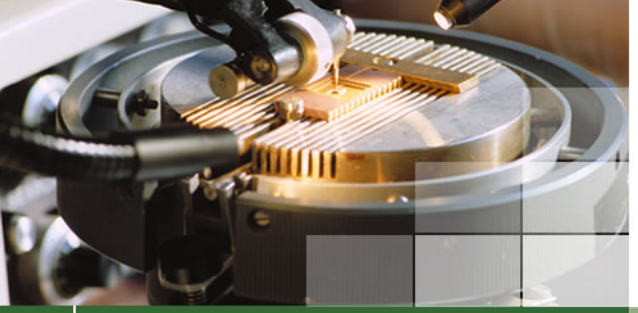

POLITECNICO DI MILANO

Dipartimento di
Elettronica e Informazione

Planning and Managing Software Projects 2014-15

Class 12

Risk Management

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Credits

- These slides are largely based on Prof. John Musser class notes on “Principles of Software Project Management”
  - Original slides are available at http://www.projectreference.com/
- Reuse and republish permission was granted

Risk Management

- Problems that haven't happened yet
- Why is it hard?
- Some are wary of bearing bad news
  - No one wants to be the messenger
  - Or seen as "a worrier"
- You need to define a strategy early in your project

Risk Management

- Identification, Analysis, Control
- Goal: avoid a crisis
- Risk Mgmt. vs. Project Mgt.
  - For a specific vs. all projects
  - Proactive vs. reactive

Definitions

- Project Risk
  - Characterized by:
    - Uncertainty (0 < probability < 1)
      - NOTE: If the probability is high, you may have planed the project in a wrong way.
    - An associated loss (money, life, reputation, etc)
    - Manageable – some action can control it
- Risk Exposure
  - Product of probability and potential loss
- Problem
  - A risk that has materialized

NASA risk classification

TABLE 3-1 FMEA/CIL Criticality Classification

Criticality Category	Potential Effect of Failure
1	Loss of life or vehicle
1R	Redundant hardware element, failure of which could cause loss of life or vehicle
2	Loss of mission
2R	Redundant hardware element, failure of which could cause loss of mission
3	All others
For Ground Support Equipment only:	
1S	Failure of a safety or hazard monitoring system to detect, combat, or operate when required and could allow loss of life or vehicle
2S	Loss of vehicle system

NASA Risk Management for Space Shuttle

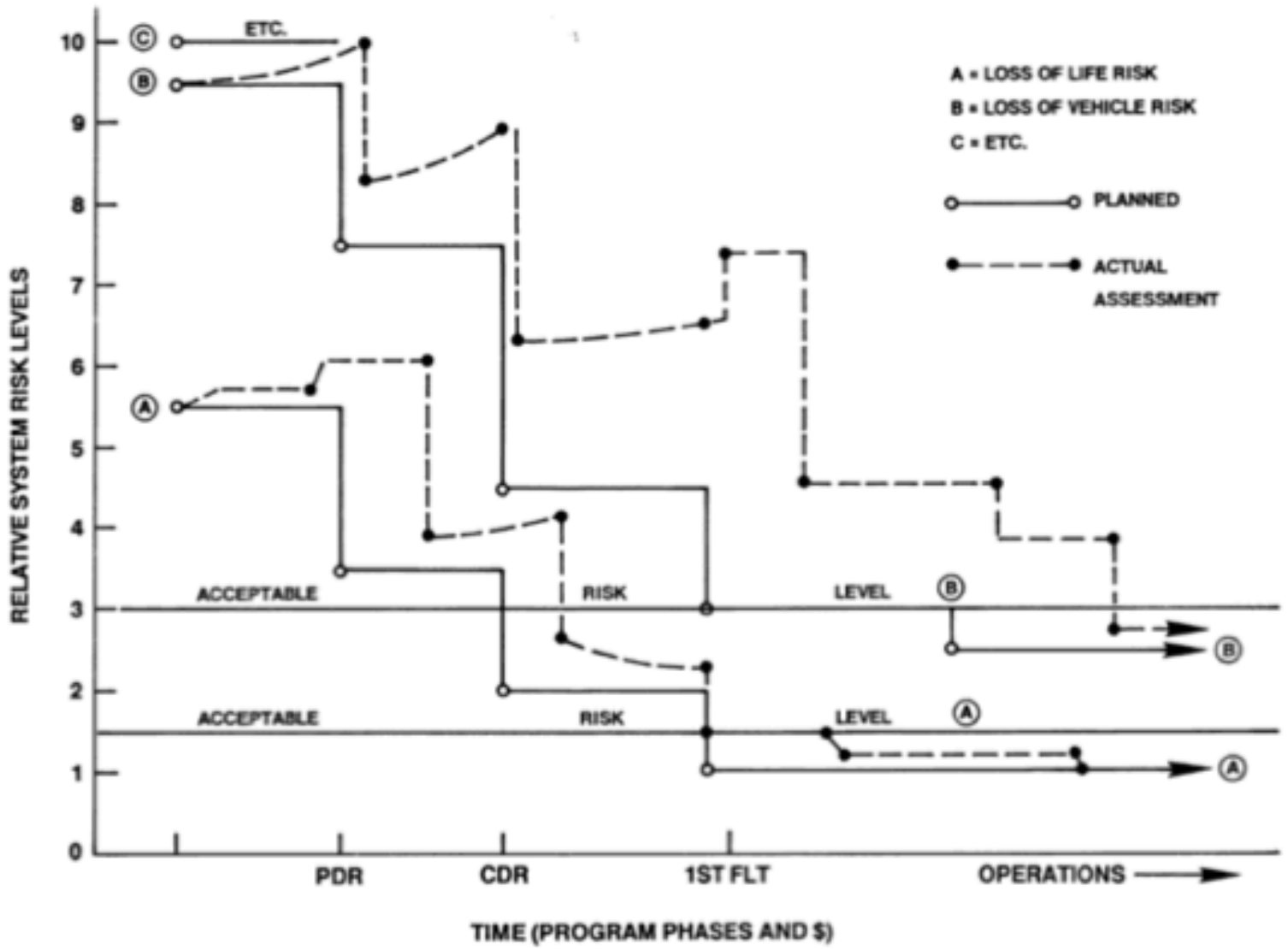


FIGURE 4-1 Conceptual diagram of risk management involving iterative steps taken to achieve specified levels of acceptable risk.

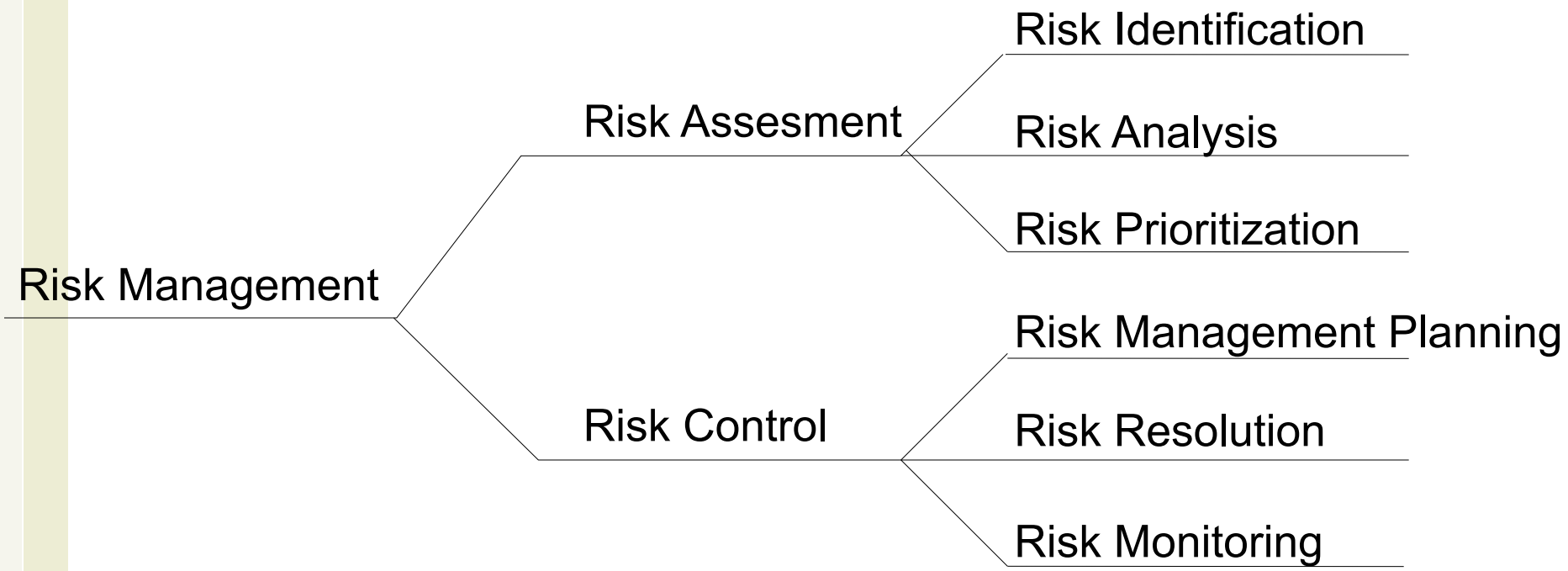
Types of Risks

- Schedule Risks
  - Schedule compression (customer, marketing, etc.)
- Cost Risks
  - Unreasonable budgets
- Requirements Risks
  - Incorrect
  - Incomplete
  - Unclear or inconsistent
  - Volatile
- Quality Risks
- Operational Risks
- Most of the “Classic Mistakes”
  - Classic mistakes are made more often

Types of Unknowns

- Known Unknowns
  - Information you know someone else has
- Unknown Unknowns
  - Information that does not yet exist

Processes

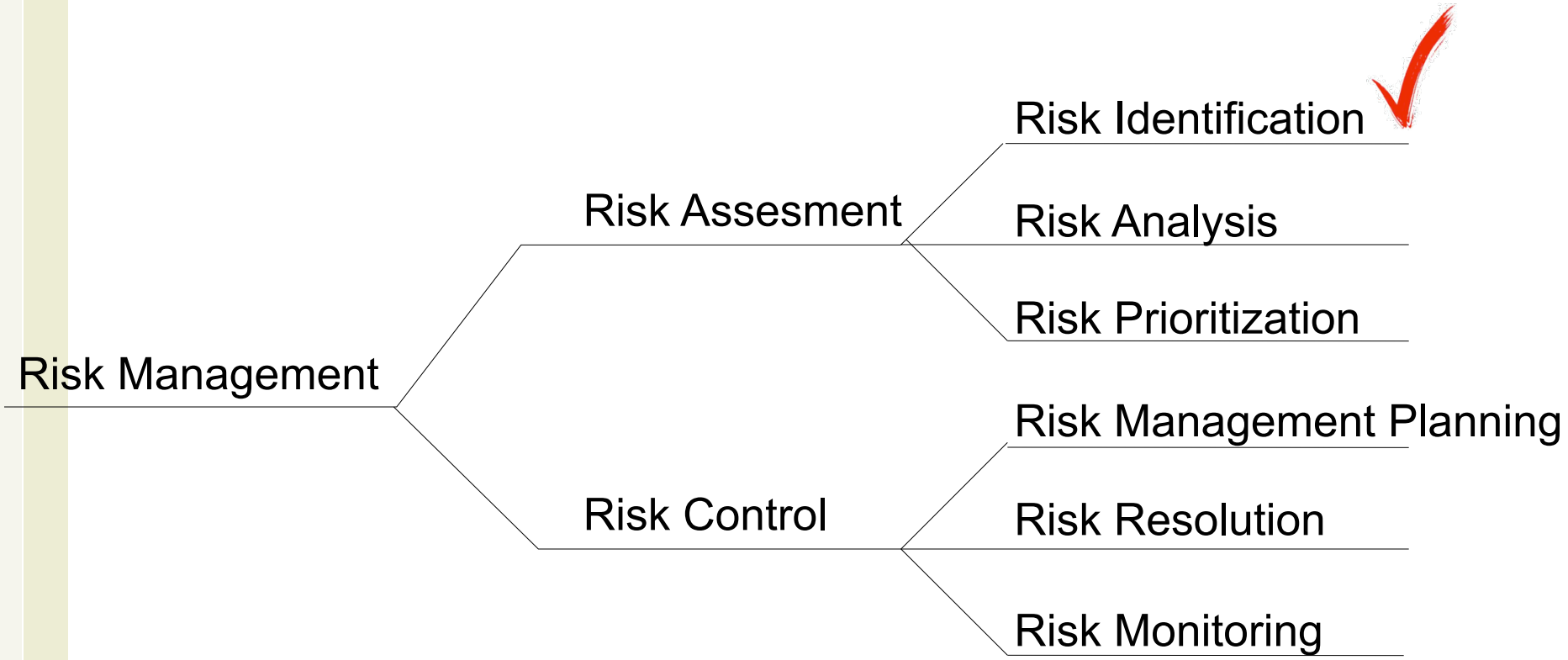


[Source: "Software Risk Management", Boehm, 1989]

Risk Identification

- Get your team involved in this process
  - Don't go it alone
- Produces a list of risks with potential to disrupt your project's schedule (but also budget, quality, …)
- Use a checklist or similar source to brainstorm possible risks
  - http://www.construx.com/Complete_List_of_Schedule_Risks/

Processes



[Source: "Software Risk Management", Boehm, 1989]

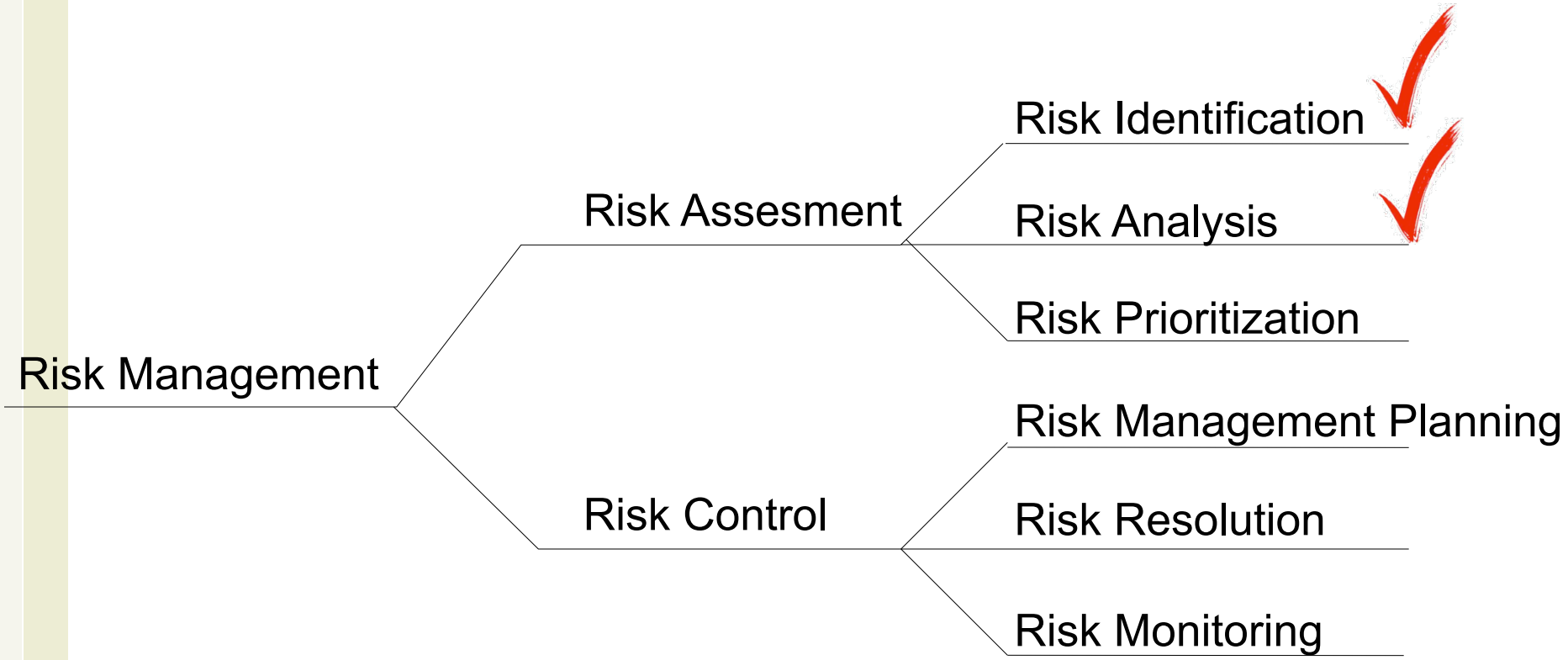
Risk Analysis 1/2

- Determine impact of each risk
- Risk Exposure (RE)
  - RE = Probability of loss * size of loss
- Examples
  - risk is “Facilities not ready on time”
    - Probability is 25%, size is 4 weeks, RE is 1 week
  - risk is “Inadequate design – redesign required”
    - Probability is 15%, size is 10 weeks, RE is 1.5 weeks
- Statistically are “expected values”
- Sum all RE’s to get expected overrun
    - Which is pre risk management

Risk Analysis 2/2

- Estimating size of loss
  - Loss is easier to see than probability
    - You can break this down into “chunks” (like WBS)
- Estimating probability of loss
  - Use team member estimates and have a risk-estimate review
  - Use Delphi or group-consensus techniques
  - Use gambling analogy” “how much would you bet”
  - Use “adjective calibration”:
    - highly likely
    - probably
    - improbable
    - unlikely
    - highly unlikely

Processes

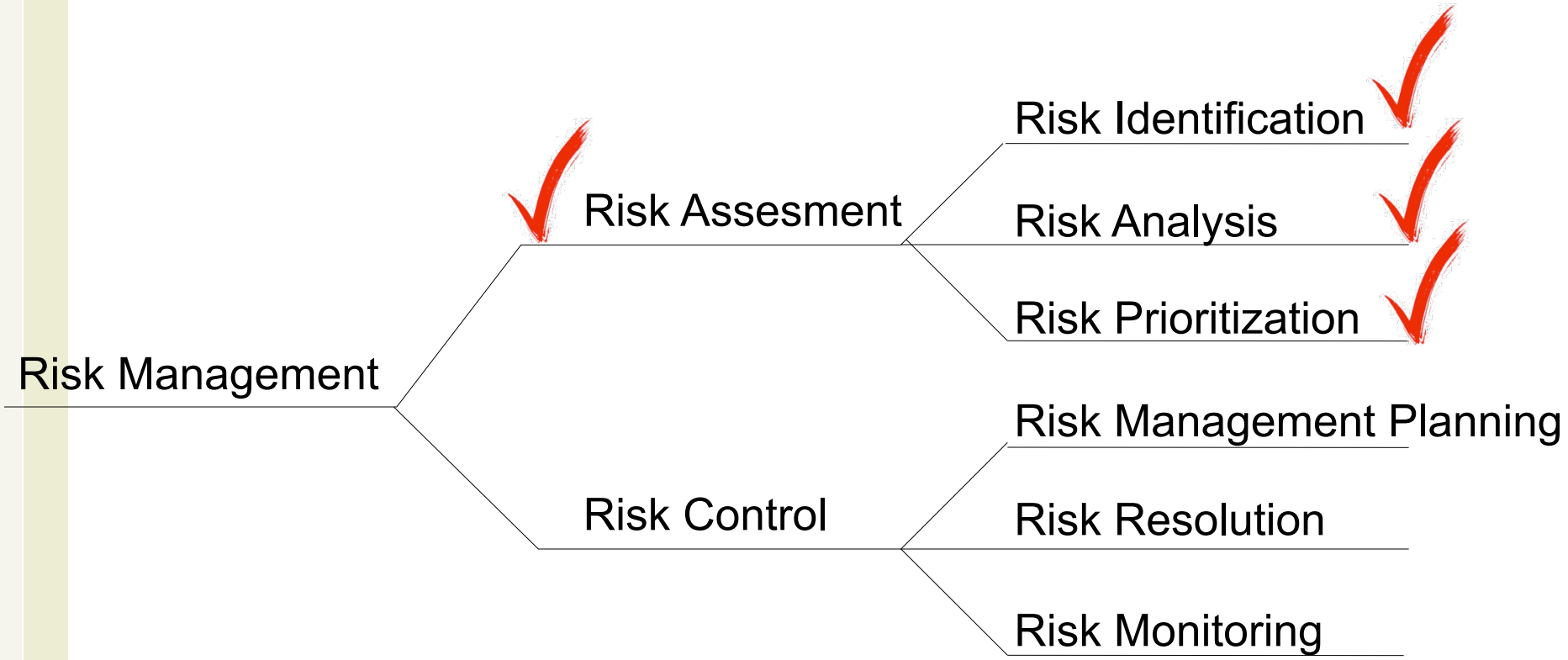


[Source: "Software Risk Management", Boehm, 1989]

Risk Prioritization

- Remember the 80-20 rule
- Often want larger-loss risks higher
  - Or higher probability items
- Possibly group ‘related risks’
- Helps identify which risks to ignore
  - Those at the bottom

Processes

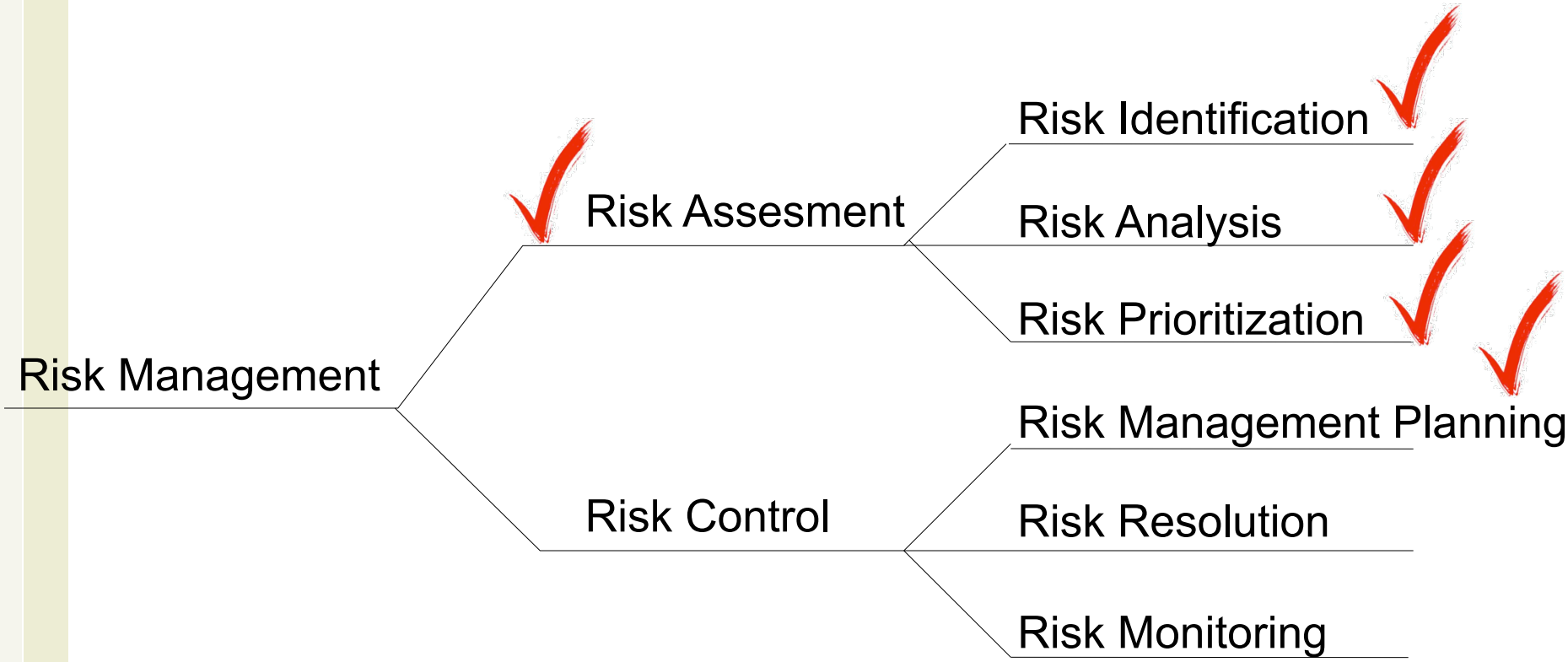


[Source: "Software Risk Management", Boehm, 1989]

Risk Management Planning

- McConnell's example
  - http://www.construx.com/Thought_Leadership/Books/Survival_Guide/Resources_By_Chapter/Sample_Risk_Management_Plan/

Processes



[Source: "Software Risk Management", Boehm, 1989]

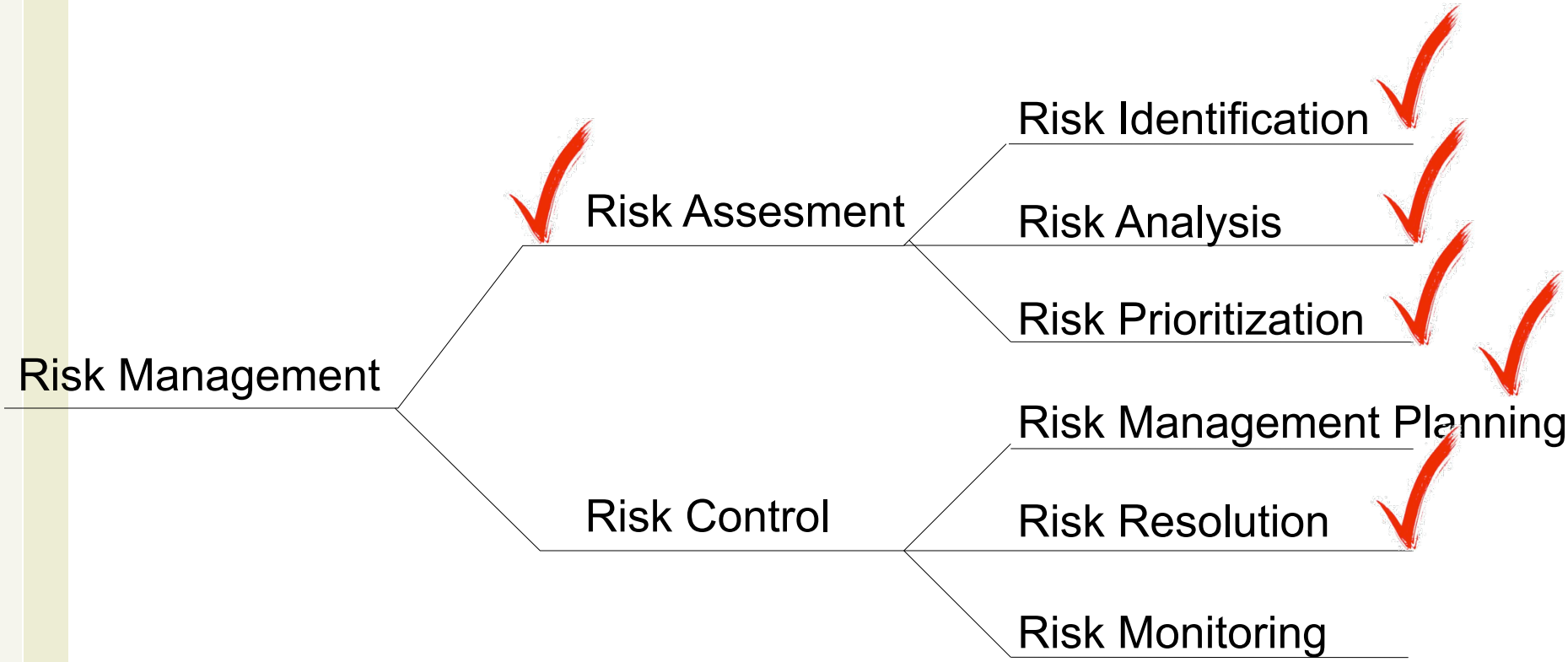
Risk Resolution 1/2

- Risk Avoidance
  - Don't do it
  - Scrub from system
- Risk Assumption
  - Don't do anything about it
  - Accept that it might occur
  - But still watch for it
- Problem control
  - Develop contingency plans
  - E.g., allocate extra test resources
- Risk Transfer
  - To another part of the project (or team)
  - Move off the critical path at least

Risk Resolution 2/2

- Knowledge Acquisition
  - Investigate
    - Ex: do a prototype
  - Buy information or expertise about it
  - Do research

Processes

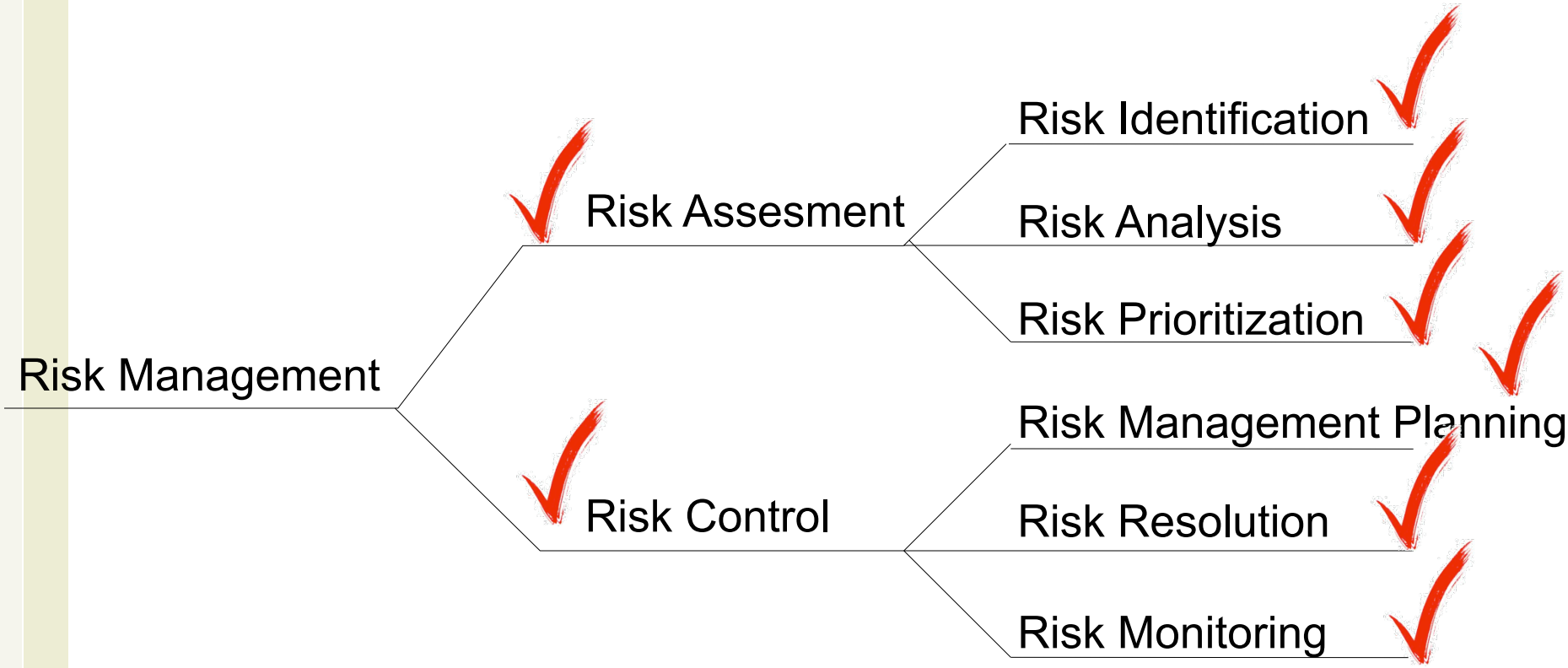


[Source: "Software Risk Management", Boehm, 1989]

Risk Monitoring

- Top 10 Risk List
  - Rank
  - Previous Rank
  - Weeks on List
  - Risk Name
  - Risk Resolution Status
- A low-overhead best practice
- Interim project post-mortems
  - After various major milestones
- McConnell's example
  - http://www.construx.com/Thought_Leadership/Books/Survival_Guide/Resources_By_Chapter/Sample_Top_10_Risks_List/

Processes



[Source: "Software Risk Management", Boehm, 1989]

Risk Communication

- Don't be afraid to convey the risks
- Use your judgment to balance
  - Sky-is-falling whiner vs. information distribution

Miniature Milestones 1/3

- A risk-reduction technique
- Use of small goals within project schedule
  - One of McConnell's Best Practices (Ch. 27)
- Fine-grained approach to plan & track
- Reduces risk of undetected project slippage
- Pros
  - Enhances status visibility
  - Good for project recovery
- Cons
  - Increase project tracking effort

Miniature Milestones 2/3

- Can be used throughout the development cycle
- Works with hard-to-manage project activities or methods
  - Such as with evolutionary prototyping
- Reduces unpleasant surprises
- Success factors
  - Overcoming resistance from those managed
  - Staying true to ‘miniature’ nature
- Can improve motivation through achievements

Miniature Milestones 3/3

- Requires a detailed schedule
- Have early milestones
- McConnell says 1-2 days
  - Longer is still good (1-2 weeks)
- Encourages iterative development
- Use binary milestones
  - Done or not done (100%)

Questions?