CH02: Modeling the process and life cycle

- Process of developing software (organization and discipline in the activities) contribute to the **quality** of the software and the **speed** with which it is developed
- * The Meaning of Process
- * Software Process Models
- * Tools and Techniques for Process Modeling
- * Practical Process Modeling

TECH
Computer Science

The Meaning of Process

- We can think of a set of ordered tasks as a **process**: a series of steps involving activities, constraints and resources that produce an intended output of some kind.
- When the process involves the building of some product, we sometimes refer to the process as a **life cycle**.

Following a Process

- A process is a collection of procedures (a recipe), organized so that we build products to satisfy a set of goals or standards.
- Processes are important because they impose consistency and structure on a set of activities.
- When we know how to do something well and we want to ensue that others do it the same way.

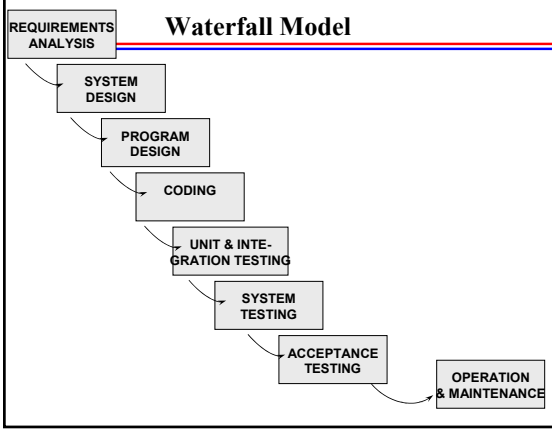
Writing a Process (Writing a "program" for others to follow)

- Prescribe all major activities
- Uses resources, subject to a set of constraints
- May composed of sub-processes
- Each activities has entry and exit criteria
- Activities are organized in a sequence.
- State the goals of each activity.

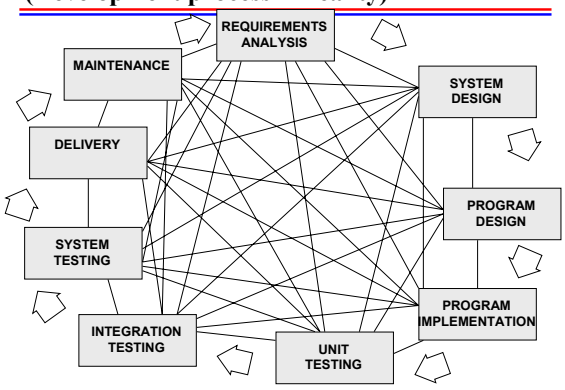
Software Process Models

- are prescriptions for the way software development **should progress**.
- are descriptions of the way software development **is done** in actuality.
- Every software development process model includes system requirements as **input** and delivered product as **output**.

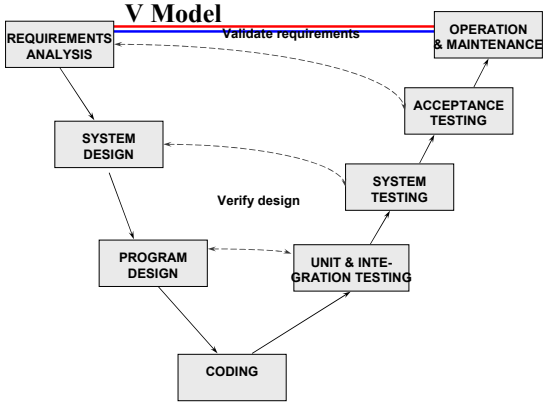
Waterfall Model



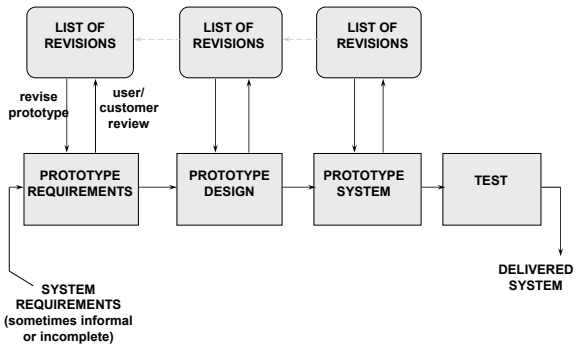
(Development process in reality)



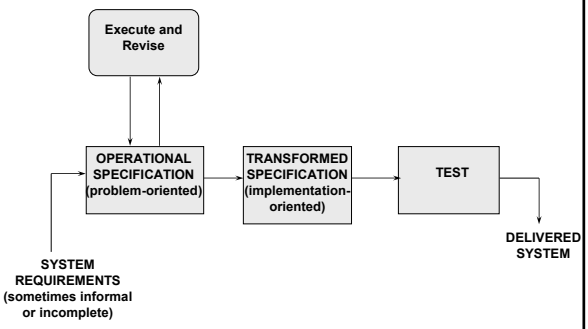
V Model



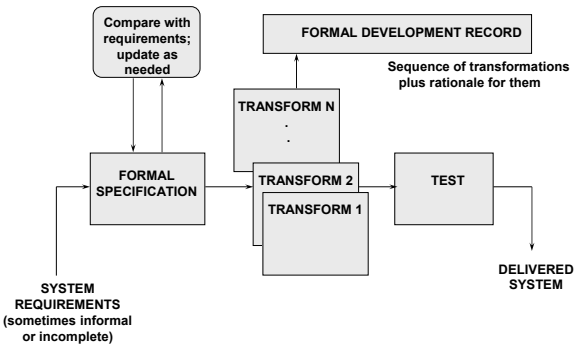
Prototyping Model



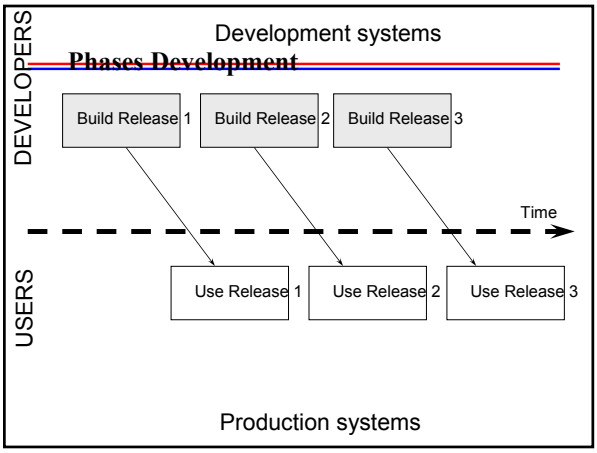
Operational Specification: requirements enacted (automated) using a software package



Transformational Model

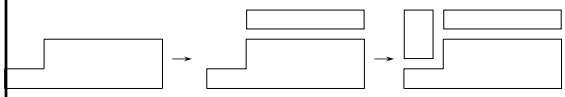


Phases Development

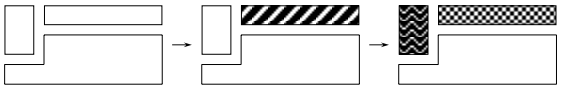


(Increments and Interactions)

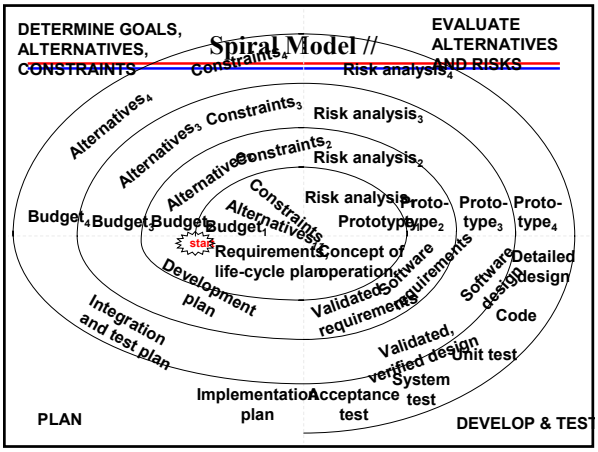
INCREMENTAL DEVELOPMENT



ITERATIVE DEVELOPMENT



Spiral Model //



Tools and Techniques for Process Modeling

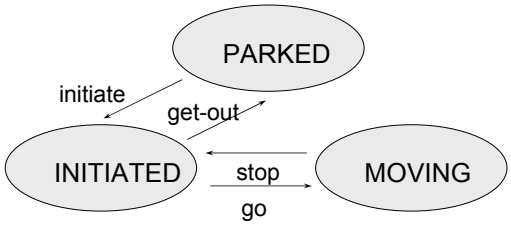
- Choose Language or Notation
- A **static** model depicts the process, showing that the inputs are transformed to outputs.
- A **dynamic** model can enact the process, so that the user can see how intermediate and final products are transformed over time.

Static Modeling: Lai Notation

- State tables show information about the completeness of each artifact at a given time.
- Transition diagrams show how the states are related to one another.

State table and Transition diagram

Parked:
((state_of(car.engine) = off)
(state_of(car.gear) = park)
(state_of(car.speed) = stand))



Dynamic Modeling: System Dynamics

- Simulate the process and make changes before the resources are actually expended.
- Factors affecting overall productivity.
- (Quantified) Relationships (links) between the factors.
- System dynamics models are supported by software that simulates the overall process.

Practical Process Modeling

- used properly, process modeling offers great benefits for understanding processes and revealing inconsistencies.
- Develop special language to help defining and enacting processes, e.g. Marvel specification language.
- A process model is useful for guiding your behavior when you are working with a group.