CSE 6324

Advanced Topic in Software Engineering

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Risk

- Risk: potential problem that might happen!
- Risks:
  - Involves uncertainty
  - Include a loss

Attack Risk

“If you don’t actively attack the risks, they will actively attack you”

Tom Gilb

Consequences of Risk

- Missed time, cost & quality targets
- Upset customers
- Health & safety problems
- Effects on the reputation and so on future customers

Types of Risk

- Project risks
- Technical risks
- Business risks
- Known risks
- Unknown risks

Types of Risk

- Project risks
  - threaten the project plan
- Technical risks
  - threaten product quality and the timeliness of the schedule
- Business risks
  - threaten the viability of the software to be built (market risks, strategic risks, management risks, budget risks)

Types of Risk

- Known risks
  - predictable from careful evaluation of current project plan and those extrapolated from past project experience(lack of scope,..)

- Unknown risks
  - some problems will simply occur without warning

Risk Management

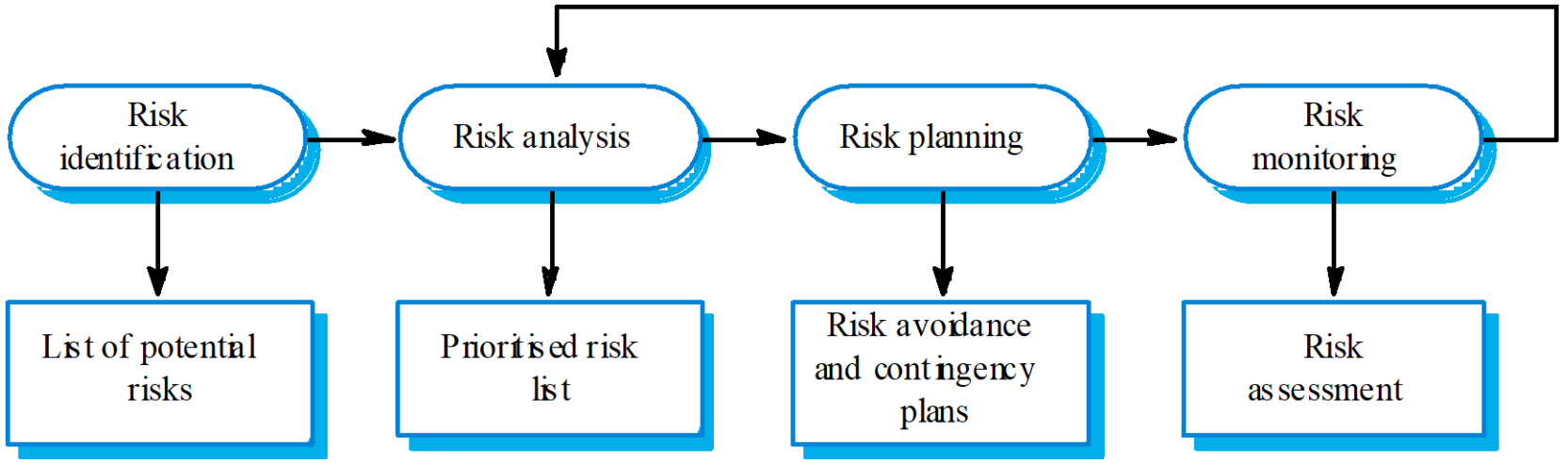
Risk Management

- Risk management is a series of steps which aim to identify, address, and eliminate risk items before they become threats.

- 80/20 rule: 80% of overall risk from 20% of identified factors.

Risk Management Process

- Risk identification
- Risk analysis
- Risk planning
- Risk mitigation, monitoring, management



Elements of Risk Management: Risk Identification

- Continuous and iterative process
- The sooner the better
- Be specific
- Don’t try to do everything at once.

Elements of Risk Management: Risk Identification

- Discovering possible risks through:
  - Brainstorming
  - Experience
  - Interviewing
  - Consulting a checklist of possible risks
    - Schedule
    - Cost
    - Quality
    - Requirement
    - Operation

Elements of Risk Management: Risk Identification

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    - Cost
    - Quality
    - Requirement
    - Operation

- Uncertain requirement
- Poor estimation

Elements of Risk Management: Risk Identification

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    - Cost
    - Quality
    - Requirement
    - Operation

- Unreasonable budget

Elements of Risk Management: Risk Identification

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    - Operation

- Nonusable
- Nonmaintainable
- Non portable

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- Uncertain requirement

Elements of Risk Management: Risk Identification

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    - Cost
    - Quality
    - Requirement
    - Operation

- Sensitive installation
- Help function doesnot match with manual process

Elements of Risk Management: Risk Analysis

- Assess probability, seriousness, and urgency of each risk.
    - Probability may be very low, low, moderate, high or very high.
    - Risk effects might be catastrophic, serious, tolerable or insignificant.
    - Urgency might be immediate, short term, or long term.

Elements of Risk Management :Risk Table Construction

- List all risks in the first column of the table
- Classify each risk and enter the category label in column two
- Determine a probability for each risk and enter it into column three
- Enter the severity of each risk (negligible, marginal, critical, catastrophic) in column four.
- Sort the table by probability and impact value
- Determine the criteria for deciding where the sorted table will be divided into the first priority concerns and the second priority concerns
- First priority concerns must be managed (a fifth column can be added to contain a pointer into the RMMM document)

Elements of Risk Management: Risk Analysis

Risk Summary	Risk Category	Probability	Impact (1-4)
Organizational financial problems force reductions in the project budget.	Business	Low	Catastrophic
Loss of equipment at critical times in the project.	Technical	High	Serious

Elements of Risk Management: Risk Analysis

- The overall risk exposure formula is RE = P x C
  - P = the probability of occurrence for a risk
  - C = the cost to the project should the risk actually occur

- Example
  - P = 80% probability that 18 of 60 software components will have to be developed
  - C = Total cost of developing 18 components is $25,000
  - RE = .80 x $25,000 = $20,000

Elements of Risk Management: Risk Analysis

Risk	Probability	Impact	Expected Value
1	25%	$45,000	$11,250
2	50%	$2,000	$1,000
3	30%	$100,000	$30,000

Elements of Risk Management: Risk Planning

- Risk avoidance
- Risk acceptance
- Risk control
- Risk transfer
- Knowledge Refinement

Elements of Risk Management: Risk Planning

Risks	Avoidance	Acceptance	Control	Transfer	Knowledge Refinement
Vehicle and/or occupant injury in an auto accident while driving to work					

Elements of Risk Management: Risk Planning

Risks	Avoidance	Acceptance	Control	Transfer	Knowledge Refinement
Vehicle and/or occupant injury in an auto accident while driving to work	◆Live close to work and walk ◆Ride rapid-transit systems	Drive to work and hope for the best	◆Reduce speed limits ◆Wear seatbelts ◆Strengthen side panels ◆Go with a safe driver	◆Carry auto insurance ◆Operate good emergency medical systems ◆Sue other driver	◆Determine safest automobiles through crash tests ◆Determine safest route to work

Elements of Risk Management :RMMM

- **Risk Mitigation**
  - The primary strategy and is achieved through plan

Elements of Risk Management: Risk Mitigation Example

Risk: loss of key team members

- Determine causes of job turnover.
- Eliminate causes before project starts.
- After project starts, assume turnover is going to occur and work to ensure continuity.
- Make sure teams are organized and distribute information widely.
- Define documentation standards and be sure documents are produced in a timely manner.
- Conduct peer review of all work.
- Define backup staff.

Elements of Risk Management :RMMM

- Risk Mitigation
  - proactive planning for risk avoidance
- Risk Monitoring
  - **assessing** whether predicted risks occur or not
  - **ensure** that risk aversion steps defined for the risk are being properly applied
  - collect **information** for future risk analysis
  - **Considering key risks during management reviews**

Elements of Risk Management : RMMM

- Risk Mitigation
  - proactive planning for risk avoidance
- Risk Monitoring
  - assessing whether predicted risks occur or not
  - ensuring risk aversion steps are being properly applied
  - collect information for future risk analysis
  - determining which risks caused which problems

- Risk Management and contingency plan
  - actions to be taken in the event that mitigation steps have failed and the risk has become a live problem

Questions: