Chapter 3
Prescriptive Process Models

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Comments on HW #1

- Generally did good job
  - HWs submitted earlier have better scores
    - Start your HW as early as possible
- Do not write in a colloquial style, but a literary style
  - Be careful to select proper words appropriate in technical context
    - Spend time to find a right work by using thesaurus
- If you have a score less than 8/10, try to improve your writing skill

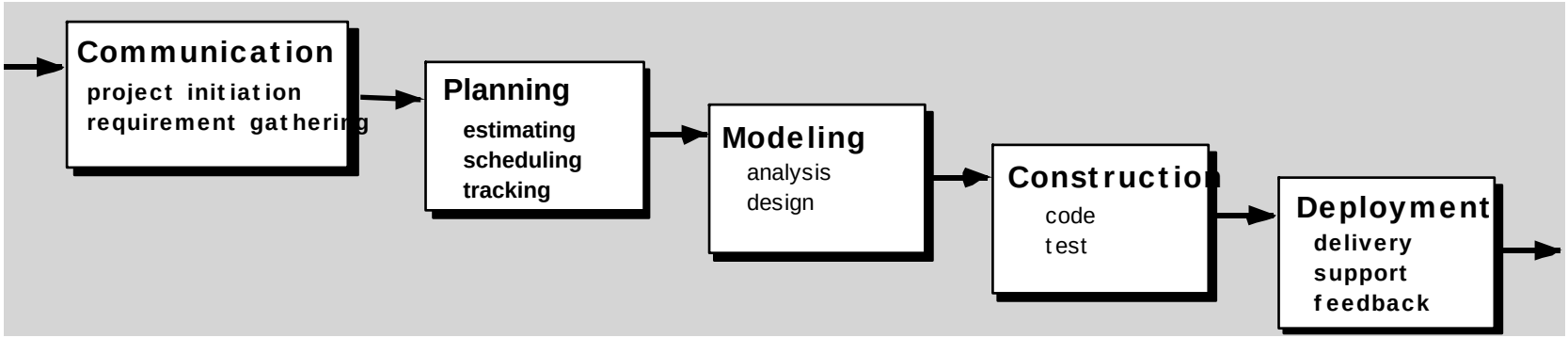
Prescriptive Models

- Prescriptive process models advocate an orderly approach to software engineering

That leads to a few questions …

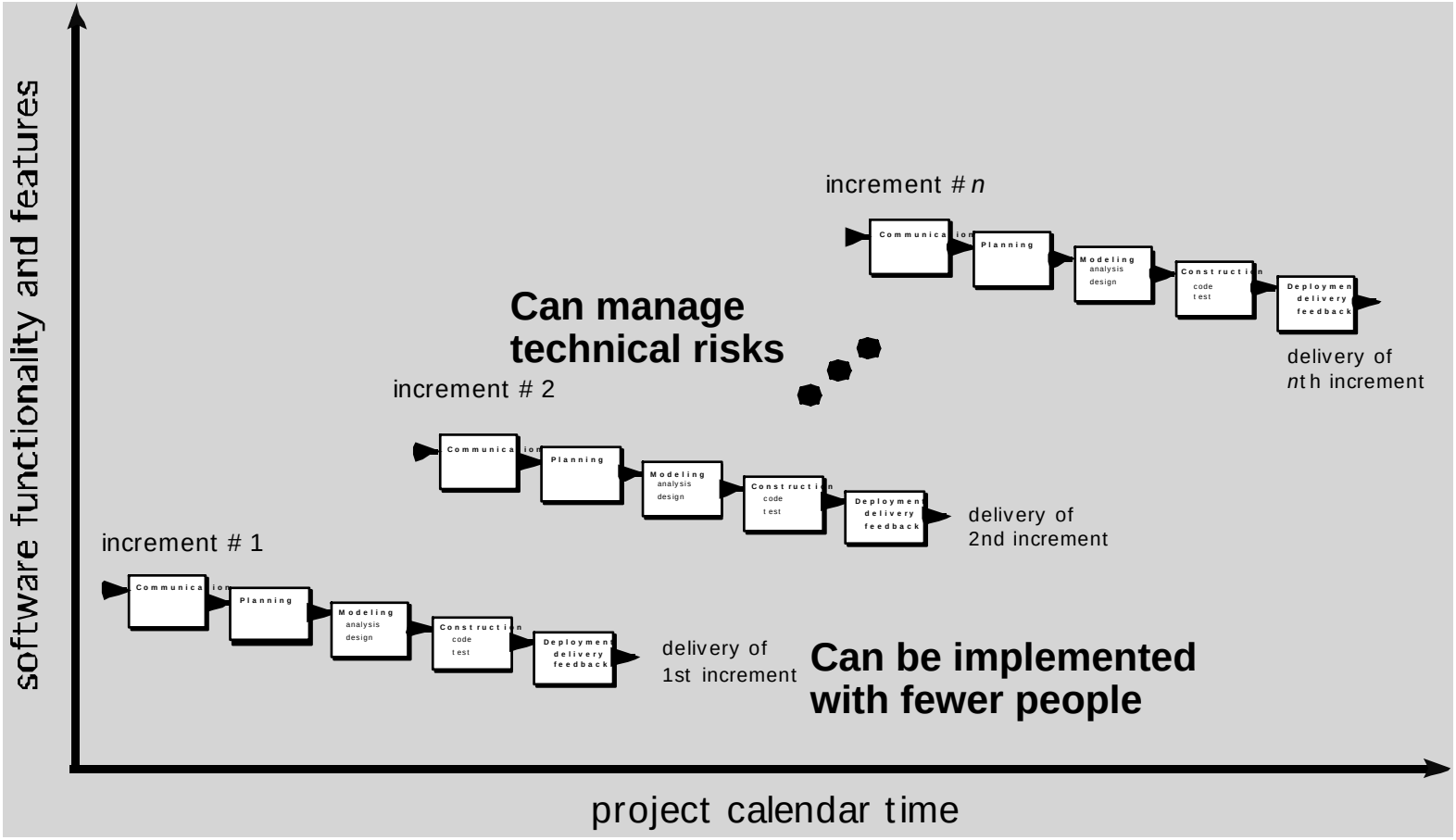
- If prescriptive process models strive for structure and order, are they inappropriate for a software world that thrives on change?
- Yet, if we reject traditional process models (and the order they imply) and replace them with something less structured, do we make it impossible to achieve coordination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

The Waterfall Model

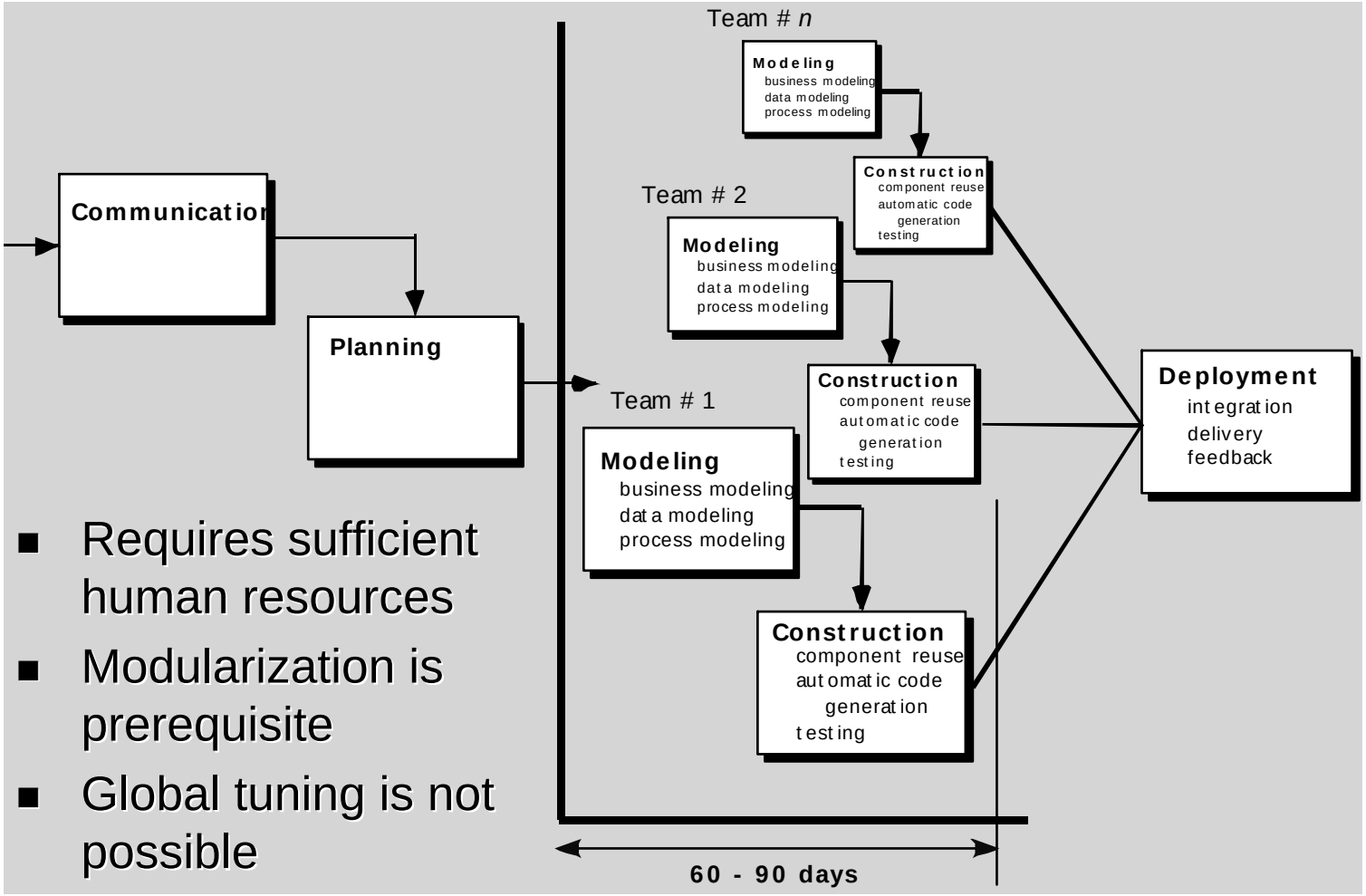


- Which problems does the waterfall model have?
  - …

The Incremental Model

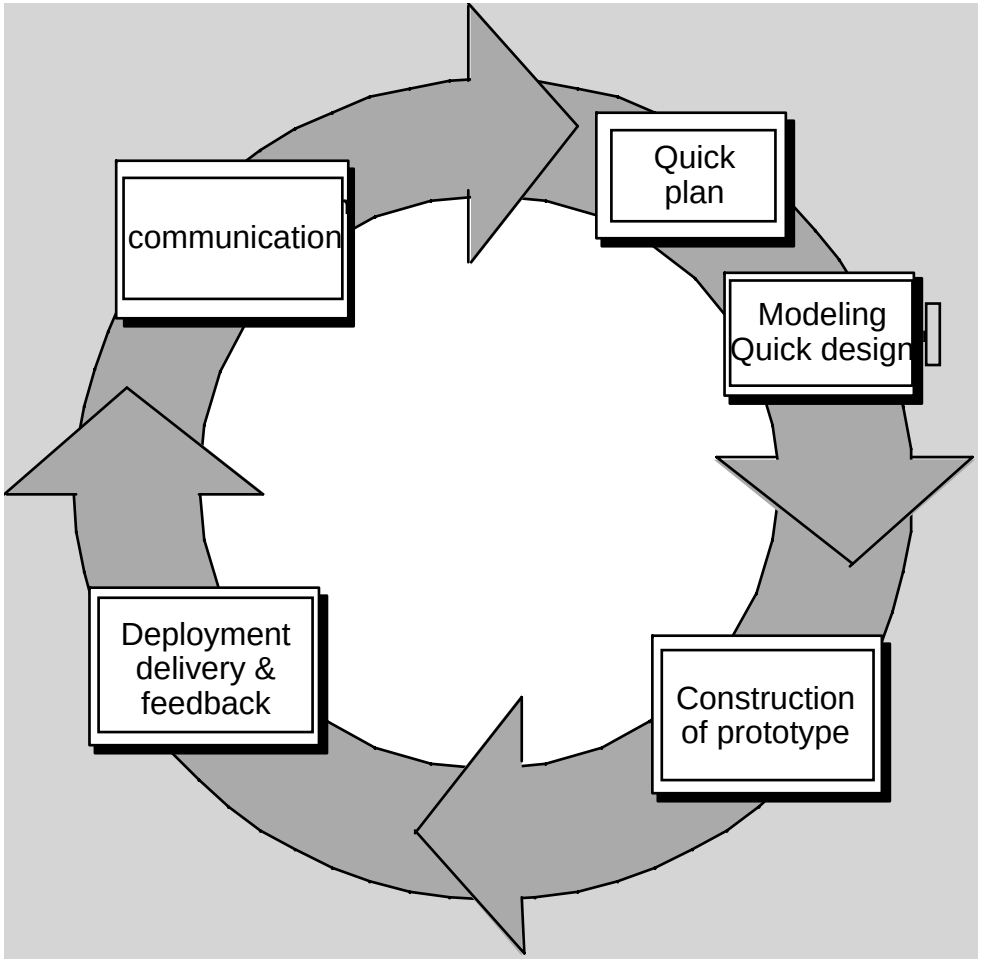


The RAD (Rapid Application Development) Model



- Requires sufficient human resources
- Modularization is prerequisite
- Global tuning is not possible

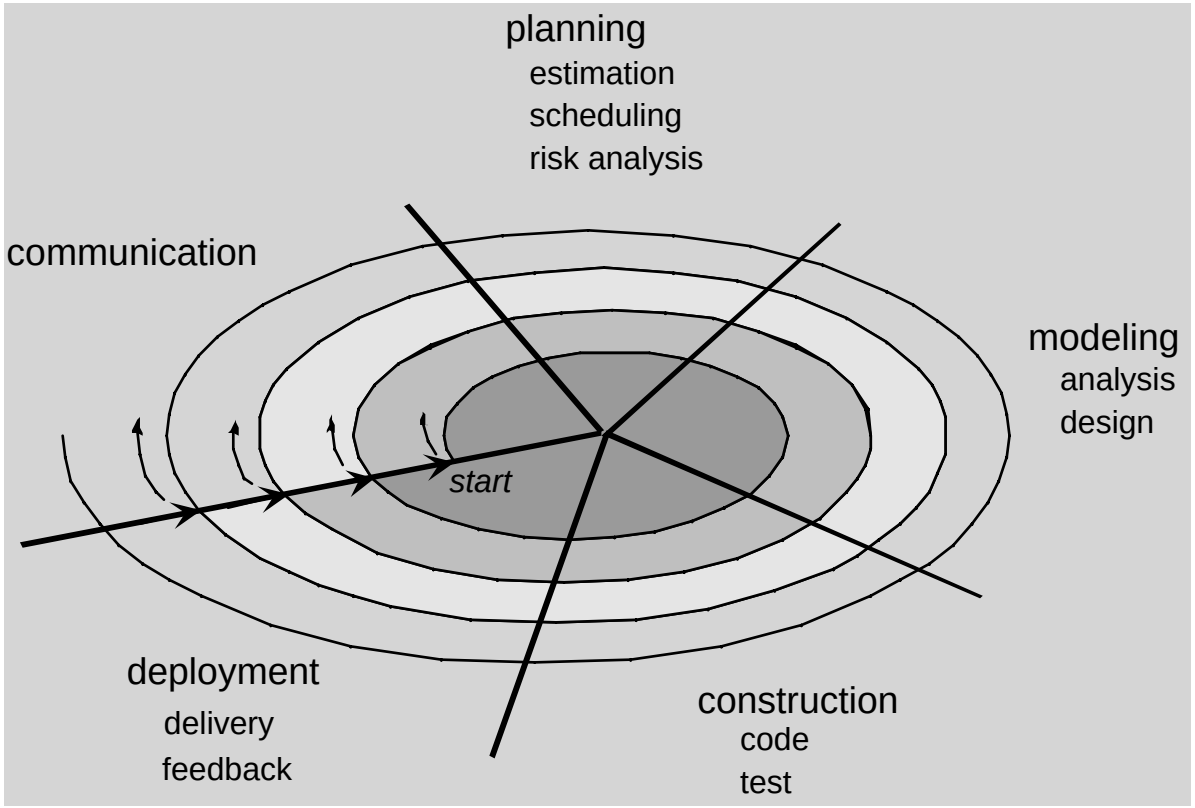
Evolutionary Models: Prototyping



Ex. Use-case design

Ideally, the prototype serves to identify SW requirements

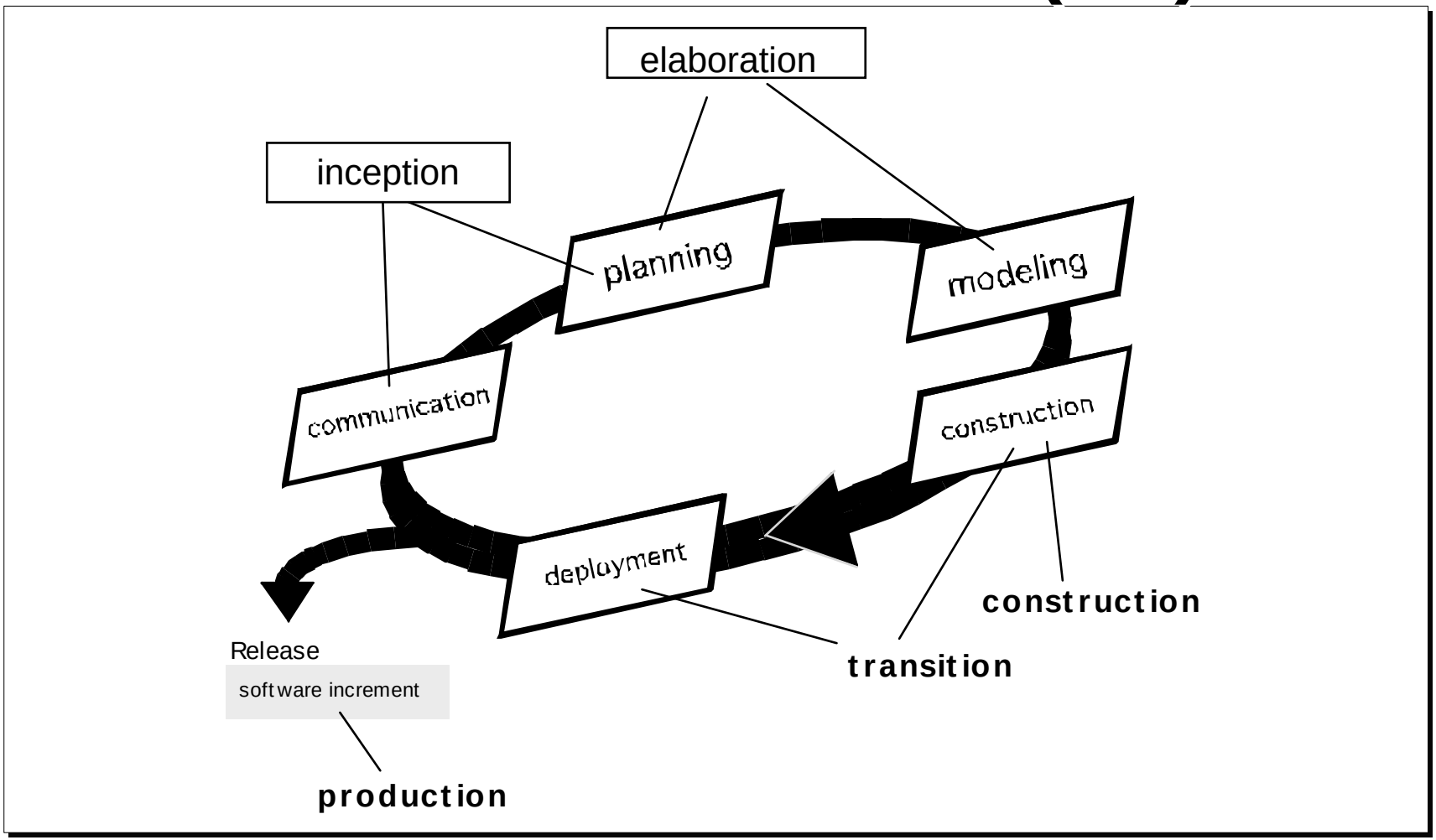
Evolutionary Models: The Spiral



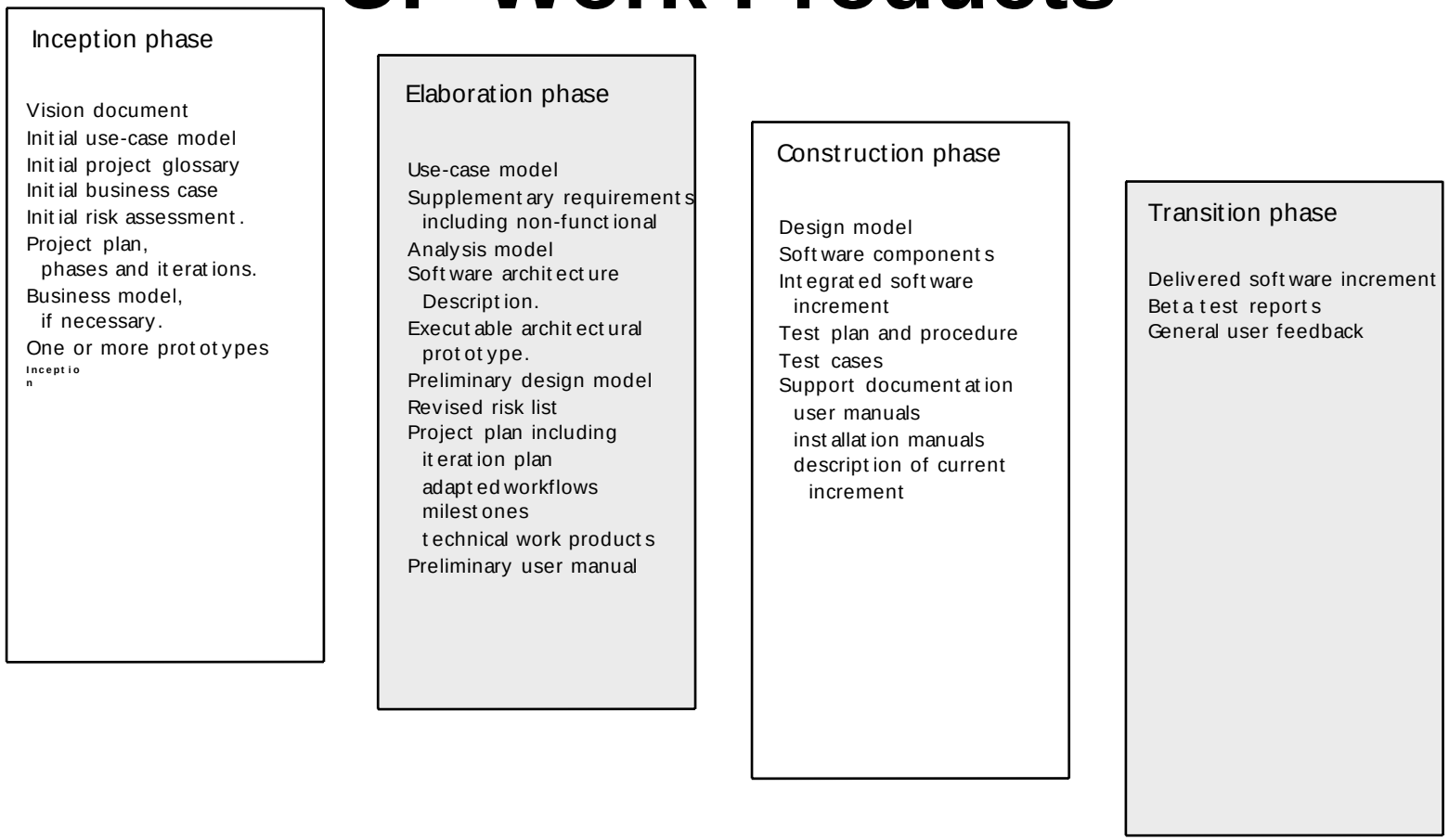
Still Other Process Models

- 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)



UP Work Products



Quick Overview of SafeHome

- The SafeHome company has developed an innovative HW box that implements wireless Internet (802.11) connectivity in a very small form factor (the size of a matchbook).
- The idea is to use this technology to develop and market a comprehensive home automation product line.
  - This would provide security functions, control over telephone answering machines, lights, heating, air conditioning, and home entertainment devices.
- The first generation of the system will only focus on home security since that is a market the public readily understands.

SafeHome[9]

How a Project Starts

The scene: Meeting room at CPI Corporation, a (fictional) company that makes consumer products for home and commercial use.

The players: Mal Golden, senior manager, product development; Lisa Perez, marketing manager; Lee Warren, engineering manager; Joe Camalleri, executive VP, business development.

The conversation:

Joe: Okay, Lee, what's this I hear about your folks developing a what? A generic universal wireless box?

Lee: It's pretty cool, about the size of a small matchbook. We can attach it to sensors of all kinds, a digital camera, just about anything. Using the 802.11b wireless protocol. It allows us to access the device's output without wires. We think it'll lead to a whole new generation of products.

Joe: You agree, Mal?

Mal: I do. In fact, with sales as flat as they've been this year, we need something new. Lisa and I have been doing a little market research, and we think we've got a line of products that could be big.

Joe: How big. . . , bottom-line big?

Mal: (avoiding a direct commitment): Tell him about our idea, Lisa.

Lisa: It's a whole new generation of what we call "home management products." We call 'em *SafeHome*. They use the new wireless interface, provide homeowners or small business people with a system that's controlled by their PC—home security, home surveillance, appliance and device control. You know, turn down the home air conditioner while you're driving home, that sort of thing.

Lee: (jumping in) Engineering's done a technical feasibility study of this idea, Joe. It's doable at low manufacturing cost. Most hardware is off the shelf. Software is an issue, but it's nothing that we can't do.

Joe: Interesting. Now, I asked about the bottom line.

Mal: PCs have penetrated 60 percent of all households in the USA. If we could price this thing right, it could be a killer-App. Nobody else has our wireless box—it's proprietary. We'll have a two-year jump on the competition. Revenue? Maybe as much as $30–40 million in the second year.

Joe (smiling): Let's take this to the next level. I'm interested.

SafeHome

Selecting a Process Model, Part 1

The scene: Meeting room for the software engineering group at CPI Corporation, a (fictional) company that makes consumer products for home and commercial use.

The players: Lee Warren, engineering manager; Doug Miller, software engineering manager; Jamie Lazar, software team member; Vinod Raman, software team member; and Ed Robbins, software team member.

The conversation:

Lee: So let's recapitulate. I've spent some time discussing the *SafeHome* product line as we see it at the moment. No doubt, we've got a lot of work to do to simply define the thing, but I'd like you guys to begin thinking about how you're going to approach the software part of this project.

Doug: Seems like we've been pretty disorganized in our approach to software in the past.

Ed: I don't know, Doug. We always got product out the door.

Doug: True, but not without a lot of grief, and this project looks like it's bigger and more complex than anything we've done in the past.

Jamie: Doesn't look that hard, but I agree . . . our ad hoc approach to past projects won't work here, particularly if we have a very tight timeline.

Doug (smiling): I want to be a bit more professional in our approach. I went to a short course last week and learned a lot about software engineering . . . good stuff. We need a process here.

Jamie (with a frown): My job is to build computer programs, not push paper around.

Doug: Give it a chance before you go negative on me. Here's what I mean. [Doug proceeds to describe the process framework described in Chapter 2 and the prescriptive process models presented to this point.]

Doug: So anyway, it seems to me that a linear model is not for us . . . assumes we have all requirements up front and knowing this place, that's not likely.

Vinod: Yeah, and that RAD model sounds way too IT-oriented . . . probably good for building an inventory control system or something, but it's just not right for *SafeHome*.

Doug: I agree.

Ed: That prototyping approach seems OK. A lot like what we do here anyway.

Vinod: That's a problem. I'm worried that it doesn't provide us with enough structure.

Doug: Not to worry. We've got plenty of other options, and I want you guys to pick what's best for the team and best for the project.

SafeHome: Selecting a Process Model, Part 2

- The players:
  - Lee Warren: engineering manager
  - Doug Miller: SE manager
  - Ed and Vinod: members of the SE team

The conversation: (Doug describes evolutionary process options)

- Ed: Now I see something I like. An incremental approach makes sense and I really like the flow of that spiral model thing. That's keeping it real.
- Vinod: I agree. We deliver an increment, learn from customer feedback, replan, and then deliver another increment. It also fits into the nature of the product. We can have something on the market fast and then add functionality with each version, er, increment.
- Lee: Wait a minute, did you say that we regenerate the plan with each tour around the spiral, Doug? That's not so great, we need one plan, one schedule, and we've got to stick to it.
- Doug: That's old school thinking, Lee. Like Ed said, we've got to keep it real. I submit that it's better to tweak the plan as we learn more and as changes are requested. It's way more realistic. What's the point of a plan if it doesn't reflect reality?
- Lee (frowning): I suppose so, but senior management's not going to like this… they want a fixed plan.
- Doug (smiling): Then, you 'll have to reeducate them, buddy