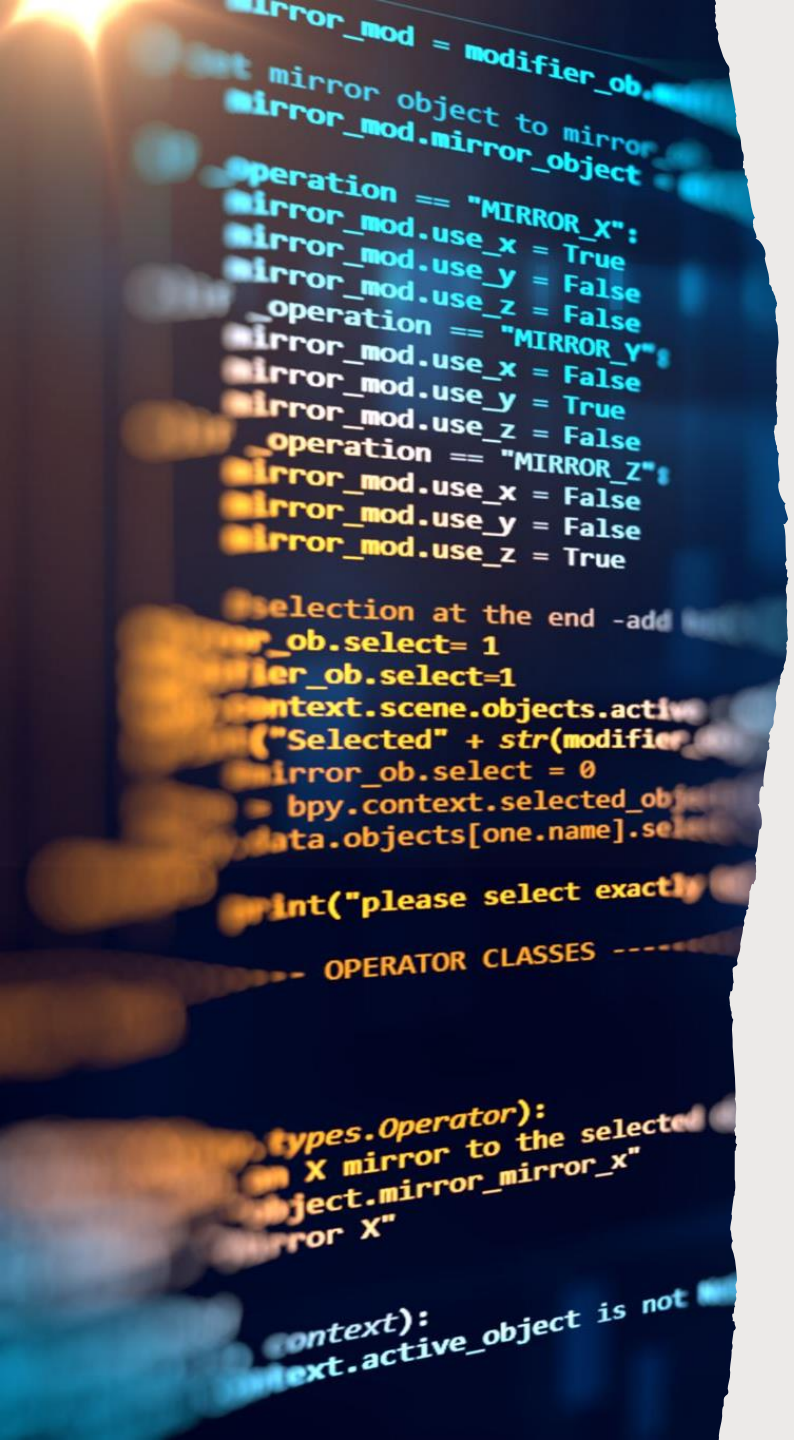
Understanding and Managing Risks in Software Projects

What is Risk

- Risks: Events or conditions that may occur during the lifecycle of a software project and can have a negative impact on its success.
- The significance of risk management:
  - Reduces uncertainty
  - Enhances decision-making
  - Boosts project results.



Types of Risks in Software Projects

- **Technical Risks**
  - Dependence on technology
  - Solution Complexity
  - Lack of Technical Expertise

Examples: Software bugs, Hardware failures etc.

Types of Risks in Software Projects(contd.)

- **Resource Risks**
  - Inadequate Team Skills
  - Resource Shortages
- Examples: Skill gaps, staff turnover, lack of necessary tools etc.

Types of Risks in Software Projects(contd.)

- **Cost Risks**
  - Inaccurate Cost Estimation
  - Exceeding the budget
- Examples: Unexpected expenses, partially done project etc.

Types of Risks in Software Projects(contd.)

- **Schedule Risks**
  - Poor Time Estimation
  - Resource Constraints
- Examples: Missed deadlines, delays in critical tasks etc.

Types of Risks in Software Projects(contd.)

- **Scope Risks**
  - Incomplete Requirements
  - Scope Creep (Continuous or uncontrolled growth in a projects scope)
- Examples: Suddenly changing project scope, unclear objectives etc.

Types of Risks in Software Projects(contd.)

- **Quality Risks**
  - Insufficient Testing
  - Poor Code Quality
- Examples: Frequent defects, compromised performance.

Components / Category		Performance	Support	Cost	Schedule
Catastrophic	1	Failure to meet the requirement would result in mission failure		Failure results in increased costs and schedule delays with expected values in excess of $500K	
	2	Significant degradation to nonachievement of technical performance	Nonresponsive or unsupportable software	Significant financial shortages, budget overrun likely	Unachievable IOC
Critical	1	Failure to meet the requirement would degrade system performance to a point where mission success is questionable		Failure results in operational delays and/or increased costs with expected value of $100K to $500K	
	2	Some reduction in technical performance	Minor delays in software modifications	Some shortage of financial resources, possible overruns	Possible slippage in IOC
Marginal	1	Failure to meet the requirement would result in degradation of secondary mission		Costs, impacts, and/or recoverable schedule slips with expected value of $1K to $100K	
	2	Minimal to small reduction in technical performance	Responsive software support	Sufficient financial resources	Realistic, achievable schedule
Negligible	1	Failure to meet the requirement would create inconvenience or nonoperational impact		Error results in minor cost and/or schedule impact with expected value of less than $1K	
	2	No reduction in technical performance	Easily supportable software	Possible budget underrun	Early achievable IOC

Note: (1) The potential consequence of undetected software errors or faults.
(2) The potential consequence if the desired outcome is not achieved.

Risk information sheet

Risk ID: P02-4-32	Date: 5/9/02	Prob: 80%	Impact: high

Description:
Only 70 percent of the software components scheduled for reuse will, in fact, be integrated into the application. The remaining functionality will have to be custom developed.

Refinement/context:
Subcondition 1: Certain reusable components were developed by a third party with no knowledge of internal design standards.
Subcondition 2: The design standard for component interfaces has not been solidified and may not conform to certain existing reusable components.
Subcondition 3: Certain reusable components have been implemented in a language that is not supported on the target environment.

Mitigation/monitoring:
1. Contact third party to determine conformance with design standards.
2. Press for interface standards completion; consider component structure when deciding on interface protocol.
3. Check to determine number of components in subcondition 3 category; check to determine if language support can be acquired.

Management/contingency plan/trigger:
RE computed to be $20,200. Allocate this amount within project contingency cost. Develop revised schedule assuming that 18 additional components will have to be custom built; allocate staff accordingly.
Trigger: Mitigation steps unproductive as of 7/1/02

Current status:
5/12/02: Mitigation steps initiated.

Originator: D. Gagne	Assigned: B. Laster

Impact of Risks

- Increased Costs
- Reduced Quality
- Delayed Project Timeline
- Damage to Reputation
- Loss of Business Opportunities

RMMM

RMMM refers to risk mitigation, monitoring, and management.

The goal of RMMM plan is to identify as many potential risks as possible.

It is the organization’s responsibility to perform RMMM in order to produce a quality product.

The quicker the risks can be identified and avoided, the smaller the chances of having to face that particular risk’s consequence.

The fewer consequences suffered, the better the product, and the smoother the development process.

Risk Mitigation

- Prevent the risk from the occurrence
  - Communicate with the staff and find risk
  - Eliminate the causes for risk before the project starts
  - Controlling the corresponding documents from time to time.
  - Conducting timely reviews to speed up the work.

Risk monitoring

- To determine whether or not the projected risks occur.
- To guarantee that risk aversion steps are followed correctly.
- To collect information for future risk assessments.
- To determine which risks generate which problems throughout the project.

Risk Management and planning :

- Let’s assume that the risk is real, and that the mitigation effort failed.
- When a risk becomes a reality and produces serious problems, the project manager takes on this duty.
- It is easier to manage risks if the project manager successfully employs project mitigation to remove risks.
- The risk register is the primary goal of the risk management plan.
  - This risk register describes and prioritizes the potential dangers to a software project.

Example (High Stuff turnover)

- Risk Mitigation
  - Meet with present employees to understand the causes of turnover
  - Before the project begins, mitigate the factors that are achievable.
  - As soon as the project begins, consider that there will be turnover and devise strategies to assure continuity when employees leave.
  - Project teams should be organized in such a way that knowledge about each development activity is widely spread.
  - Define documentation standards and methods to ensure that documents are produced on time.
  - Assign a backup technician to each important technologist.

Example (High Stuff turnover)

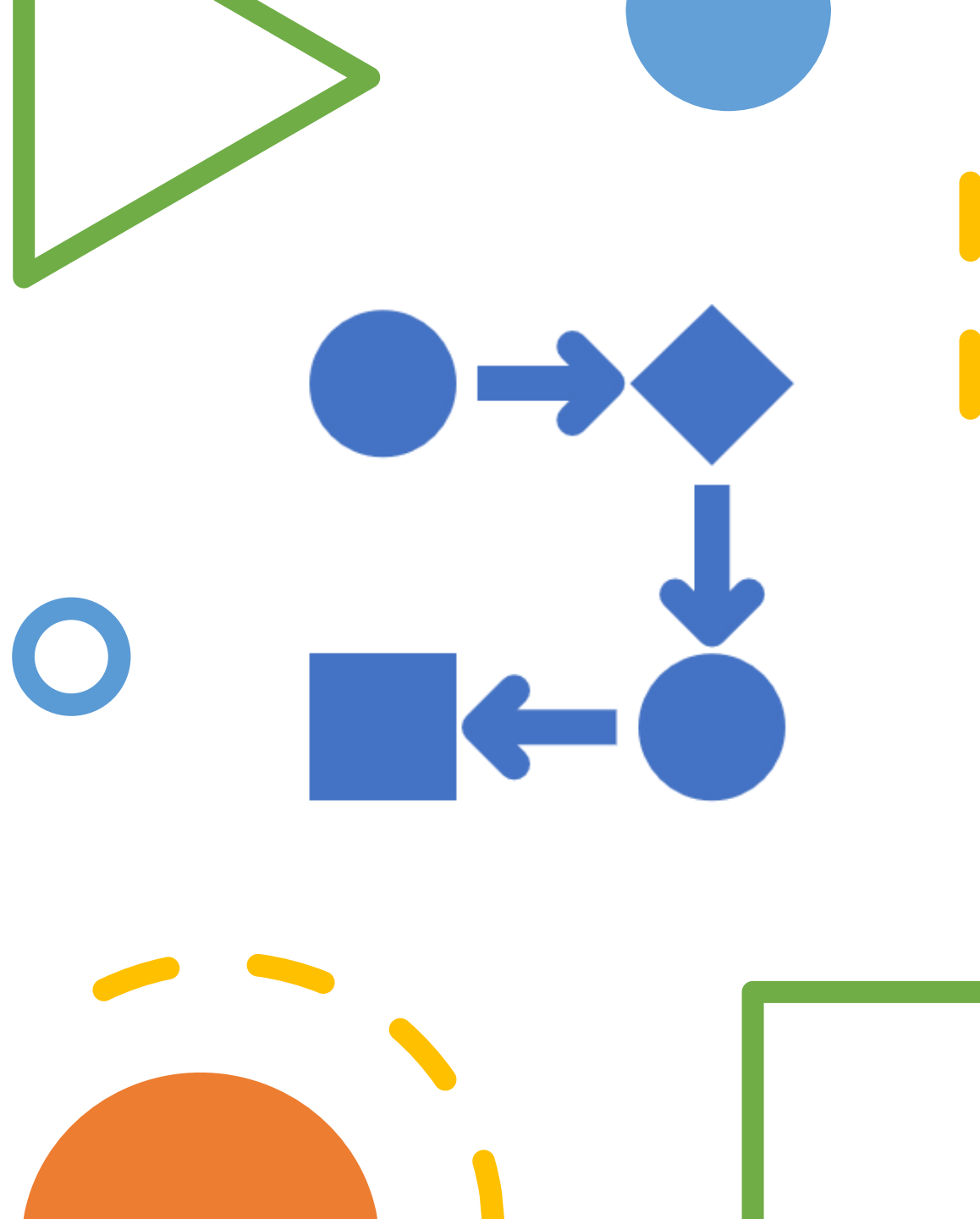
- Risk Monitoring
  - The general attitude of team members in response to project pressures.
  - Team members' interpersonal relationships.
  - Possible issues with salary and benefits.
  - The availability of jobs both within and outside of the firm.

Example (High Stuff turnover)

- Risk Management
  - The project is well advanced, and some personnel have announced their departure.
  - If the mitigation approach was followed, backups are available, information is documented, and knowledge is distributed throughout the team.
  - Furthermore, the project manager may temporarily refocus resources (and alter the project timetable) to fully staffed functions, allowing newcomers who must be recruited to the team to "get up to speed."

Drawbacks of RMMM

- It adds to the project's costs.
- It requires more time.
- Implementing an RMMM may turn out to be another time-consuming effort for larger projects.
- RMMM does not guarantee a risk-free project; in fact, potential risks may arise after the project has been completed.



Thank You