

# Software Process Model



**Process Iteration**



**Incremental  
Delivery**

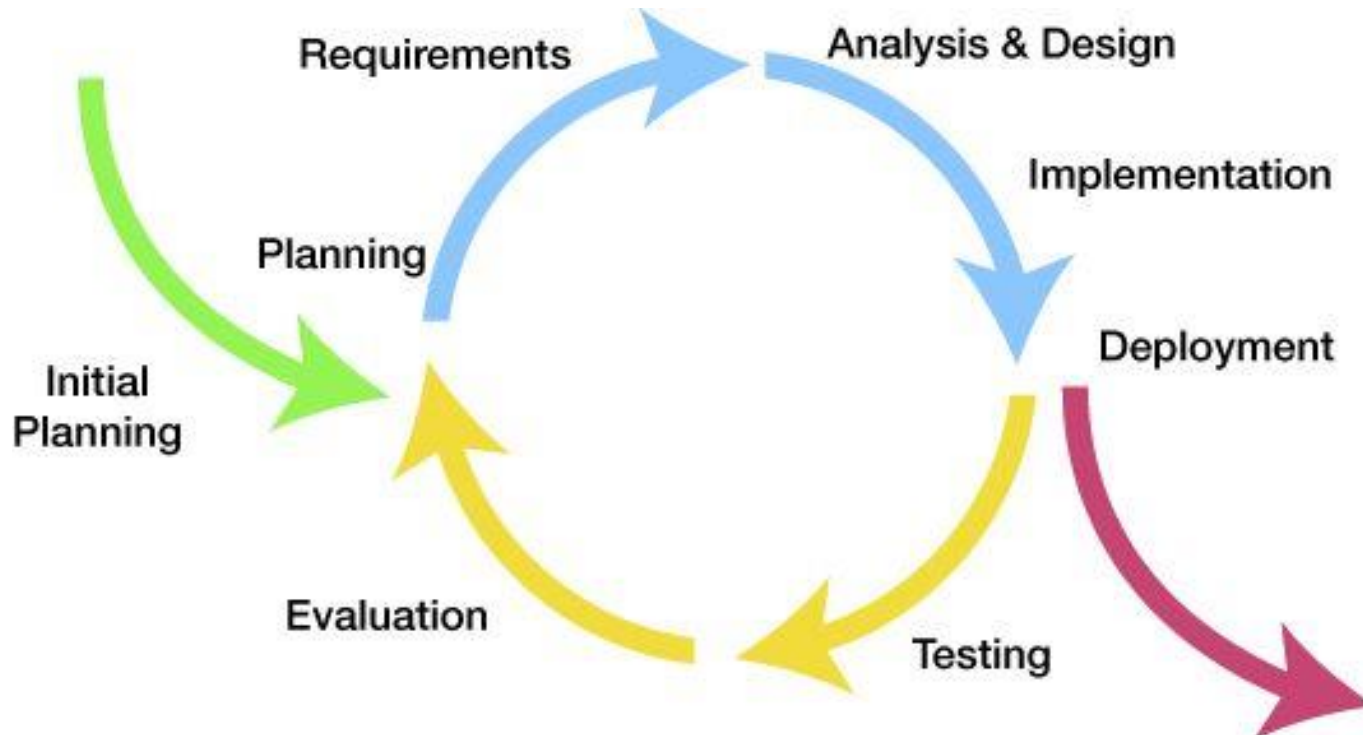


Spiral Model

**Spiral  
Development**

# Process Iteration

- System requirements change as the business procuring the system responds to management changes
- As new technologies become available designs & implementations change and hence the process activities are repeated regularly.



# Process Iteration

- Two process models have been explicitly designed to support iteration process
  - Incremental delivery – The software specification, design and implementation are broken down into series of increments that are each developed in turn
  - Spiral development – The development of the system spirals outwards from an initial outline through to the final developed system
- The essence of the iterative process is that the specification is developed in conjunction with the software
- In incremental approach there is no complete system specification until the final increment is specified.

# Incremental Delivery

- Waterfall model of development requires customers for a system to commit to a set of requirements before design begins and the designer to commit to particular design strategies before implementation
- An evolutionary approach to development allows requirements and design decisions to be delayed but also leads to software that may be poorly structured and difficult to understand and maintain
- Incremental delivery is an in-between approach that combines the advantages of these models

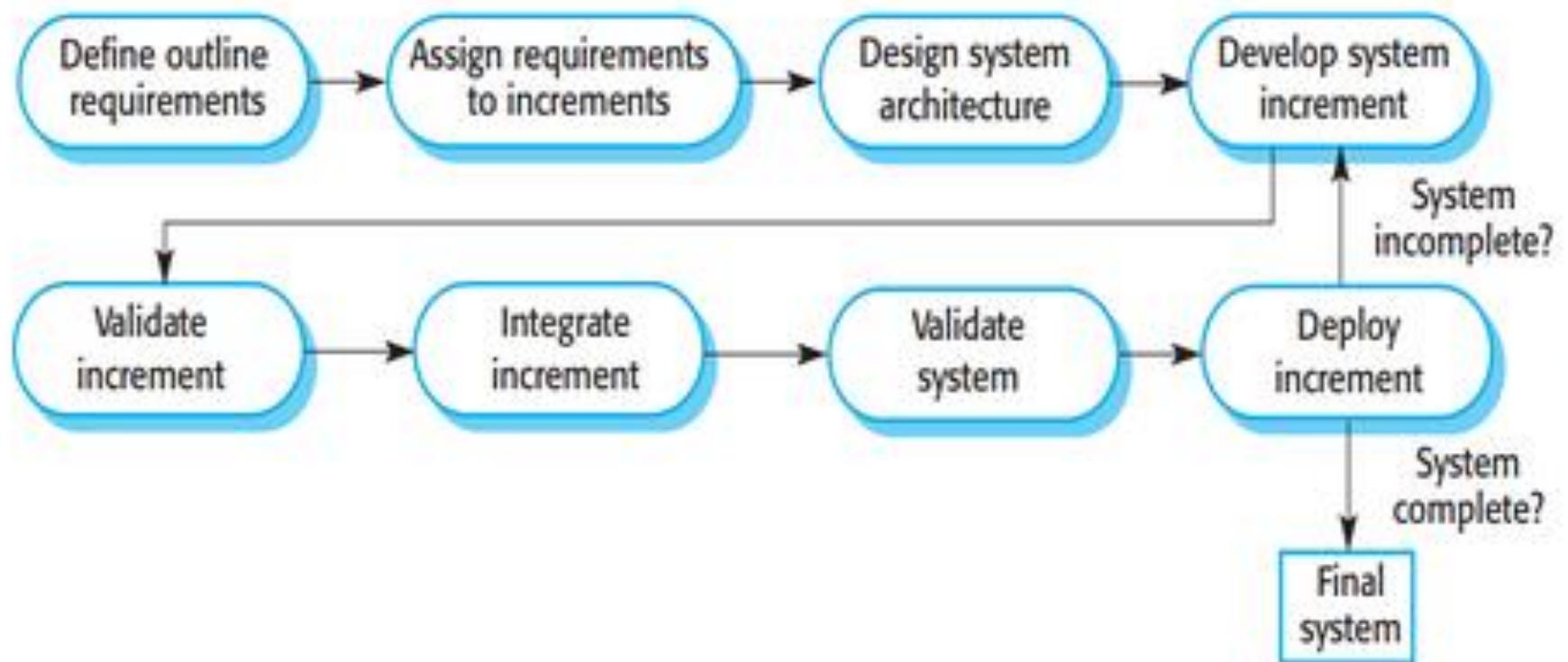
# Incremental Delivery

- In an incremental development process customer identify the services to be provided by the system also called as increments
- Once these increments are defined each one of these are prepared sequentially
- Once an increment is completed and delivered customers can put it into service thereby using it helping them to clarify their doubts
- As the new increments are completed they are integrated with existing increments so that system functionality improves with each delivered increment

# Incremental Delivery Model



# Incremental delivery



# Incremental Delivery

- This incremental development process has number of advantages
  - Customers do not have to wait until the entire system is delivered before they can gain value from it. The first increment satisfies their most critical requirements so they can use the software immediately
  - Customers can use early increment as prototypes and gain experience that informs their requirements for later system increments
  - There is a lower risk of overall project failure. Although problems may be encountered in some increments it is likely that some will be successfully delivered to the customers
  - As the highest priority services are delivered first and later increments are integrated with them it is inevitable that most important system services receive the most testing. This means that customers are less likely to encounter software failures in the most important part of the system



# Incremental Delivery

- Incremental development process has following disadvantages
  - Increments should be relatively small and each increment should deliver some system functionality
  - It may be difficult to map the customers requirements onto increments of right size
  - As the requirements are not defined in detail until an increment is to be implemented it is hard to identify common facilities that are needed by all increments

# Incremental Delivery Example

## Focus on Incremental Delivery of Business value

Not like this....



1



2



3



4

Like this!



1



2



3



4



5

# Spiral Development

- It represents a software process as a spiral loop
- Each loop in spiral represents a phase of the software process. Thus, innermost loop might be concerned with system feasibility, the next loop with requirements definition and so on
- Each loop in the spiral is split into four sectors
- Objective Setting – Specific objectives for that phase of the project are defined. Constraints on the process and the product are identified and a detailed management plan is drawn. Project risks are identified. Alternative strategies depending on these risks may be planned.

# Spiral Model



# Spiral Development

- Risk Assessment and reduction – For each identified project risks a detailed analysis is carried out. Steps are taken to reduce the risks
- Development and Validation – After risk evaluation a development model for the system is chosen.
- Planning – The project is reviewed, and a decision is made whether to continue with a further loop of the spiral

# Spiral Development Contd.

