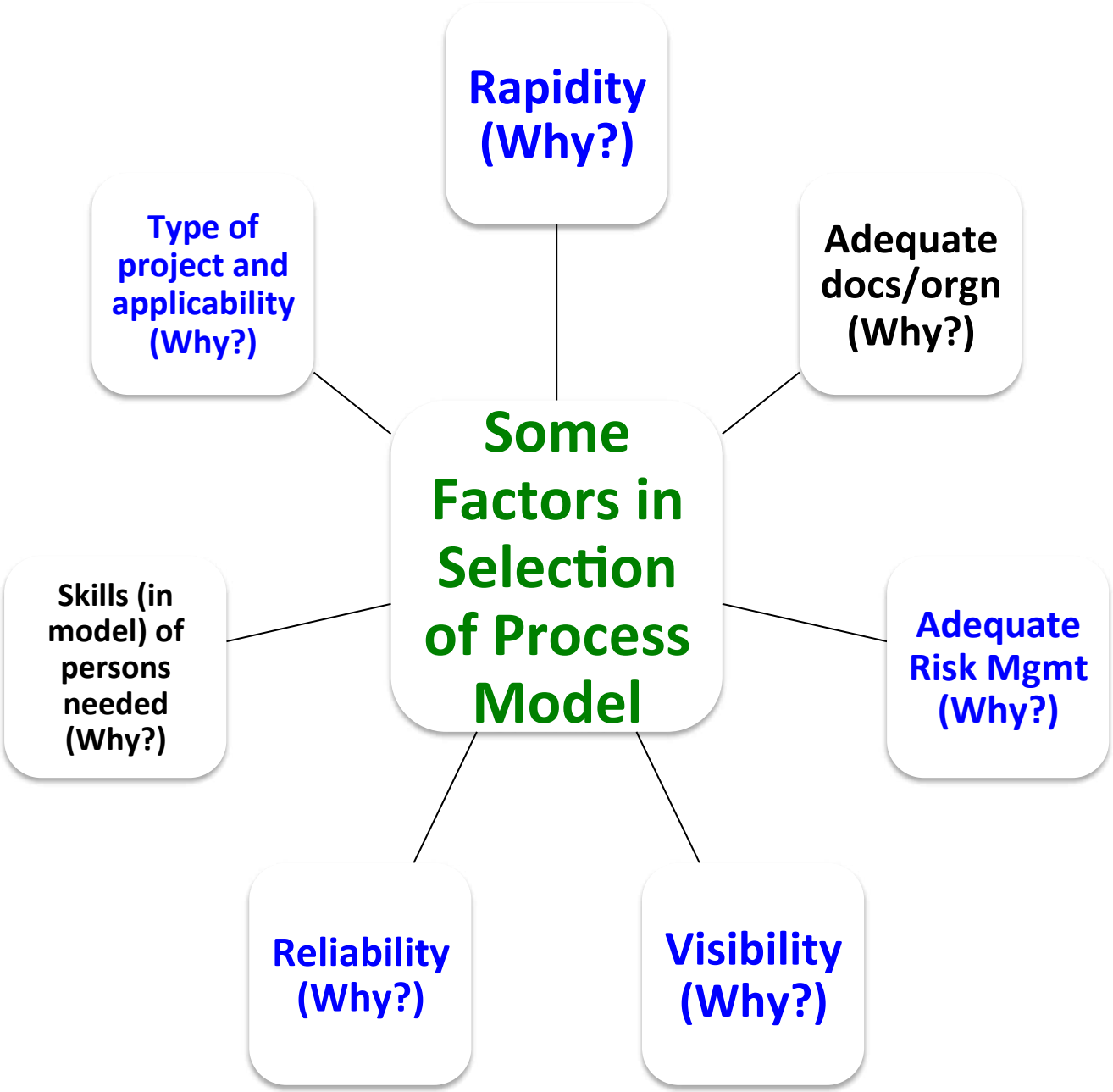
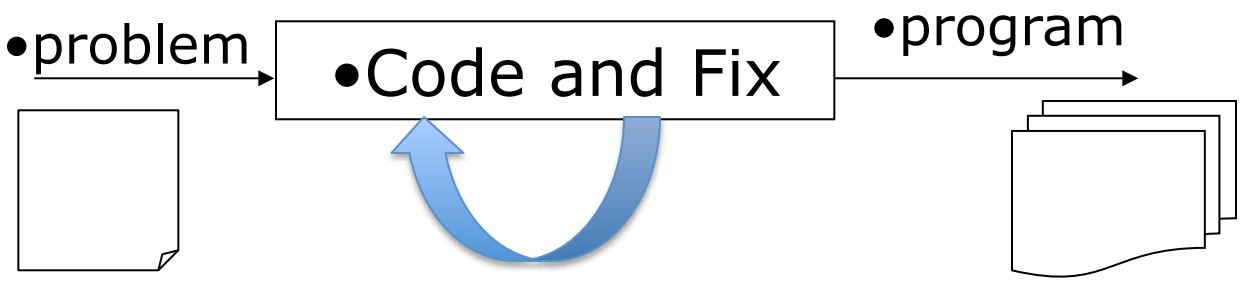
Process Models

(also known as

Software Lifecycle Models)

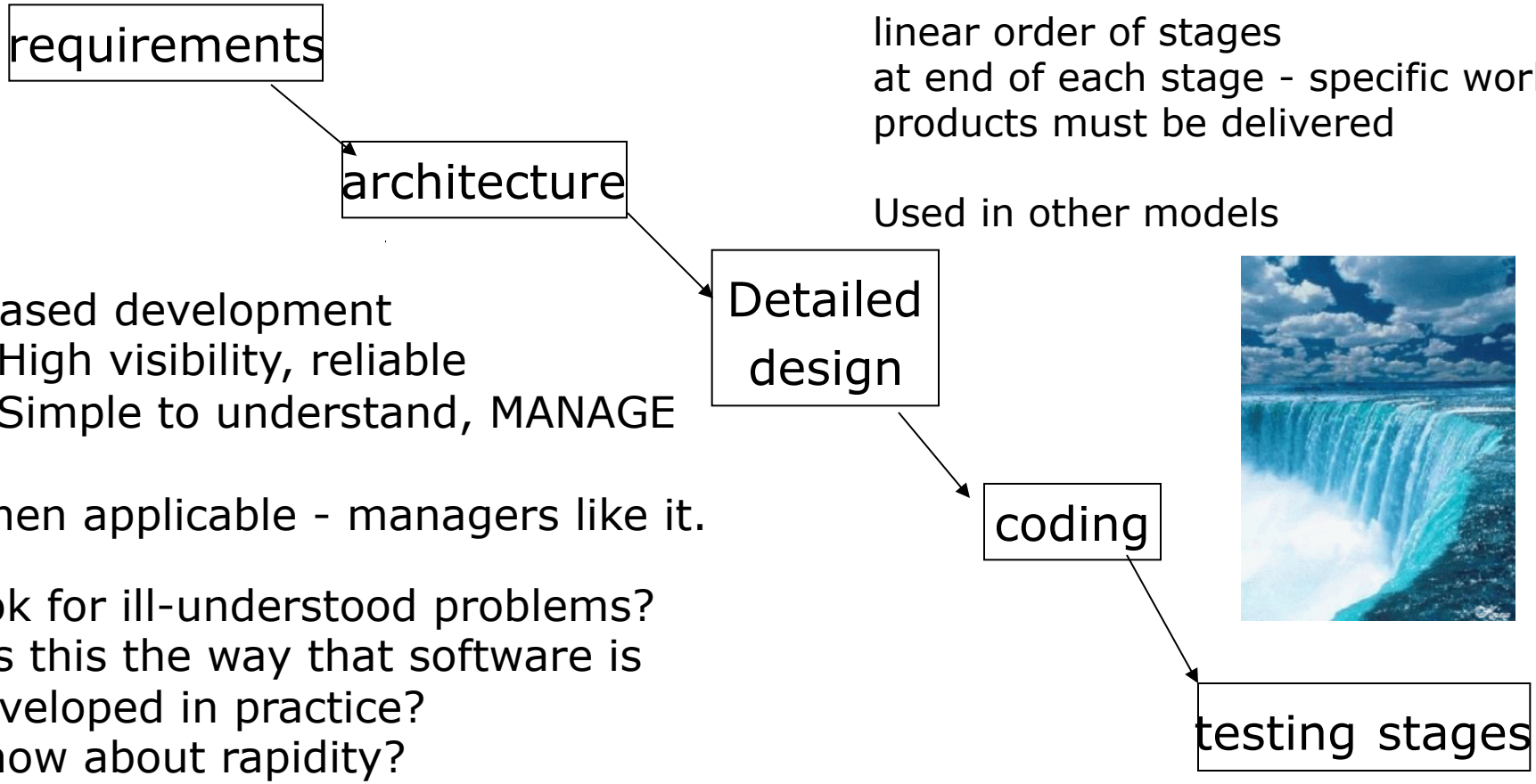

Some Factors in Selection of Process Model
Rapidity (Why?)
Adequate docs/orgn (Why?)
Adequate Risk Mgmt (Why?)
Visibility (Why?)
Reliability (Why?)
Skills (in model) of persons needed (Why?)
Type of project and applicability (Why?)

Code and Fix Model



- poor match for user needs
- poor reliability
- Poor visibility
- cannot distribute work
- spaghetti code
- not designed for testing/maintenance
- Ok for small, throwaway, class assignments

Waterfall model



linear order of stages
at end of each stage - specific work products must be delivered

Used in other models

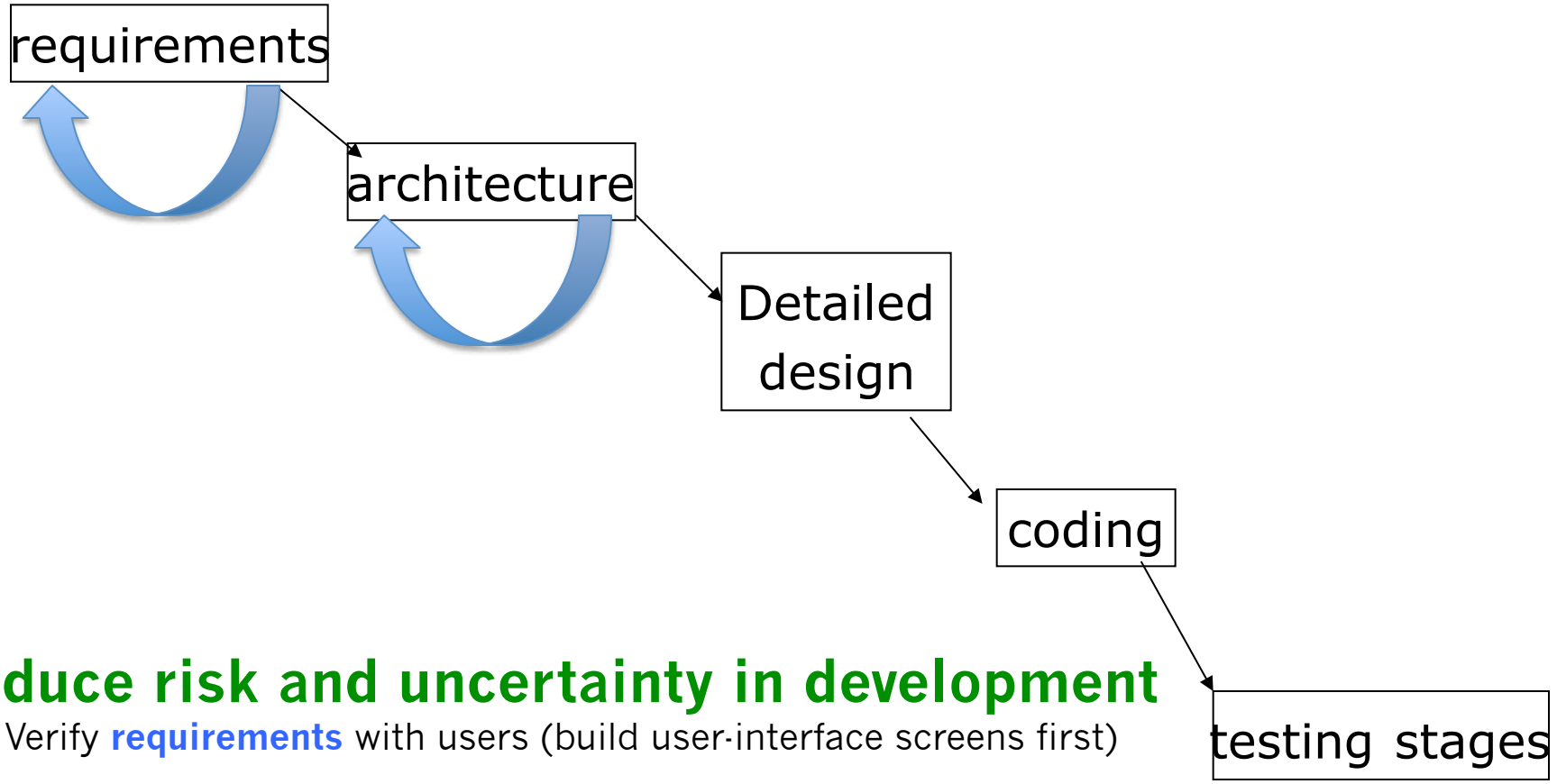
Phased development
+ High visibility, reliable
+ Simple to understand, MANAGE

When applicable - managers like it.

- ok for ill-understood problems?
- is this the way that software is developed in practice?
- how about rapidity?

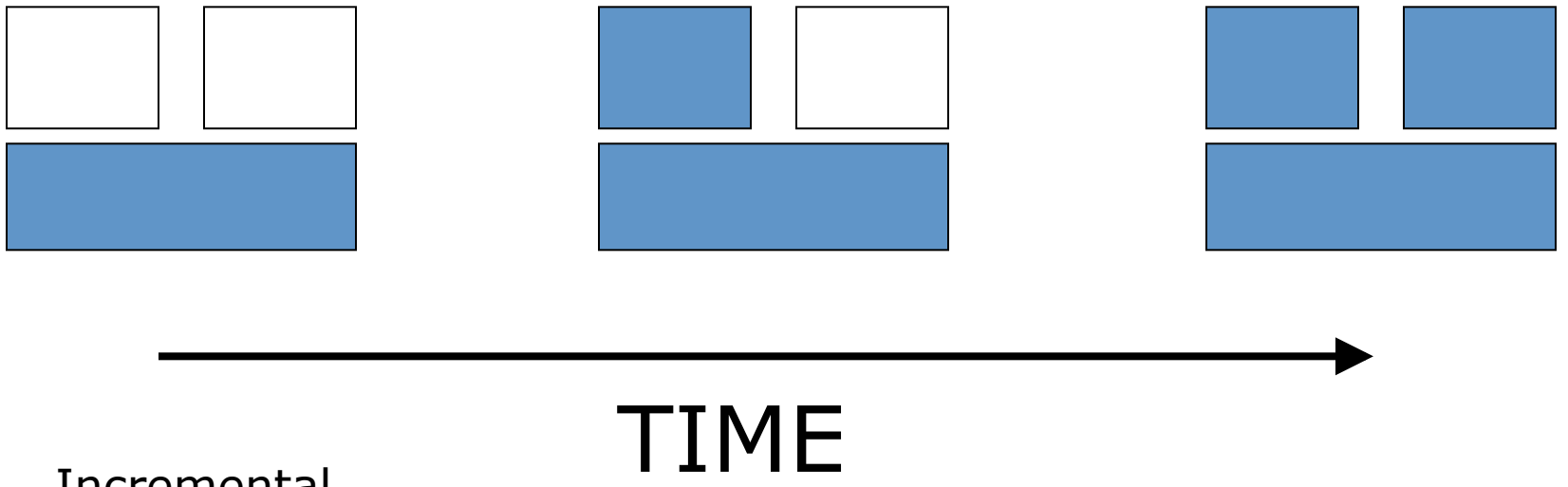
Note that there are many variants of the waterfall model.

Prototyping

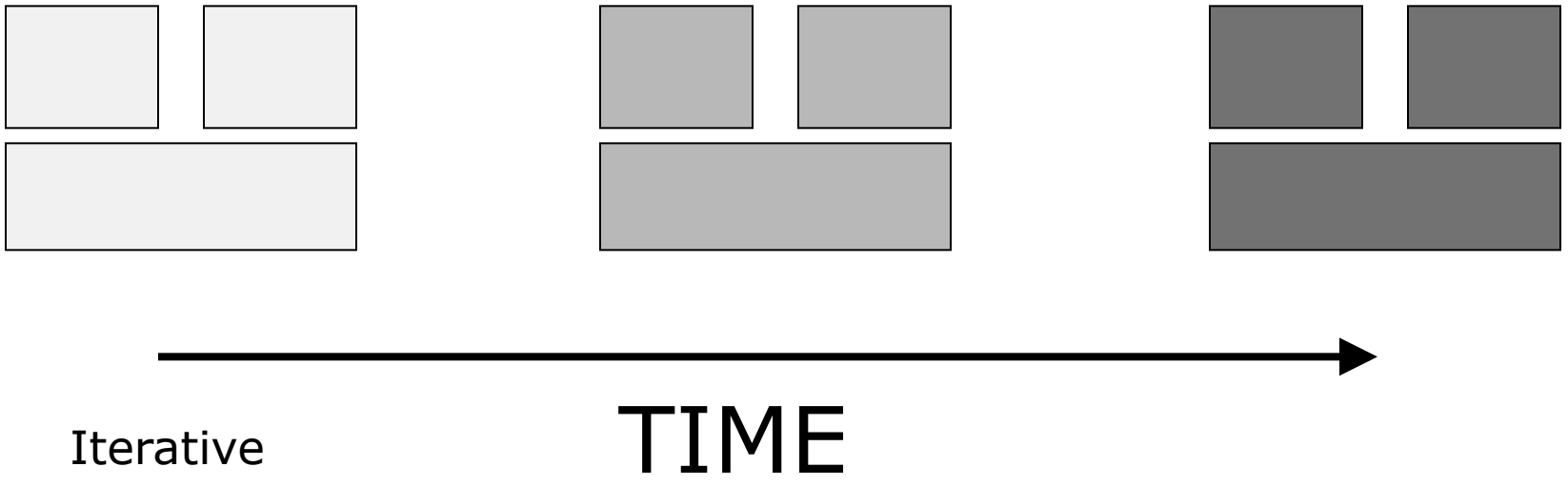


- **Reduce risk and uncertainty in development**
  - Verify **requirements** with users (build user-interface screens first)
  - Try out **design** alternatives to better understand the issues
- A variation of waterfall model.

Iterative/Incremental

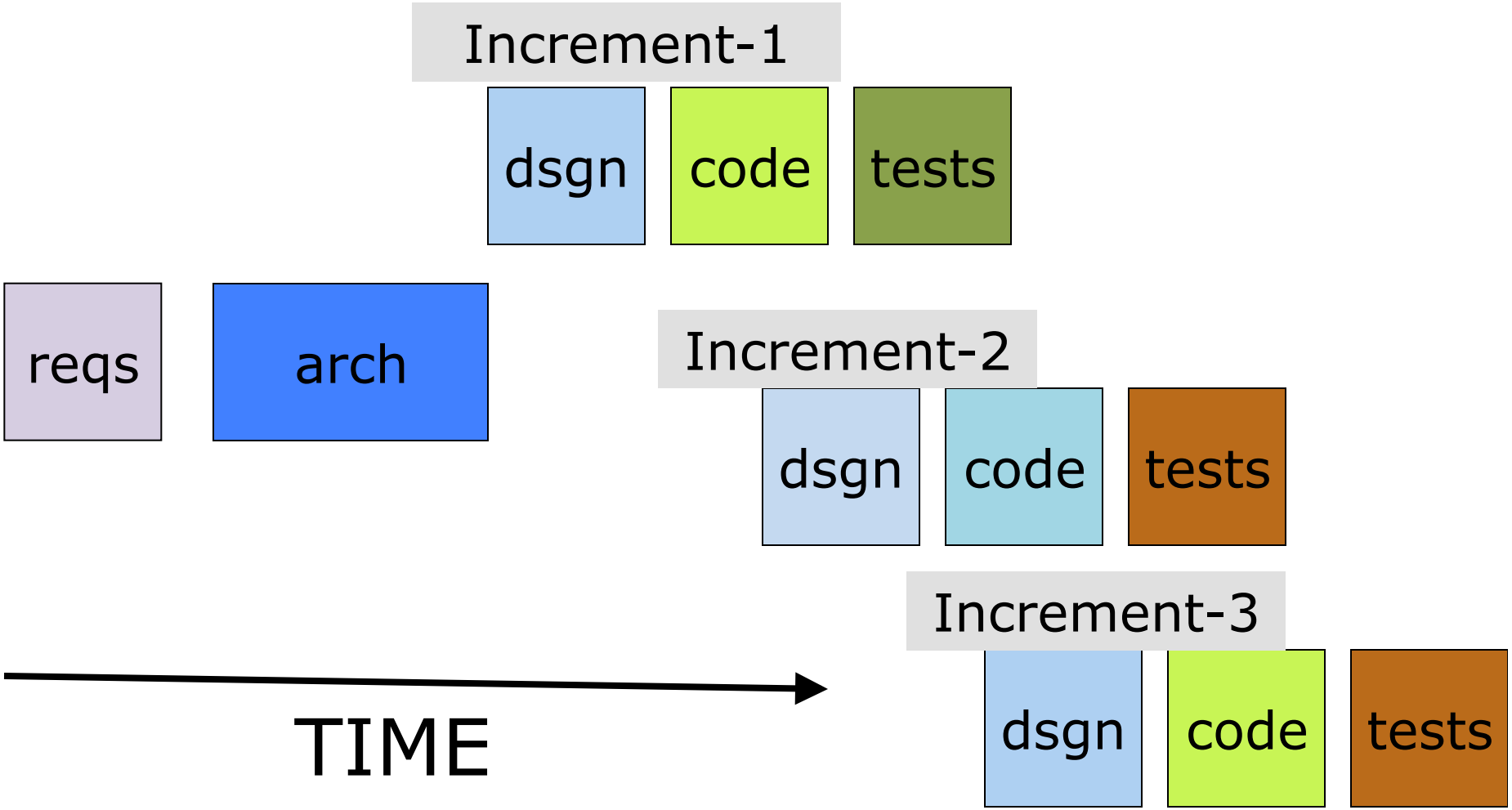


Incremental



Iterative

Iterative/Incremental

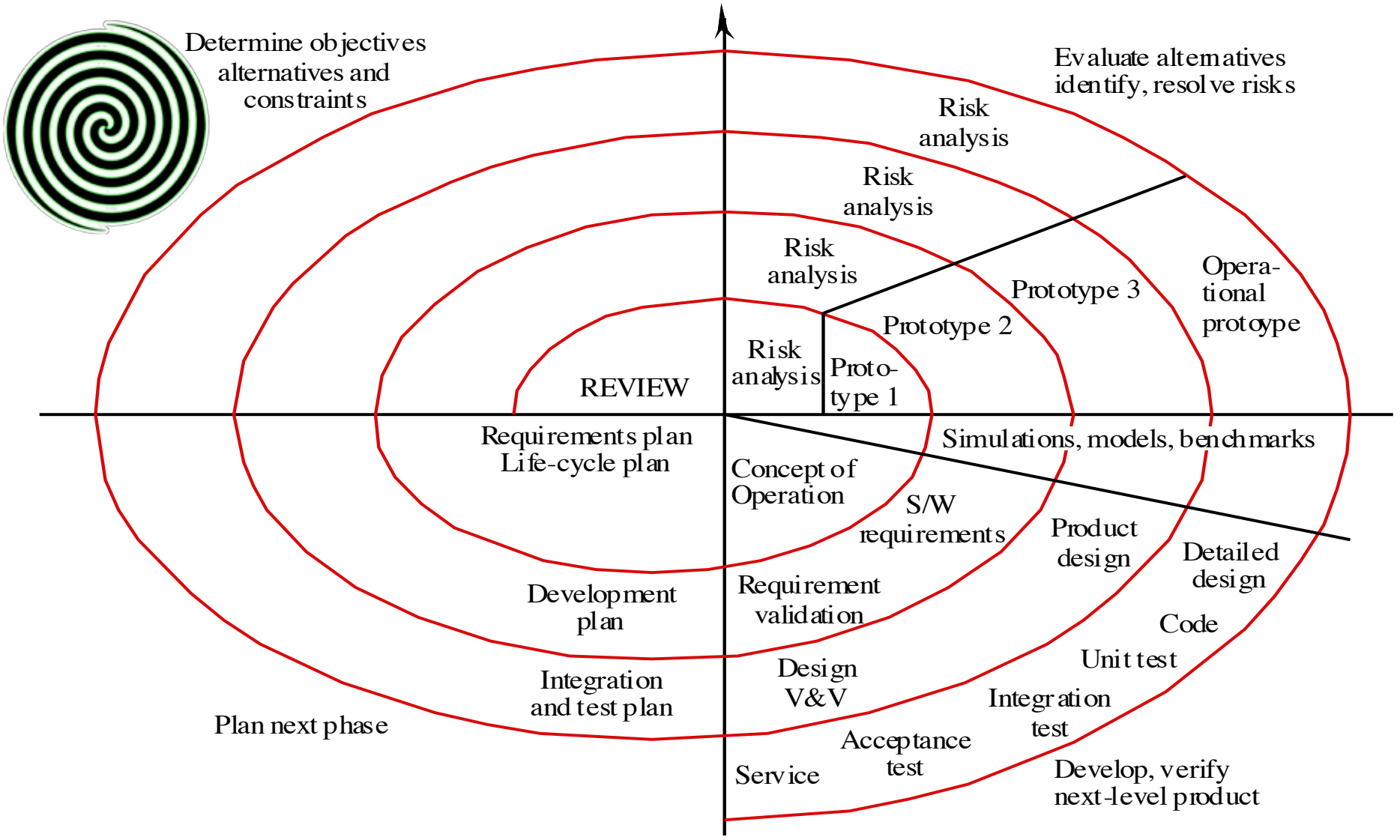


+/-

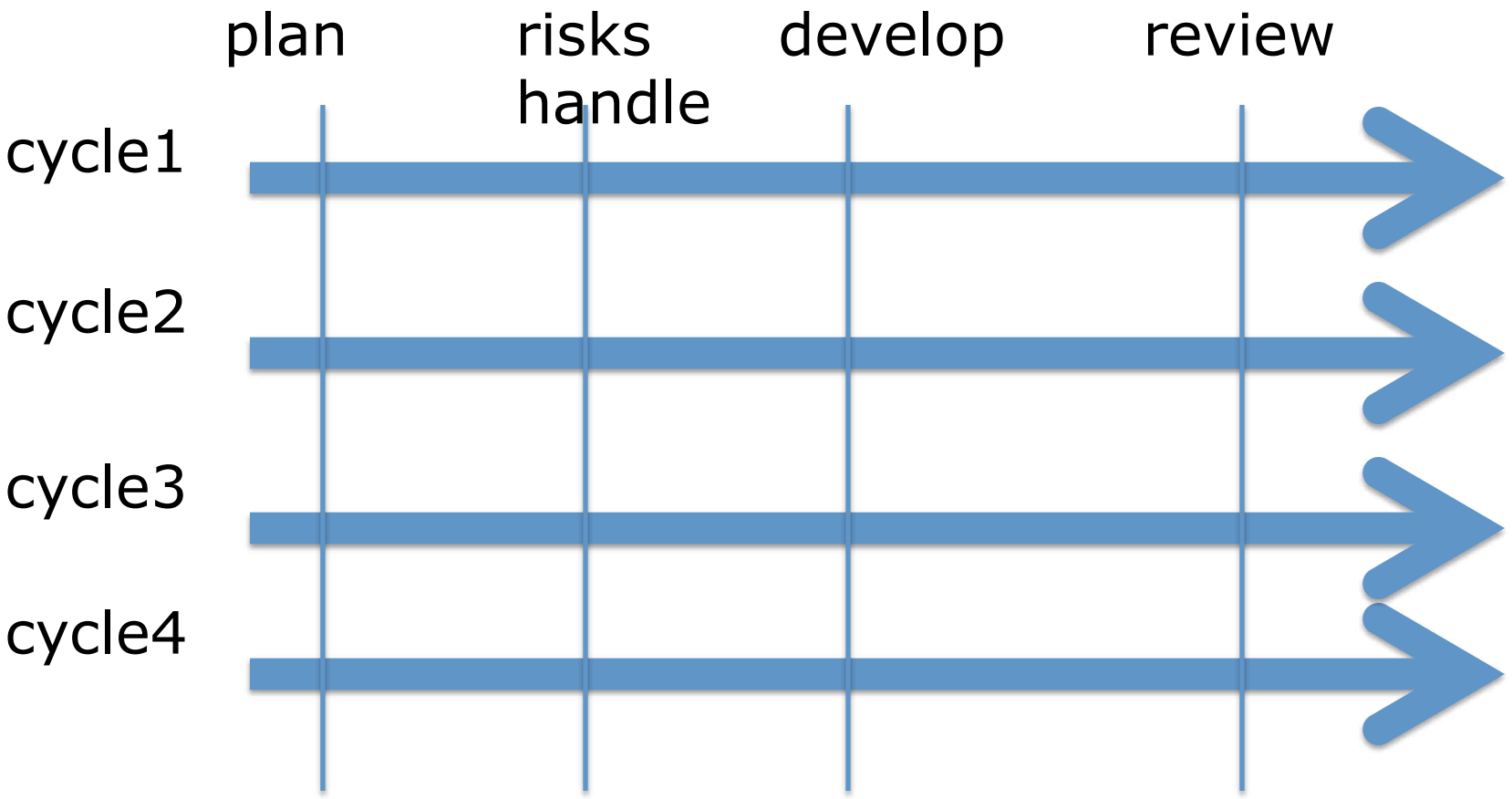
+ quick time-to-market (rapidity)
+ Validate each step with the user + feedback
+ focus on area of expertise (GUI, perf etc) at a time

- Maintenance and development teams - both required
- more chances of spaghetti code (refactor on the go)
- does it work for contract work?
- Increments and iterations need to be well defined

Boehm's Spiral model



spiral model is like iteration



Boehm's spiral model

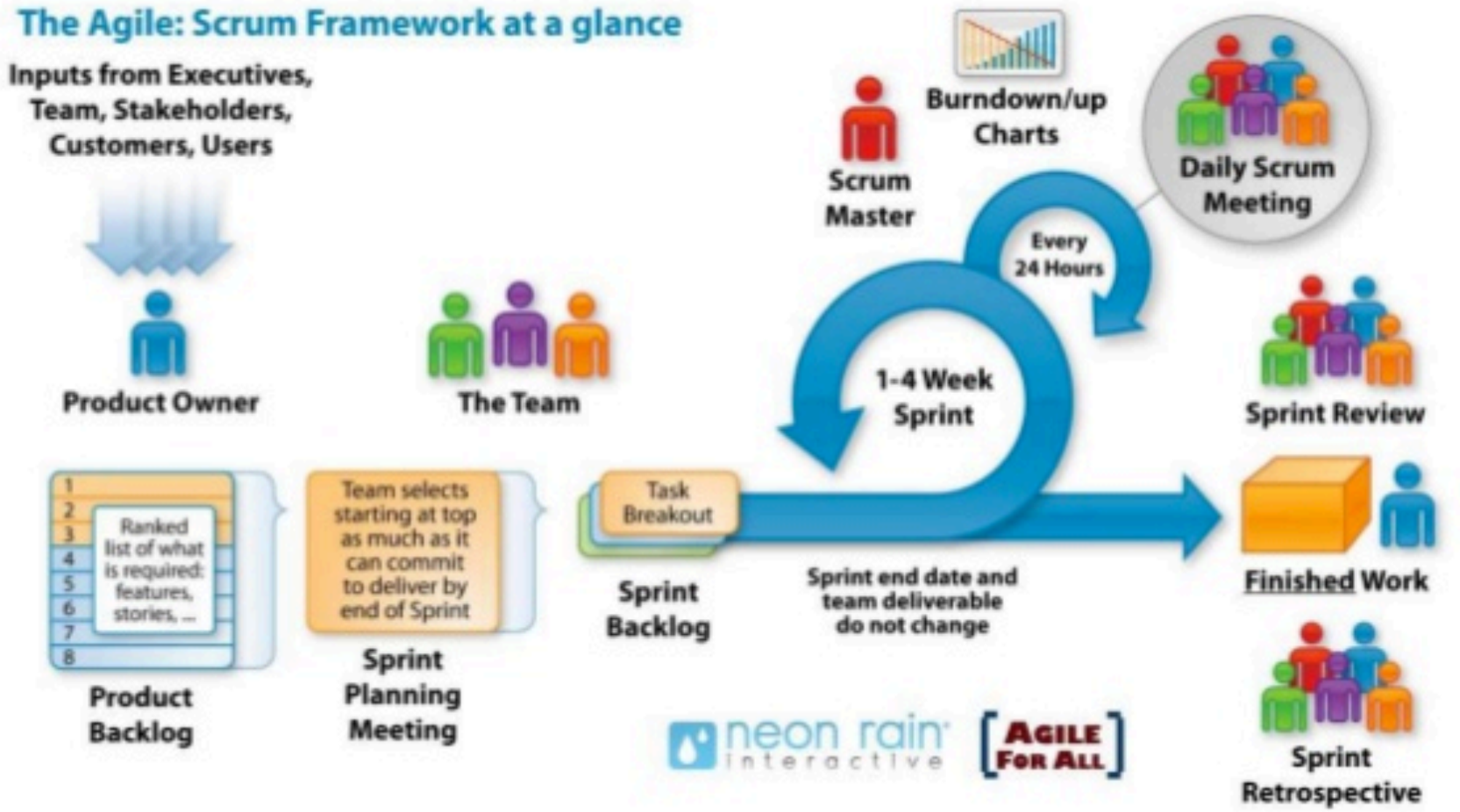
- Process is represented as a spiral rather than as a sequence of activities with backtracking
- Each loop in the spiral represents a phase in the process.
- No fixed phases such as specification or design - loops in the spiral are chosen depending on what is required
- **Risks** are explicitly assessed and resolved throughout the process

Spiral Model (cont'd)

- Advantages
  - + works well on internal software development
  - + handles risk and uncertainty
  - + clear focus on planning, risk, and determining alternatives.
  - + becomes equivalent to other models as it is flexible in what can be done in a sector.

- Disadvantages
  - - risk management skills needed to use properly
  - - milestones not clear

SCRUM


The Agile: Scrum Framework at a glance
Inputs from Executives, Team, Stakeholders, Customers, Users
Product Owner
The Team
Scrum Master
Burndown/up Charts
Daily Scrum Meeting
Every 24 Hours
1-4 Week Sprint
Sprint Review
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
Sprint end date and team deliverable do not change
Finished Work
Sprint Retrospective
neon rain interactive
AGILE FOR ALL

Product backlog

- The requirements
- A list of all desired work on the project
- Ideally expressed such that each item has value to the users or customers of the product
- Prioritized by the product owner
- Reprioritized at the start of each sprint

Scrum Board (Use Trello)

- Tool to visualize progress within sprint
- User stories and tasks written on post-it notes
- Tasks moved from:
  - To do
  - In progress
  - Done

The daily scrum

- Parameters
  - Daily
  - 15-minutes
  - Stand-up
- Not for problem solving
  - Whole world is invited
  - Only team members, ScrumMaster, product owner, can talk
- Helps avoid other unnecessary meetings

Agile practices

- User Stories
- On Site Customer

- Make Frequent Small Releases
- Move People Around
- Collective Code Ownership
- Daily Stand Up Meeting

- test-first
- Refactor Mercilessly
- Coding Standard
- Pair Programming
- Integrate Often
- Optimize Last

A few –ves of Agile

- High level architecture?
- Documents (for maintenance)?
- Stressful. Anxiety about productivity.
- Herded through small use-cases – very oriented to doing all the time.

A few other process Models

- RUP (Rational Unified Process)
- Agile
  - XP
  - TDD
  - Kanban

- Each organization has its own variant of process model and workflow and will train developers first on their processes.

Self Check

- List five process models
- What are a few of the problems with code&fix?
- What are some advantages of Waterfall Model?
- Briefly describe the Spiral Model. What are some of it's advantages?
- What are the different artifacts in Scrum?
- What is done during Sprint planning?
- What is done during Daily Scrum?
- What are some disadvantages of Agile processes?