Prescriptive Models

- Prescriptive process models advocate an orderly approach to software engineering

That leads to a few questions …

- If prescriptive process models strive for structure and order, are they inappropriate for a software world that thrives on change?
- Yet, if we reject traditional process models (and the order they imply) and replace them with something less structured, do we make it impossible to achieve coordination and coherence in software work?
The Waterfall Model

Communication
- project initiation
- requirement gathering

Planning
- estimating
- scheduling
- tracking

Modeling
- analysis
- design

Construction
- code
- test

Deployment
- delivery
- support
- feedback
The Incremental Model

Software functionality and features vs. project calendar time

increment # 1  
increment # 2
increment # n

delivery of 1st increment
delivery of 2nd increment
delivery of nth increment

Communicate  Planning  Modeling  Construct  Delivery  Feedback
Communicate  Planning  Modeling  Construct  Delivery  Feedback
Communicate  Planning  Modeling  Construct  Delivery  Feedback

The RAD Model

Communication  
Planning  
Modeling  
Construction  
Deployment

Team # 1
- Modeling  
  business modeling  
  data modeling  
  process modeling  
- Construction  
  component reuse  
  automatic code generation  
  testing

Team # 2
- Modeling  
  business modeling  
  data modeling  
  process modeling  
- Construction  
  component reuse  
  automatic code generation  
  testing

Team # n

60 - 90 days

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Evolutionary Models: Prototyping

- Quick plan
- Modeling Quick design
- Construction of prototype
- Deployment delivery & feedback
- Communication
Evolutionary Models: The Spiral

- planning
  - estimation
  - scheduling
  - risk analysis

- communication

- modeling
  - analysis
  - design

- deployment
  - delivery
  - feedback

- construction
  - code
  - test

- start

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Evolutionary Models: Concurrent

Modeling activity

- Under development
- Under review
- Under revision
- Baselined
- Done
- Awaiting changes
- None

represents the state of a software engineering activity or task
Still Other Process Models

- **Component based development**—the process to apply when reuse is a development objective
- **Formal methods**—emphasizes the mathematical specification of requirements
- **AOSD**—provides a process and methodological approach for defining, specifying, designing, and constructing aspects
- **Unified Process**—a “use-case driven, architecture-centric, iterative and incremental” software process closely aligned with the Unified Modeling Language (UML)
The Unified Process (UP)

- inception
- elaboration
- planning
- modeling
- construction
- transition
- deployment
- communication
- production

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### UP Phases

<table>
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<th>Workflows</th>
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</tr>
</tbody>
</table>

**Iterations**: #1, #2, #n-1, #n
UP Work Products

Inception phase
- Vision document
- Initial use-case model
- Initial project glossary
- Initial business case
- Initial risk assessment
- Project plan, phases and iterations
- Business model, if necessary
- One or more prototypes

Elaboration phase
- Use-case model
- Supplementary requirements including non-functional
- Analysis model
- Software architecture description
- Executable architectural prototype
- Preliminary design model
- Revised risk list
- Project plan including iteration plan
- Adapted workflows
- Milestones
- Technical work products
- Preliminary user manual

Construction phase
- Design model
- Software components
- Integrated software increment
- Test plan and procedure
- Test cases
- Support documentation
- User manuals
- Installation manuals
- Description of current increment

Transition phase
- Delivered software increment
- Beta test reports
- General user feedback