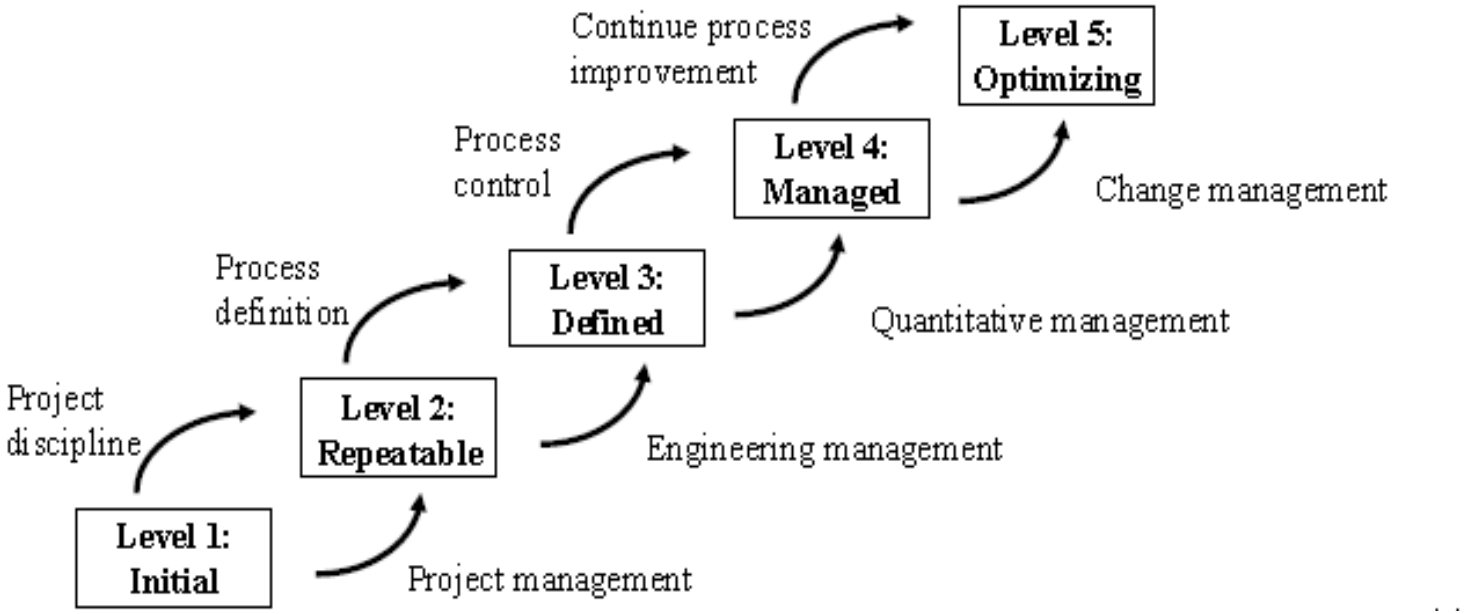
Capability Maturity Model

Material taken from Fenton and Pfleeger, Software Metrics: A Rigorous and Practical Approach , Second Edition.

Capability Maturity Model

- Capability maturity assessment
  - Capability Maturity Model (CMM) proposed by the US Software Engineering Institute (SEI) to measure a contractor's ability to develop quality software (Humphrey, 1989)

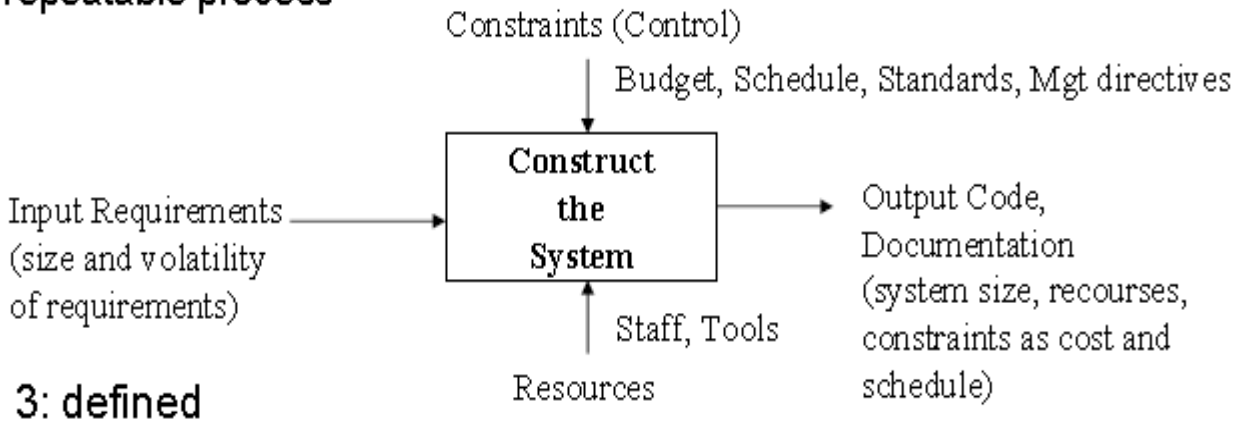


Capability Maturity Model

- **Level 1: ad hoc**
  - Inputs to the process are ill-defined; while outputs are expected.
  - The transition from inputs to outputs is undefined and uncontrolled.
  - Visibility is nil and comprehensive measurement difficult.
  - What to do: concentrate on imposing more structure and control on the process.
- **Level 2: repeatable – process dependent on individuals**
  - Though software life cycle model is well-defined, models differ between projects – reducing the opportunity for teamwork and reuse of know how.
  - Basic project management processes are used to track cost and schedule.
  - Repeatable only on similar projects.
  - Lack of complete process.
  - The client interacts with the organization at well-defined points of time, such as client reviews and client acceptance test, allowing some collections before delivery.

Capability Maturity Model

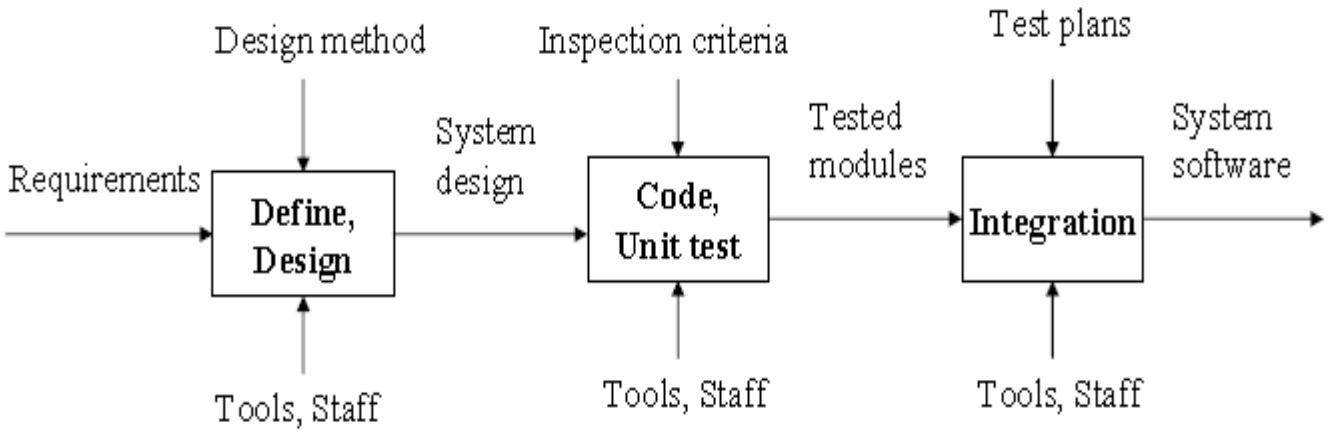
- A repeatable process



- Level 3: defined
  - Reduce excessive dependence on particular individuals by documenting and enforcing a standard process.
    - Process: waterfall, spiral, etc. Standards: IEEE's
  - Teams are allowed flexibility to tailor the organization's standards for special circumstances.
  - Lack of predictable outcomes
  - Significant difference between level 3 and 2: providing process visibility.

Capability Maturity Model

– A defined process

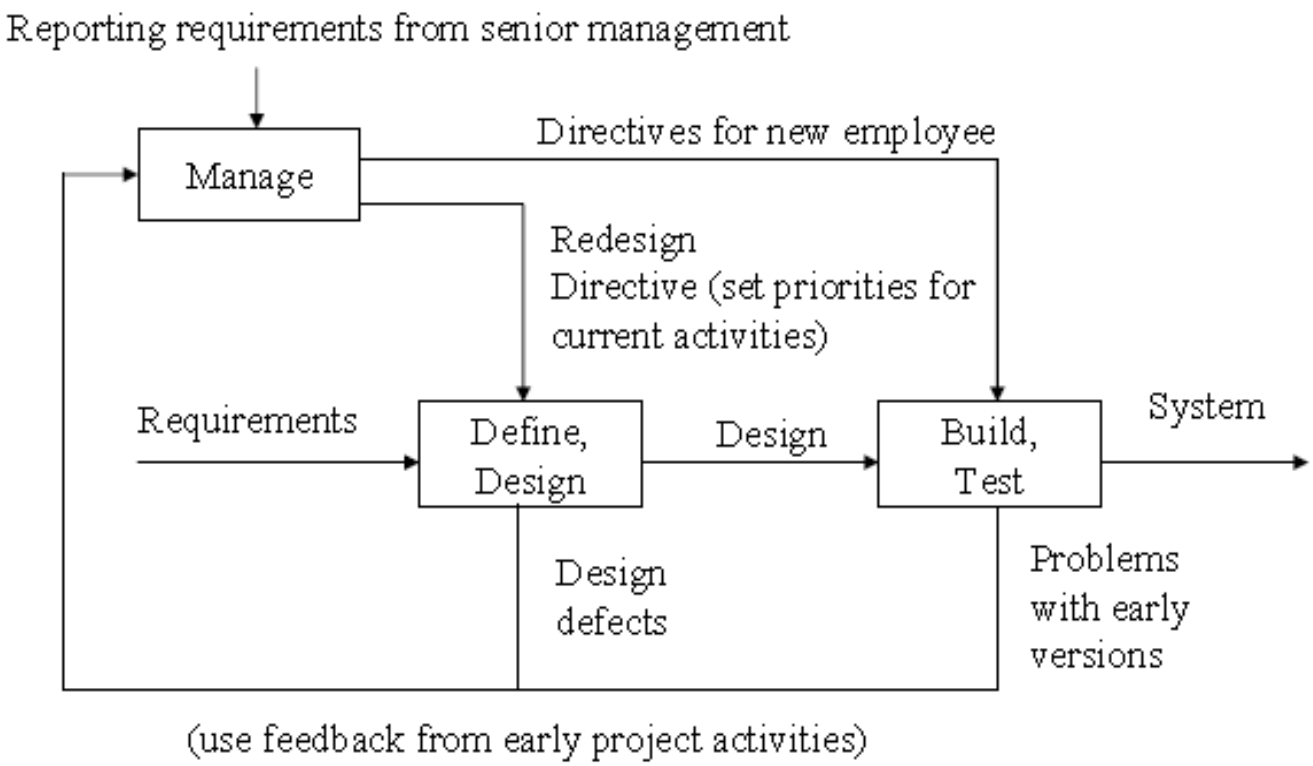


Capability Maturity Model

- Level 4: managed
  - Define metrics for activities and deliverables.
    - Detailed measurement
    - Control
    - Process and products with quantified quality predictability
  - Data are constantly collected during the duration of project.
  - Clients are informed about risks before the project begins and know the measures used by the organization.
  - Significant difference between levels 4 and 3: measurement characteristics of the over process and of the interaction among and across major activities (Agile method !).

Capability Maturity Model

- A managed process



Capability Maturity Model

- Level 5: optimizing
  - **Be able**
    - Continual process improvement through quantitative feedback.
    - Extensible scope innovative ideas and technologies.
  - **Keep track of technology and process changes that may change in the system model or deliverables even during the duration of a project**
    - Defect prevention
    - Technology change management
    - Process change management

Capability Maturity Model

CMM Summary (*)

- Level 1: Initial
  - Process: undefined, ad hoc
  - Result: outcome depends on individuals
  - Lacking: any reasonable process
    - when project is completed, nothing is recorded about its cost, schedule, or quality.
- Level 2: Repeatable
  - Process: tracks documents, cost, schedule, functionality
  - Result: repeatable on similar projects
  - Lacking: complete process

Capability Maturity Model

CMM Summary (cont'd)

- Level 3: Defined
  - Process: documented, standardized, tailorable
  - Result: consistency
  - Lacking: predictable outcomes
- Level 4: Managed
  - Process: detailed measurement; control
  - Result: process and products with quantified quality predictability
  - Lacking: mechanism for process improvement
- Level 5: Optimized
  - Process: continual process improvement through quantitative feedback; extensible scope; innovative idea and technologies