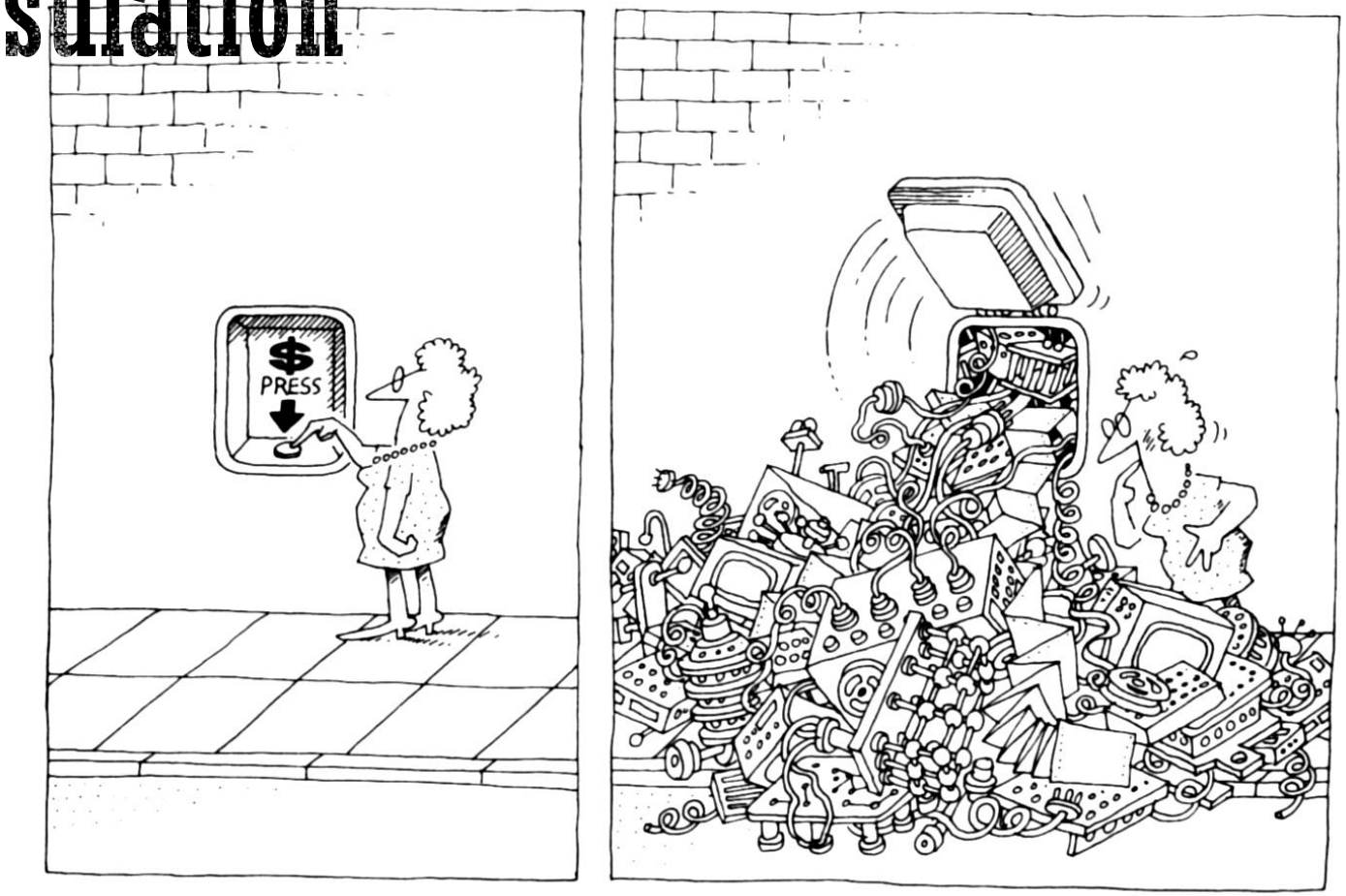
- Also known as information hiding
- Hides the details of the implementation
- Complementary to abstraction



Encapsulation hides the details of the implementation of an object.

Abstraction, Encapsulation

- Interface should be simple providing the required behaviour.
- User is presented with high level abstract view. The detail of the implementation hidden from user.
- The designer may change the implementation keeping interface the same.



The task of the software development team is to engineer the illusion of simplicity.

Modularity

- A common "Divide and conquer" approach
- Partitions a problem into sub-problems reduced complexity
- Modularity packages abstractions into discrete units
- In Java classes are the basic modules providing encapsulation and abstraction

Modularity packages abstractions into discrete units.

Hierarchy

- A way of ordering abstractions
- Object hierarchical abstractions ("HAS A" or "PART OF" relationship)
- Interfaces and behaviours at each level
- Higher levels are more abstract

Abstractions form a hierarchy.