Risk Management

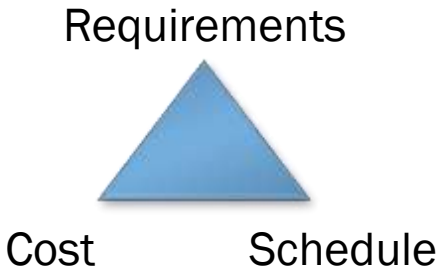
SWEN 256 – Software Process & Project Management

What is Risk?

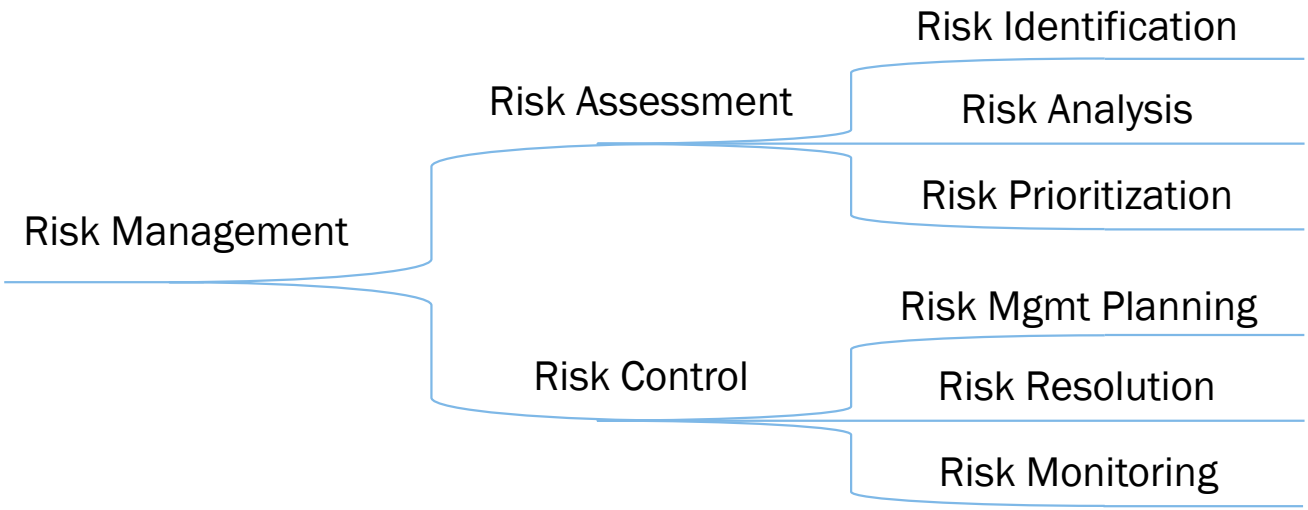
- Problems that haven't happened yet
- Characterized by:
  - Uncertainty (0 < probability < 1)
  - An associated loss (money, life, reputation, etc)
  - Manageable – some action can control it
- Needs to be actively identified and managed
  - Some choose to ignore – seen as negativity or too much worry
- Is a key element in project decision making – especially important for the *tough* decisions
- Proactive vs. Reactive
- Active **Risk Management** is a sign of a well-run project and a mature organization

Risk Classification

- Requirements Risks
  - Incorrect
  - Incomplete
  - Unclear or inconsistent
  - Volatile
- Cost Risks
  - Unreasonable budgets
- Schedule Risks
  - Schedule compression (customer, marketing, etc.)
- Quality Risks
- Life Cycle / Operational Risks
- Most of the “Classic Mistakes”



Risk Management Process



- Understanding the hierarchy of Risk Management = Understanding risks and how to deal with them

Risk Identification

- Get the team involved in this process
  - Don't go it alone
- Many approaches: ISO identified techniques (30)

Some highlights:

- Brainstorming
- Checklist
- Interviews
- SWIFT (Structured 'What-If'; Scenario Analysis
- Fault-Trees
- Incident Analysis
- Surveys

Risk Categories

- Types

Business Risk	Pure (Insurable) Risk

Known Unknowns	Unknown Unknowns

- Classification

External	Internal	Technical	Unforeseeable

- Source

Schedule	Cost	Quality	Scope	Resources	Customer

- Internal / Unique Classifications and Sources

Risk Analysis

- Numerical analysis of risk allows:
  - Make response decisions
  - Determine overall project risk
  - Add probability to predictions
  - Prioritize risks
  - Factor risk into cost, schedule, or scope targets
- Calculating Risk Exposure (RE)

$RE = P * I$	P = Probability
	I = Impact

Risk Analysis (Continued)

- Risk Exposure Examples (Time based)
  - "Facilities not ready on time"
    - Probability is 25%, size is 4 weeks, RE is 1 week
  - "Inadequate design – redesign required"
    - Probability is 15%, size is 10 weeks, RE is 1.5 weeks
- How to Estimate (Example)
  - Impact: The size of the loss – break into chunks
  - Probability:
    - 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
- Sum all RE's to get expected overrun

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
- Use **Risk Register** ***(document & manage it!)***

Risk Number	1
Risk Category	External (Inevitable)
Risk Name	Zombie Apocalypse
Probability (Scale)	1%
Impact (Scale, Areas)	Delay project by 2 Weeks
Score/ Risk Impact (P*I)	.02 Weeks
Indicators	Moaning, Missing Brains
Mitigation	Melee Weapons
Contingency	Start Robot War
Affected Stakeholders	Humanity
Resource/Response Time	Those not yet bitten / Young attractive people

Prioritization and Tracking

	Description	Likelihood	Impact	Score
1	Computer exploded	1	5	5
2	Everybody jumps ship	0.5	10	5
3	Lead Dev quits	5	8	40
4	Software License delay	4	10	40

Avoid ‘Hand-wringing’ on unlikely occurrences

	Description	Action	Owner	Due Date	Status
3	Lead Dev quits	Mgr. discussion	Mgr	9/21	Open
4	Software License delay	Expedite via procurement	Timmy	10/1	Open

Risk Management Planning

- Risk analysis and planning should continue throughout the project
- Look for ‘first indicators’!
- Risks can be eliminated, but impact analysis should be completed first
- Develop risk response strategies
- McConnell’s Example – Section 5-5 of the Rapid Development Book

Risk Resolution

Risk	Avoid	Mitigate	Transfer	Accept
Opportunity	Exploit	Enhance	Share	

- Risk Avoidance (not 'ignoring')
  - Don't do the project at all
  - Scrub from system
  - Off-load to another party
    - McConnell: design issue: have client design
- Problem control
  - Develop contingency plans
  - Allocate extra test resources
- Knowledge Acquisition
  - Investigate/ research
    - Ex: do a prototype
  - Buy information or expertise about it
- Risk Transfer
  - To another part of the project (or team)
  - Move off the critical path

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
- Communicate w/ Stakeholders!

Risk Register
Risk Number
Risk Category
Risk Name
Probability (Scale)
Impact (Scale, Areas)
Score/ Risk Impact (P*I)
Indicators
Mitigation
Contingency
Affected Stakeholders
Resource/Response Time

Monitor and Control Risks

- Concepts
  - Workarounds – unplanned corrective action for unanticipated problems
  - Risk Reassessments – periodic risk review and adjustments
  - Risk Audits – proves risk preparedness and provides lessons learned
  - Reserve Analysis – accounting for risk reserves (financial and schedule), which are only for risk
  - Status Meetings – should primarily focus on risks
  - Closing Risks – the conditions surrounding a risk are in the past, and the risk should be closed
- Outputs: Risk Register Updates, Change Requests, PM Plan Updates, Project Document Updates, Lessons Learned

Miniature Milestones

- Use of small goals within project schedule (1-2 days)
- **Reduces risk** of undetected project slippage
- Requires a detailed schedule, including early milestones
- Use binary milestones (done or not done)
- Pros
  - Enhances status visibility
  - Good for project recovery
  - Can improve motivation through achievements
  - Encourages iterative development
- Cons
  - Increase project tracking effort

Risk Management Conclusion

- Avoid Common Errors
- Risk Management should be the focus of Status Meeting
- Risk Management is often not used in Project Management, but has high ROI
- Don’t confuse risk with something that has ‘already happened’
- Risks are both good and bad
- Funds/time set aside for risks are necessary
- Communicate

Questions/Discussion

	Description	Likelihood	Impact	Score
1				
2				
3				
4				

Scenario:

- We are building a new Medical Heart Rate monitoring application
  - Uses a small monitoring sensor from ACME Industries
  - Connects to phone via BT
  - Phone app connects to central server for trend and data management
  - Team is in place. 1 long term dev, 3 new ones.