SOFTWARE DEVELOPMENT LIFE CYCLE


TIME
FOR
CHANGE

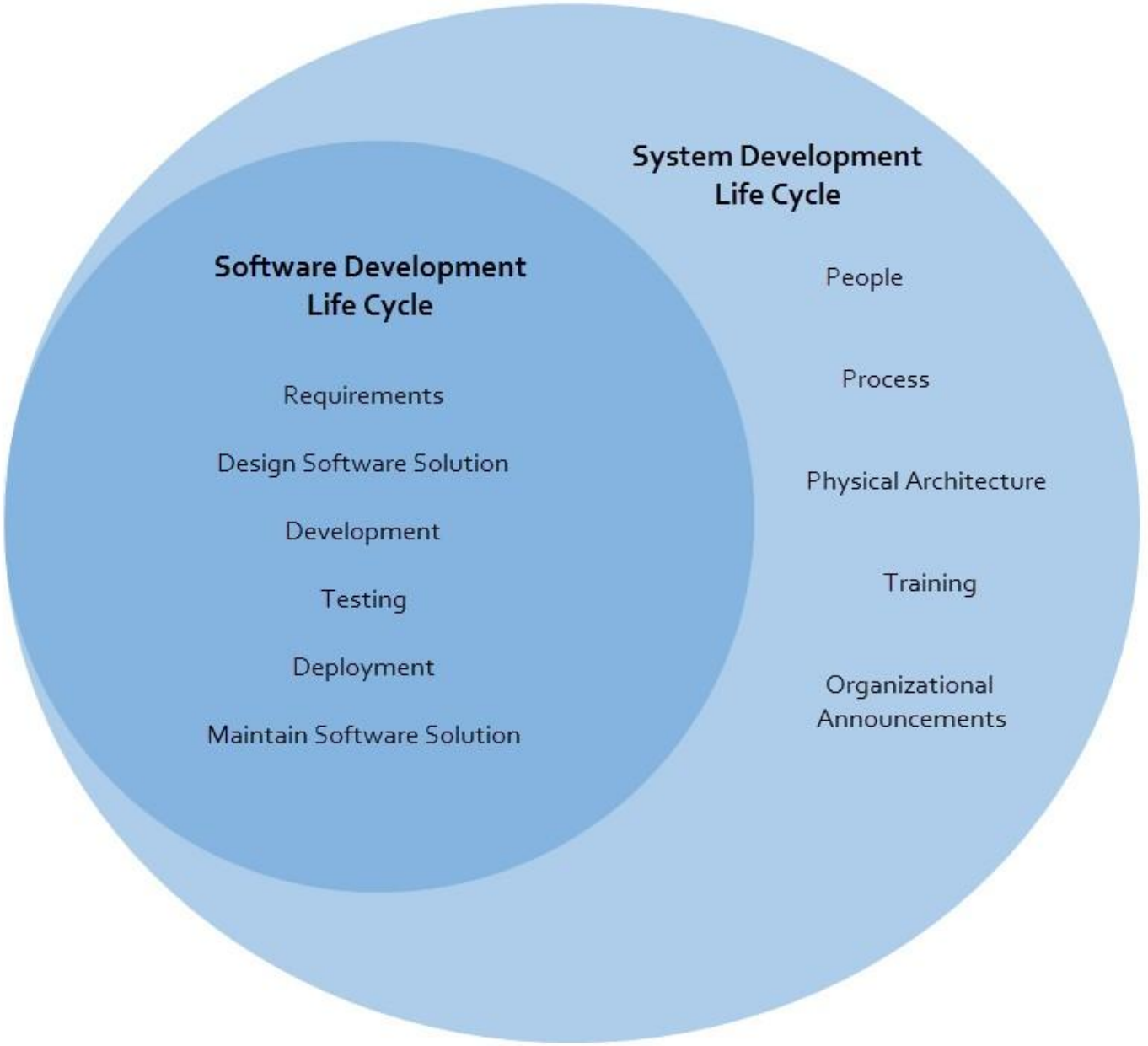
Common Misconception

Software Development Life Cycle (SDLC)

vs

Systems Development Life Cycle (SDLC)

SDLC vs SDLC


System Development Life Cycle
People
Process
Physical Architecture
Training
Organizational Announcements
Software Development Life Cycle
Requirements
Design Software Solution
Development
Testing
Deployment
Maintain Software Solution

Software Development Life Cycle (SDLC)

Process used to plan, create, test, and deploy an information system.

General SDLC Steps

1. Gather Requirements
2. Design Solution
3. Development
4. Deploy
5. Maintenance

Methodologies

- Waterfall Model
- Spiral Model
- Incremental Model
- Prototyping
- Agile
  - Scrum Model
  - Rapid Application Development (RAD)

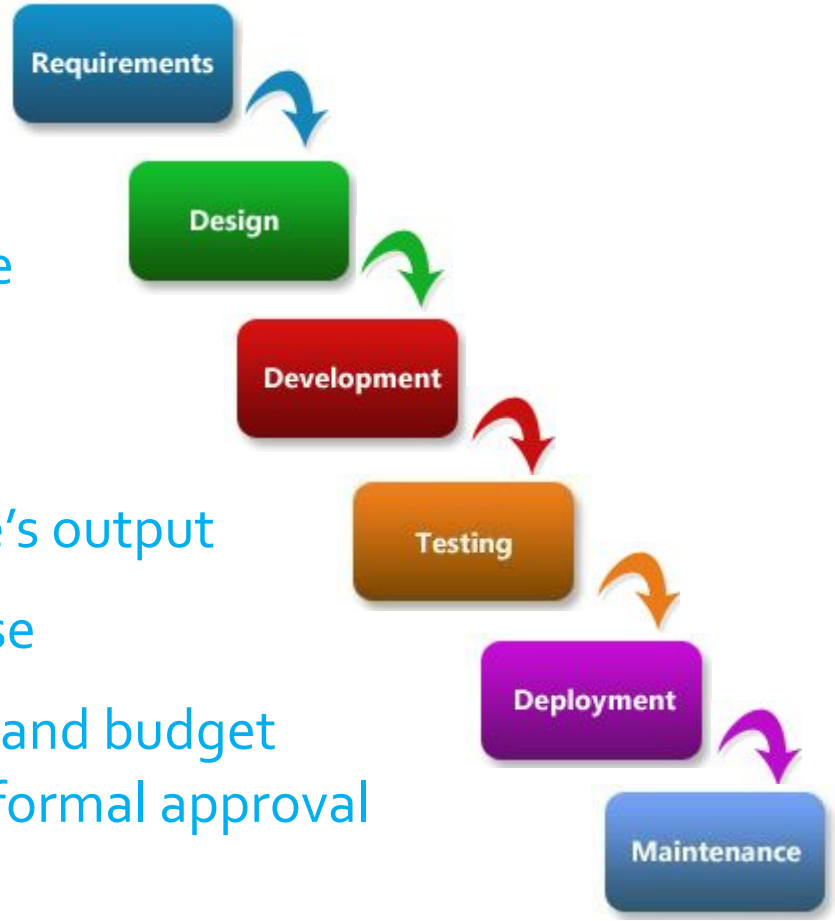
Which methodology is the BEST?

Unfortunately, it's not that easy

Waterfall Model

Waterfall Model

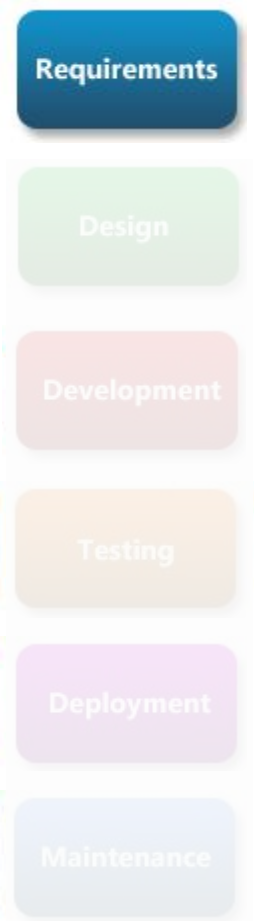
- Linear progression
- "Traditional" model
- Next phase begins once previous phase is complete
- Each phase begins with previous phase's output
- No process to go back to previous phase
- Fully planned, including time schedule and budget
- Extensive written documentation and formal approval process



Waterfall Model

- Requirements
- Design
- Development
- Testing
- Deployment
- Maintenance

Waterfall Model



- Business needs analysis
- Elicit and document requirements

Waterfall Model

- Design solution to meet requirements
- Determine hardware and system requirements
- Split design into segments

Waterfall Model

- Develop/code each segment based on design
- Developers unit test each segment

Waterfall Model

- System test each segment (QA or BA)
- User acceptance test each segment (Business)
- End-to-end test all segments together as one

Waterfall Model

Requirements

Design

Development

Testing

Deployment

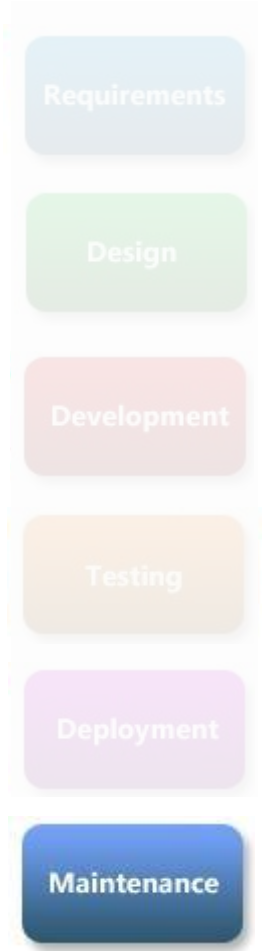
Maintenance

- Deploy software into production environment

  or

- Release to market

Waterfall Model



- Fix bugs with patches/releases
- Enhance the product to meet changing business needs

Waterfall Model

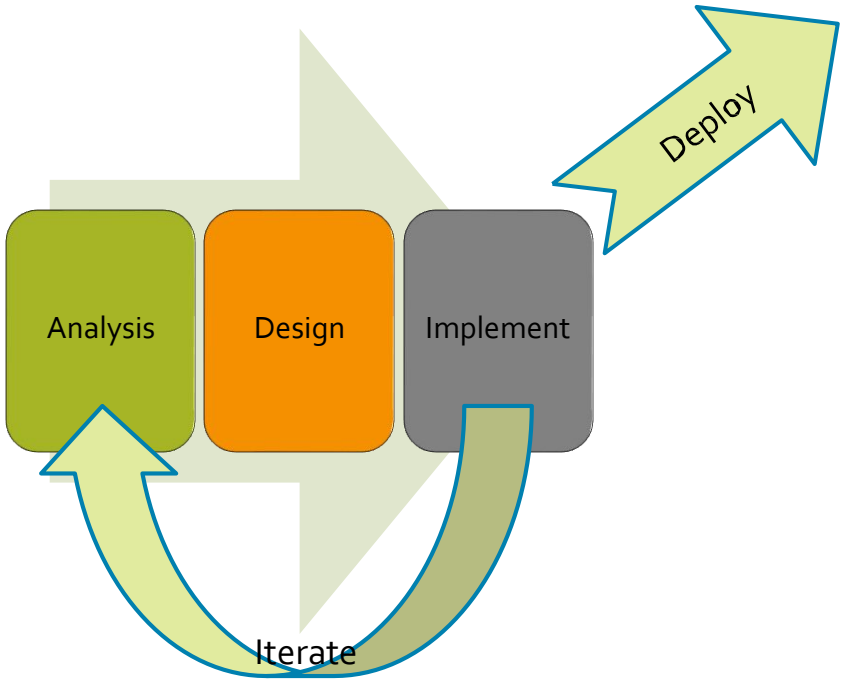
+ Clear expectations on schedule, budget, and resourcing needs
+ Extensive documentation helps ensure quality, reliability, and maintainability
+ Progress is easily measured

-Inflexible and cumbersome
-Long pole from project start to something tangible
-Problems are discovered at user testing
-Written documentation is never kept up-to-date, loses usefulness
-Promotes gap between the business users and the development team

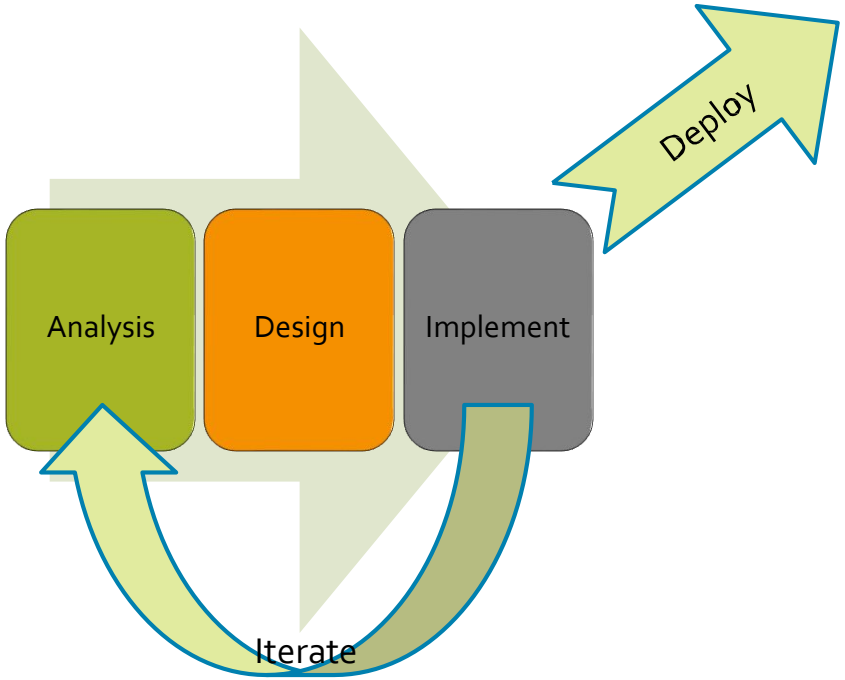
Waterfall Model: When to Use

- Clear objectives and solution
- Large, complicated, and expensive
- No pressure for immediate return on investment (ROI) from implementation
- Project team is fully knowledgeable about the solution application
- Requirements are stable and will be unchanged through development
- Resource constraints
- Strict requirement for formal approvals at milestones

Incremental Model



Incremental Model



- Combination of linear and iterative approaches
- Set of concrete steps ("mini waterfalls") that are worked through in an iterative fashion
- Allows for easier change of requirements
- Focuses on delivering customer value early in the project

Incremental Model

+ Provides early value in the development life cycle
+ Allows for requirement changes between iterations
+ Problems can be detected earlier
+ Can utilize knowledge learned in an earlier iteration

-Heavy documentation, especially around interfaces with other systems
-Can lose track of the overall business problem
-Difficult problems tend to get pushed to future iterations

Incremental Model: When to Use

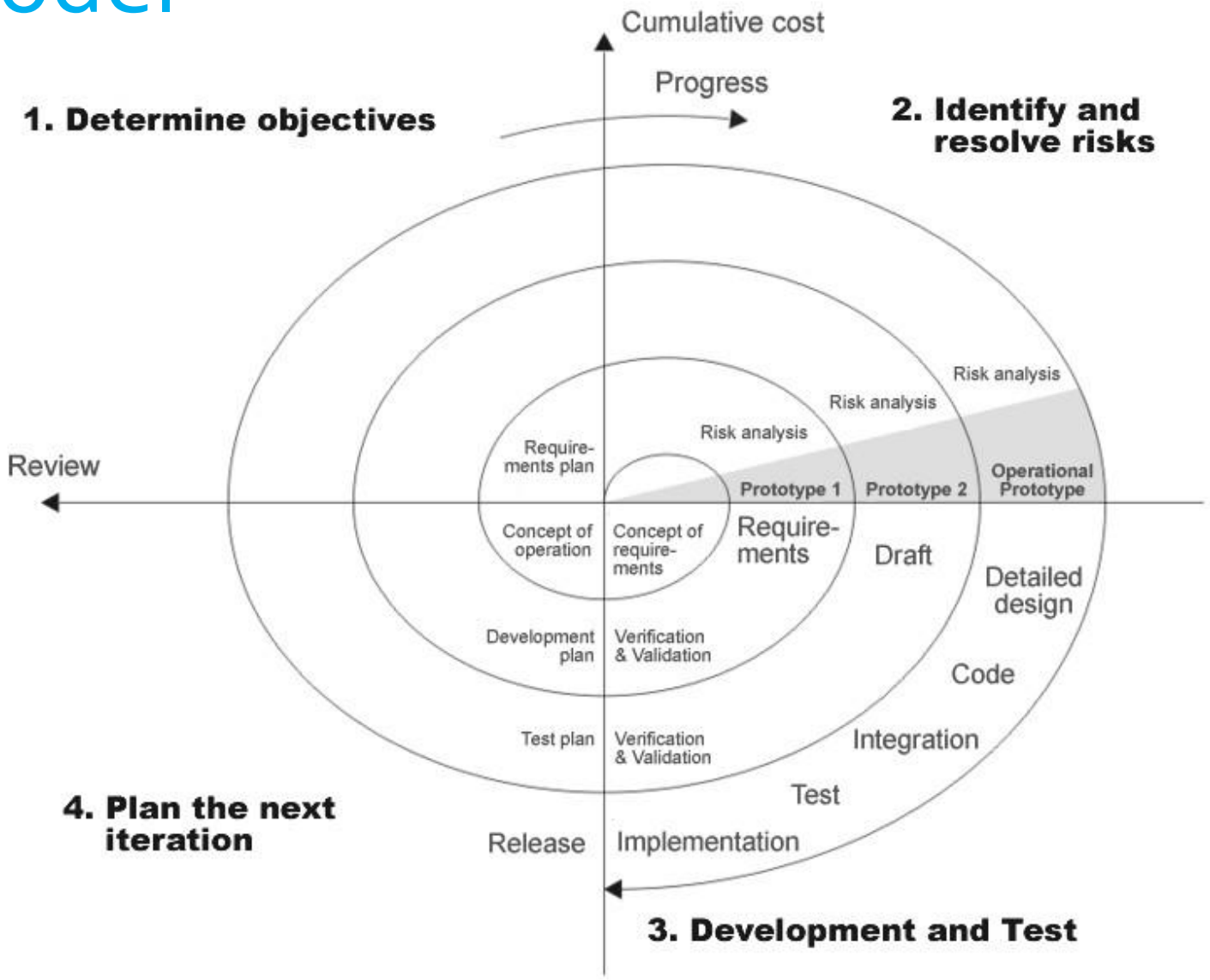
- Large projects where requirements are not understood
- Working in unfamiliar technical arenas
- Changing requirements due to rapidly changing technology, such as leading-edge applications
- Business user can be moderately to heavily engaged
- Need functional requirements turned into something tangible quickly

Spiral Model

Spiral Model

- Combination of linear and iterative
- Focuses heavily on risk assessment
- Minimized risk by breaking a project into smaller segments
- Each cycle begins with identifying stakeholders and what success looks like
- Each cycle ends with a review and a commitment

Spiral Model



Spiral Model

+ Accurately manages and mitigates risks
+ Issues are identified and solved early
+ Estimates near the end of the project are very accurate
+ Early involvement from developers increases successful design

-Long time to get to finished product
-High cost
-Relies on special skills to identify and mitigate risks
-Very customized solution limits reusability

Spiral Model: When to Use

- Risk identification and mitigation are extremely important
- Medium to high risk projects
- Users are unsure of their needs
- Prototypes are needed
- Requirements are complex
- Time and cost are not as important
- Little to no experience in project's area

Scrum Model (Agile)

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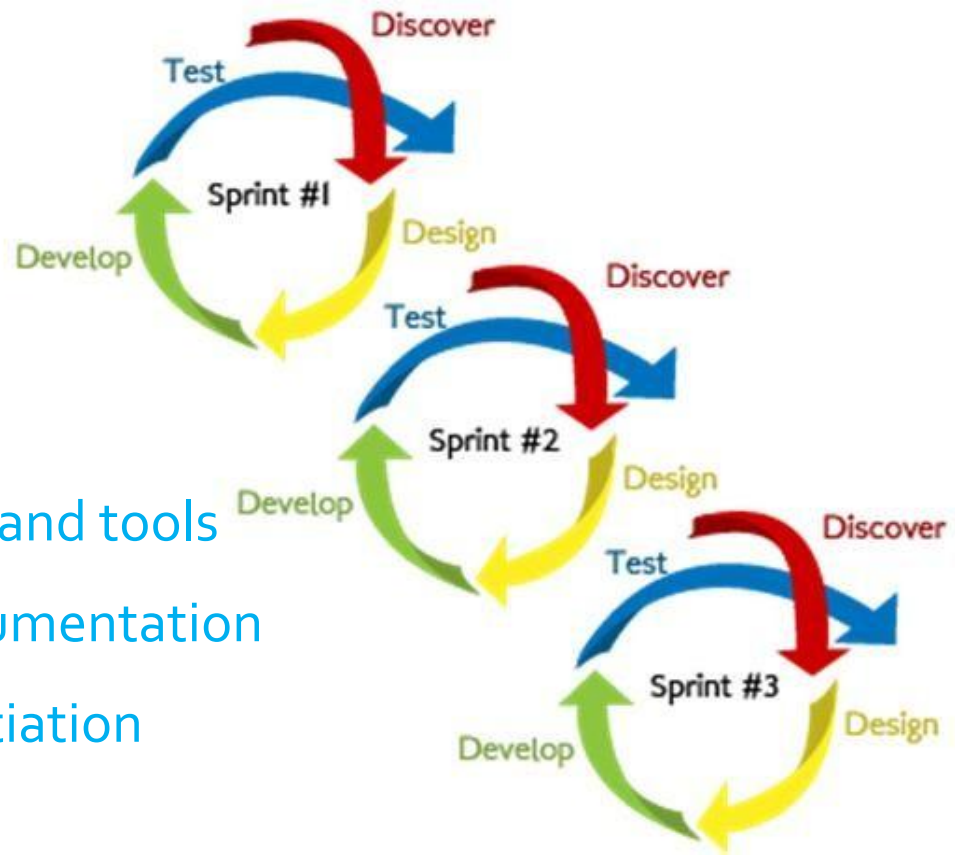
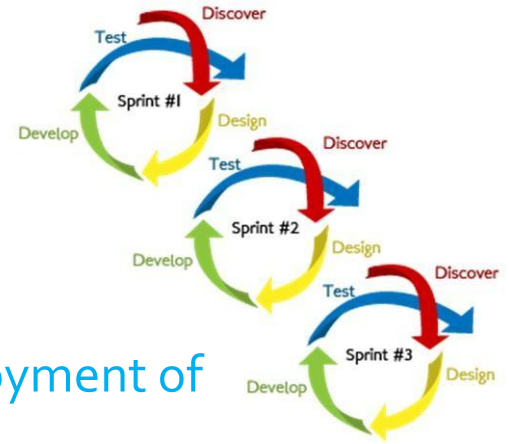


- Uses iterative approach called sprints
- Flexible and adaptable, great for the unknown
- Values individuals and interactions over processes and tools
- Values working software over comprehensive documentation
- Values customer collaboration over contract negotiation
- Values responding to change over following a plan

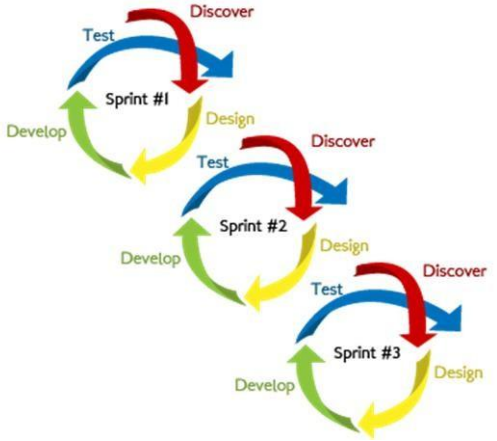
One of many different Agile methods including; Extreme Programming, Crystal Clear, Feature Driven, etc.

Scrum Model (Agile)



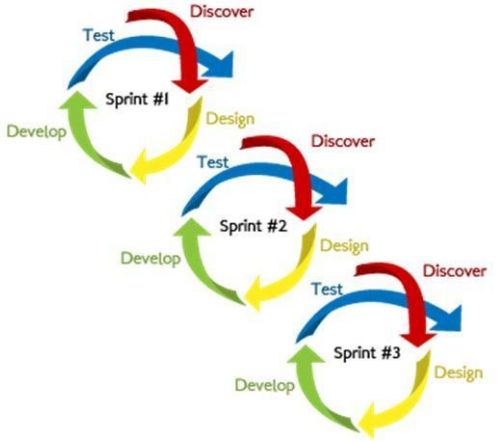
- Project team completes sprints
  - A short iteration from analysis, development, testing and possibly to deployment of a product. (14-30 days long)
  - Uses a subset of prioritized requirements that form a sprint backlog. Requirements are derived from a product backlog
- The project team is made of Product Owner, Scrum Dev Team, and Scrum Master
  - Product Owner is responsible for the return on investment (ROI).
    - Focuses on the requirements, the "what"
  - Scrum Dev Team is cross-functional.
    - Collaborates to build the product each sprint, the "how"
  - Scrum Master is the team facilitator, but has no power.
    - Removes roadblocks, sets timeframes, and provides visibility.

Scrum Model (Agile): Artifacts

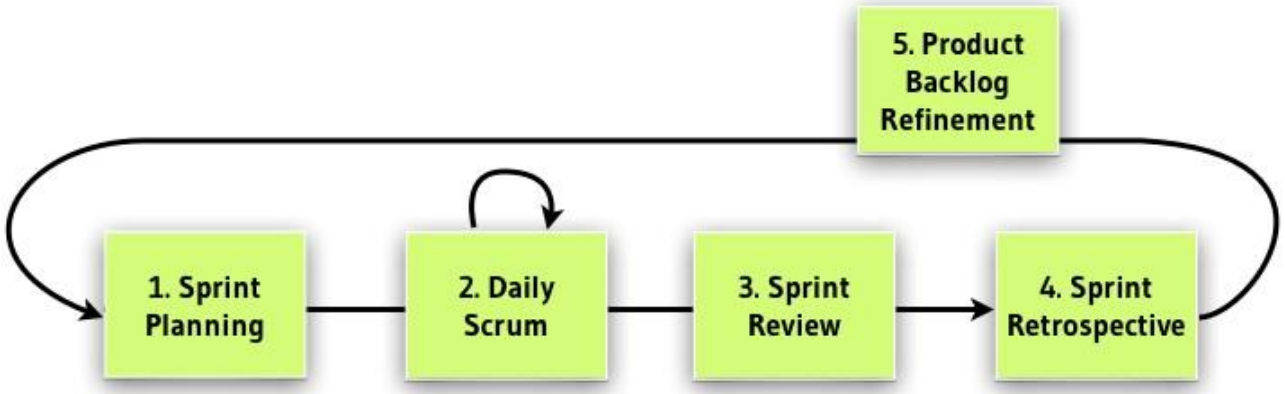


- Product Backlog
  - List of features that the business wants, force ranked by the Product Owner (one #1)
  - Anyone can add items, could be user stories or use cases
  - Does not contain tasks
- Sprint Backlog
  - Committed features that will be completed within the current sprint
  - Has a deadline to complete
  - Tasks are tracked as
    - Not started
    - In Progress
    - Completed

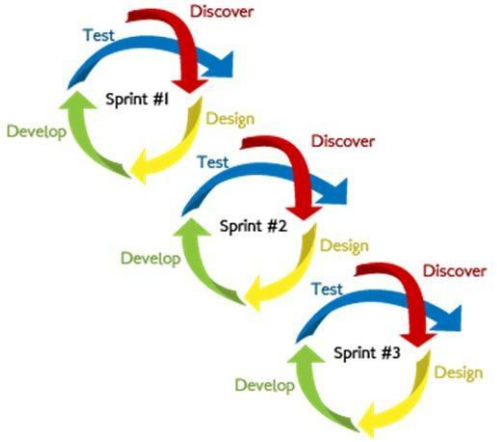
Scrum Model (Agile): Meetings



- Sprint Planning – Commit items to the sprint backlog
- Daily Scrum – Daily, 15 minutes. Yesterday, today, roadblocks
- Sprint Review – Demonstrate product, get feedback
- Sprint Retrospective – Inspect last sprint. Lessons learned
- Product Backlog Refinement – Adjust, split, and determine dependencies of backlog items



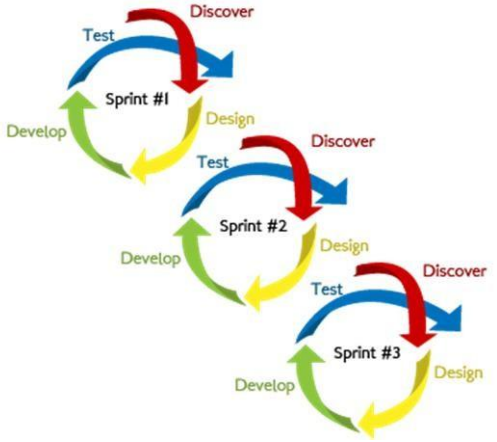
Scrum Model (Agile)



+ Flexible and adaptable to changing requirements
+ Gets workable product in-front of the business quicker
+ Promotes collaboration between business and development teams
+ Daily feedback on progress and roadblocks, stops "spinning wheels"

-Leads to scope creep due to no defined end date
-Relies on commitment of all team members
-Challenging to initially adopt and train in an organization
-Changing or leaving team members can have a drastically negative effect

Scrum Model (Agile): When to Use



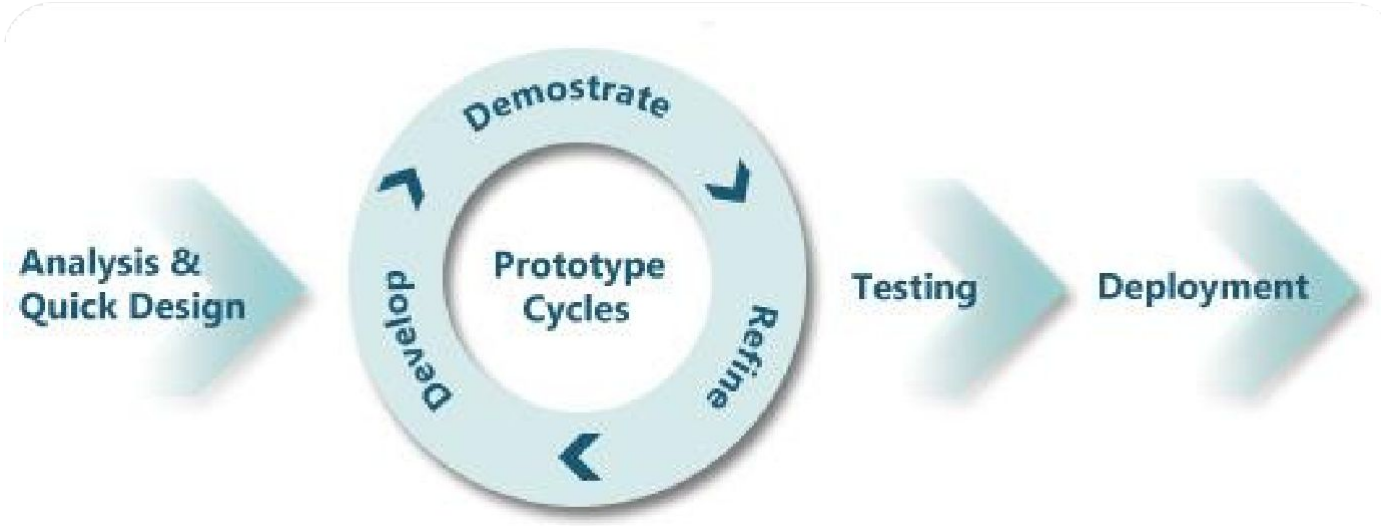
- The project is unpredictable and will have changing requirements
- Using or creating leading edge technology
- Organization as an experienced Scrum Master
- Business has experienced resource that can dedicate time to the project
- Pressure to produce a tangible product quickly
- Little to no concerns on length of project or budget
- Development team doesn’t have resource constraints

Rapid Application Development (RAD)

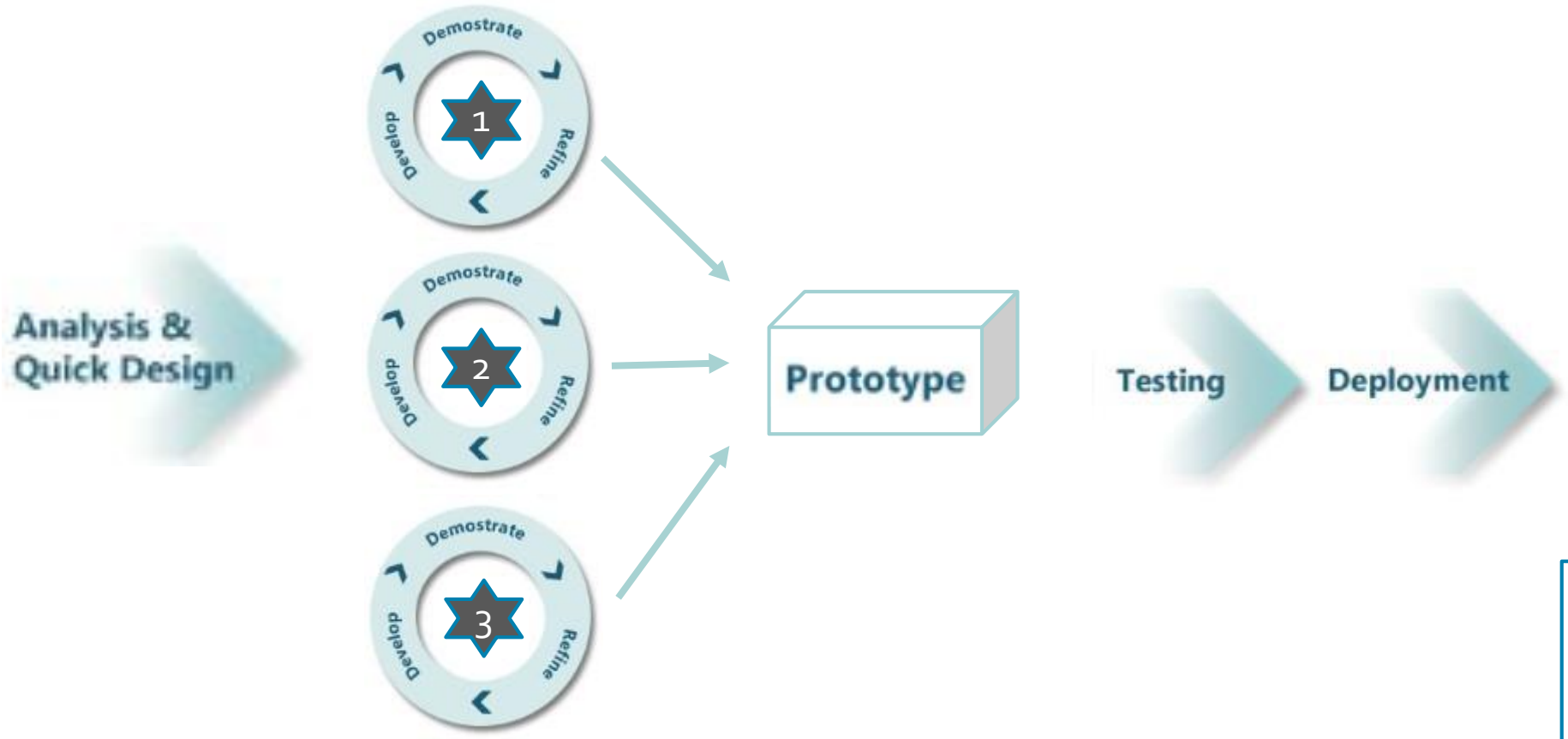
Rapid Application Development (RAD)

- Incremental approach
- Components and functions are developed in parallel
- Developments have tight timeframes
- The mini projects are assembled into a working prototype
- Feedback is received and prototype is refined
- Repeated until product fully meets requirements

Rapid Application Development (RAD)



Rapid Application Development (RAD)



Rapid Application Development (RAD)

+ Reduced time to develop
+ Increased reusability of components
+ Encourages customer feedback
+ Tackling integration early avoids later issues

-Need strong team to identify business requirements
-System must be able to be modularized
-High dependency on modeling skills
-Requires highly skilled developers and designers

RAD: When to Use

- Need a system that can be modularized and completed in 2-3 months
- High availability of quality designers for modeling
- Large budget
- Resources with high business knowledge are available to dedicate to project

Prototyping

Prototyping

- Iterative progression
- Used in conjunction with Spiral, Rapid Application Development (RAD), and Incremental models
- Breaks project into segments and creates small-scale mock-ups of the system, called prototypes
- Prototypes are iterated until they meet the requirements
- Final prototype usually discarded
- Business user is involved in the full process

Prototype Model

+ Gives business users a visual of their wants and needs
+ Promotes user participation and communication
+ Allows progress even when unclear requirements
+ Encourages innovation

-Very loose approval and control process
-Non-functional requirements are tough to identify
-Can lead to poorly designed systems
-False expectations thinking the system is complete from prototype

Prototype Model: When to Use

- Project objectives are unclear
- High pressure to implement “something”
- Frequent requirement changes
- Minimal resource constraints
- No strict approval processes needed
- Innovative, flexible designs that need to accommodate future changes