Software Engineering
2UCCE501

Module 4

Module 4

System Implementation, Configuration Management & Risk Management

4.1 Packages & Interfaces: Distinguishing between classes versus interfaces. Exposing class & package interfaces.

4.2 Mapping Model to code, Mapping object models to Database schema.

4.3 Component & Deployment Diagrams: Describing dependencies.

4.4 Managing & Controlling Changes: Managing & Controlling versions.

4.5 Categories of Risks. Nature of risks, Types of risks, Risk identification, Risk assessment, Risk Planning and control, Risk Management, Evaluating risk to schedule, PERT technique.

Risk Management

Risk Definition:

‘the chance of exposure to the adverse consequences of future events’

‘an uncertain event or condition that, if it occurs, has a positive or negative effect on a project’s objectives’

- Risks relate to possible future problems, not current ones
- They involve a possible cause and its effect(s)
  - e.g.
    - developer leaves -> task delayed
    - Misinterpretation of scope -> failure of acceptance test

Sources of Risks

Natures of risks

- People
  - Type of resources mismatch,(people with different skill set allocated)
  - Less Number of people
- Technology
  - New technology used for implementation
- Structure
  - Organization structure : Projectized / Strong Matrix / Weak matrix/ Open
- Task
  - Activities are carried out for the first time

Risk Management

Approaches to resolve risks:

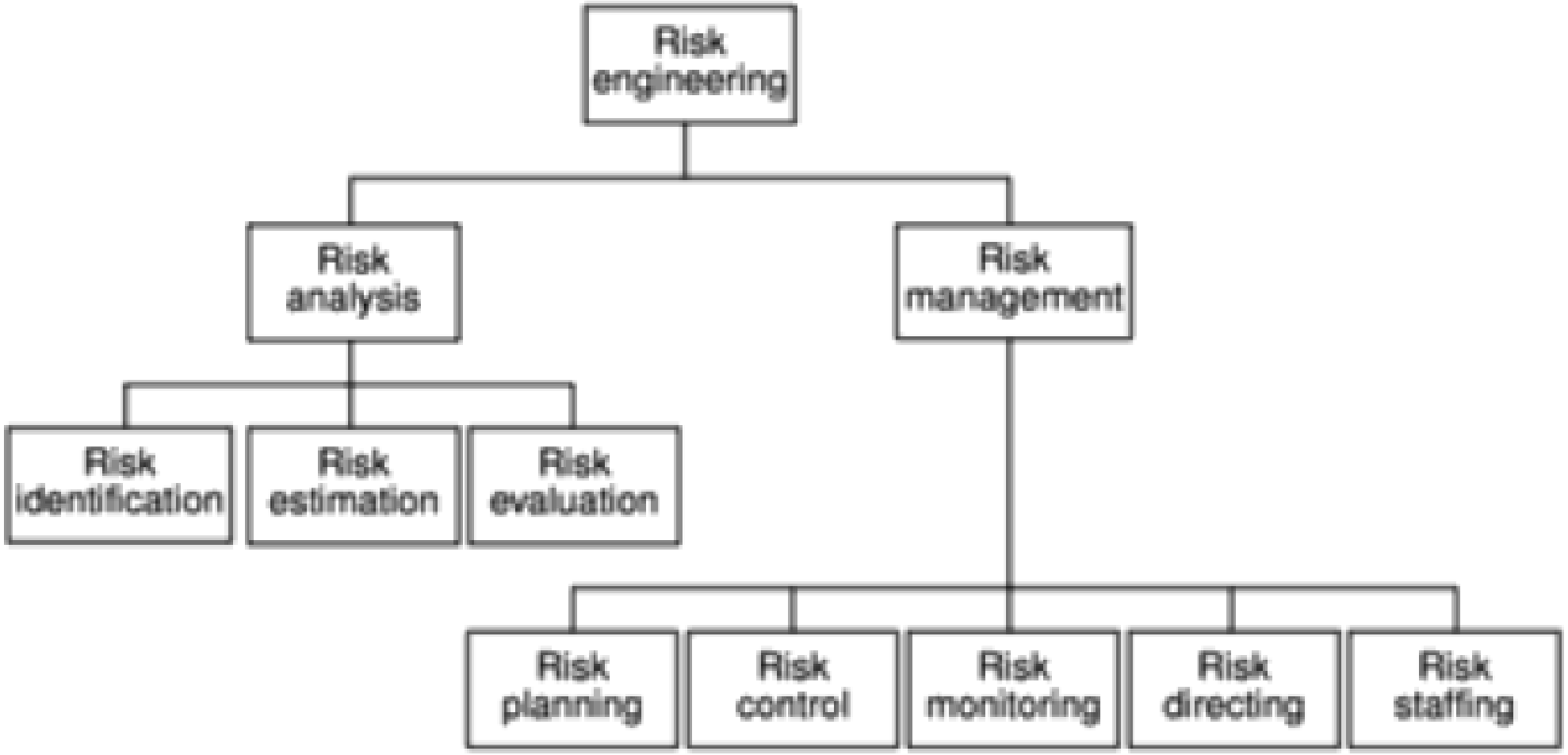
Reactive:

- Project team responds when risk occurs
- Fix on failure approach
- Crises management, if failure is NOT responded in time project may enter into jeopardy

Proactive:

- Formal Risk analysis is performed
- TQM & Statistical SQA
- Developing skills to manage changes

Boehm's risk engineering task breakdown



Boehm's top 10 development risks & reduction strategies

Risk	*Risk reduction techniques*
Personnel shortfalls	Staffing with top talent; job matching; teambuilding; training and career development; early scheduling of key personnel
Unrealistic time and cost estimates	Multiple estimation techniques; design to cost; incremental development; recording and analysis of past projects; standardization of methods
Developing the wrong software functions	Improved software evaluation; formal specification methods; user surveys; prototyping; early user manuals
Developing the wrong user interface	Prototyping; task analysis; user involvement

Boehm's top 10 development risks & reduction strategies

Risk	Risk reduction techniques
Gold plating	Requirements scrubbing, prototyping, design to cost
Late changes to requirements	Change control, incremental development
Shortfalls in externally supplied components	Benchmarking, inspections, formal specifications, contractual agreements, quality controls
Shortfalls in externally performed tasks	Quality assurance procedures, competitive design etc

Risk Planning & Control

The planning for risk includes these steps:

- Risk identification – what risks might there be?
- Risk Assessment – which are the most serious risks?
- Risk planning – what are we going to do about them?
- Risk monitoring – what is the current state of the risk?

Risk assessment

Risk exposure (RE)

= (potential damage) x (probability of occurrence)

Ideally

Potential damage: (PD) a money value

Probability (P) 0.00 (absolutely no chance) to 1.00 (absolutely certain)

RE = PD x P

Risk Analysis & Prioritization

- Reduce the risk exposure by reducing the likelihood or impact
- Drawing up contingency plans to deal with the risk should it occur
- Confidence of the risk assessment
- Compound risk
- The number of risks
- Cost of action
- Risk Reduction Leverage (RRL)= (RE_{before}- RE_{afte}r)/ risk reduction cost
- If RRL > 1. gain from implementing the risk reduction plan

Dealing with Risks

- **Generic Risks:**
- **Application factor:** nature of the application
- **Staffing Factor:**
  - staff satisfaction
  - Staff turn-over rate
- **Project factor:**
  - Project objectives are clear & know to ALL stakeholders
  - Agreed and formal quality plan must be prepared

Project Method:

Specified & structured methods will reduce risk

Hardware & Software factors:

New hardware/ software will increase risk

Risk planning

Risks can be dealt with by:

- Risk acceptance
- Risk avoidance
- Risk reduction
- Risk transfer
- Risk mitigation/contingency measures

Using PERT to evaluate the effects of uncertainty

Three estimates are produced for each activity

- *Most likely time (m)*
- *Optimistic time (a)*
- *Pessimistic (b)*
- ‘expected time’ t_e = (a + 4m +b) / 6
- ‘activity standard deviation’ S = (b-a)/6

A chain of activities

Task	a	m	b	t_e	s
A	10	12	16	?	?
B	8	10	14	?	?
C	20	24	38	?	?

$t_e = (a+4m+b)/6$ $s = (b-a)/6$

Probability chart