Managing a Successful Computing Project
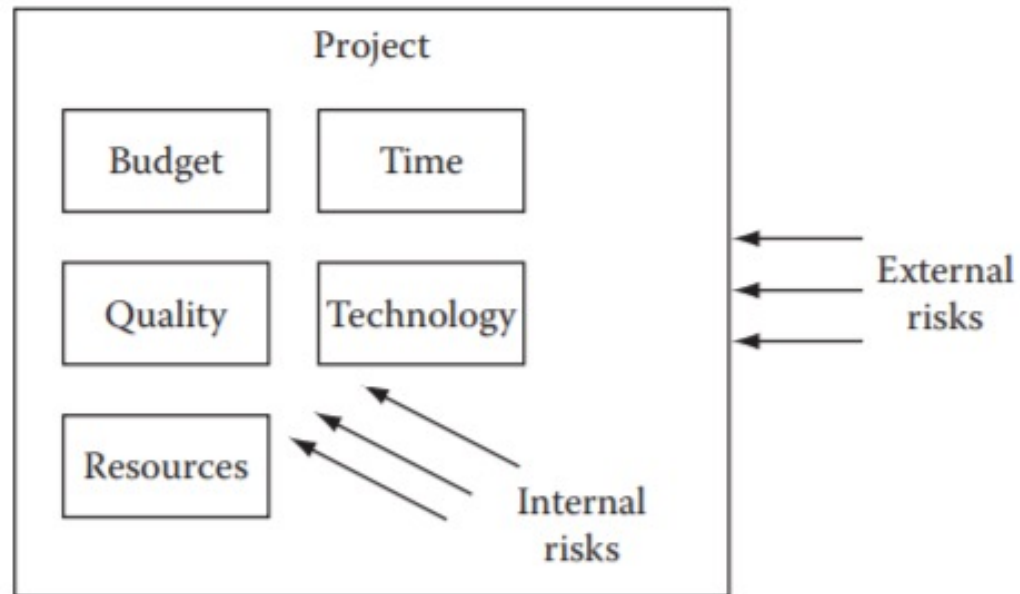
Risk Management

- Introduction to Risk Management.
- Causes of Risks
- Risk Categories
- Risk Analysis

Introduction to Risk Management

- Risks are unforeseen or unplanned happenings, which, when they occur, devastate or at least adversely affect our future plans.

- A project has these components: budget, time, resources, quality, and technology. If any risk occurs that might affect any of these components, then the project may fail.

- A project manager must develop a comprehensive risk mitigation plan so that if any risk arises during execution, he will be able to handle it comfortably. If he has not made a proper risk plan, then if anything wrong happens, he will not be able to handle it.

Risks can be categorized as external and internal. If a risk to the project arises due to an aspect being dealt with by the project team, then it is an internal risk. All other risks are external risks.


Internal and external risks for a project.

- Some of the external risks can be managed by a proactive approach. But many external risks cannot be managed.

- One good example is the obsolescence of a technology. When the project starts, a particular technology is chosen (a prebuilt vendor component, for instance) little realizing that the vendor will not support that component by the time the project finishes. Similarly, the customer may go out of business due to economic recession and the project may need to be scrapped.

- At the project level, risks impact any of these project deliverables: schedule, quality, or budget (risks affecting resources or technology ultimately impact budget, quality, or budget)
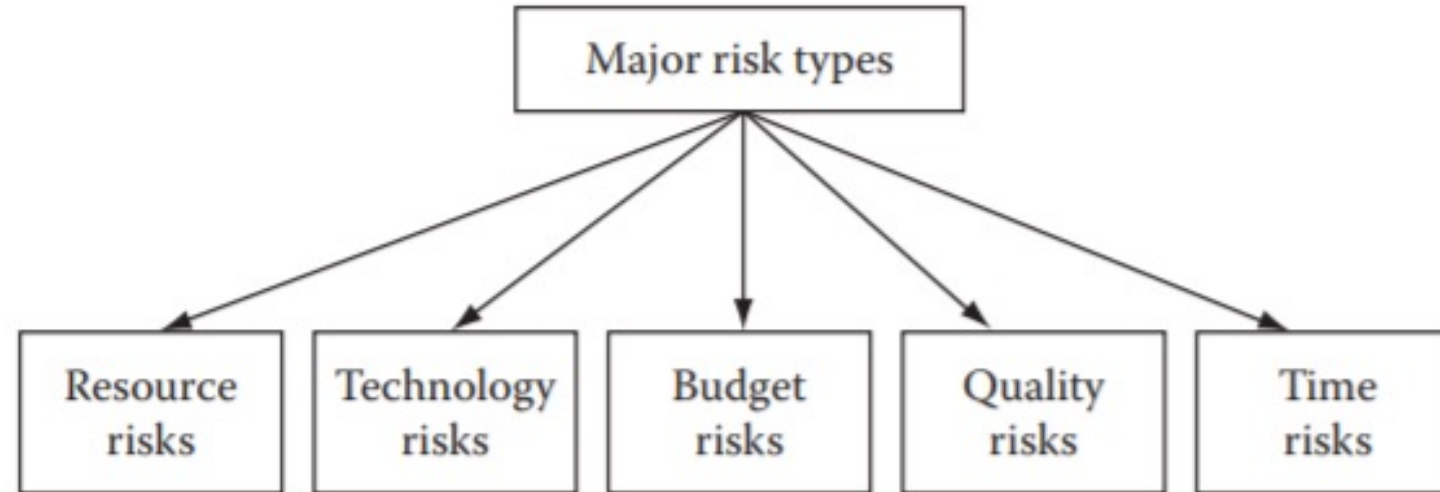
Major risk types.

- What are the probable causes of risks on a software project?

- What can be done to prevent or minimize the impact they can have on the project?

- How much impact do they have on the project?

- What is the probability that they may occur and might impact the project?

- For any good project manager, it is of utmost importance that he first of all makes a list of risks which his project faces. After that, he can find solutions for tackling them.
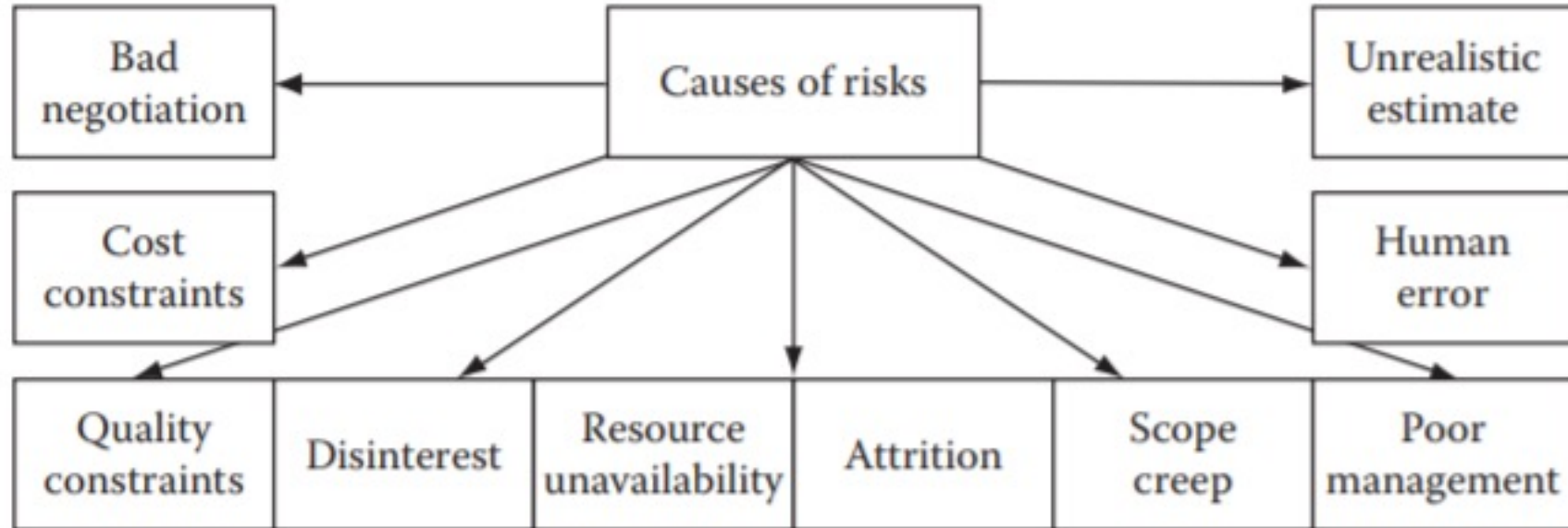
Major causes of risks.

- **Quality Constraints**:

  ➢ Quality is one of the major concerns for software products, as the high cost of supporting these products is well understood, and thus, avoidance of providing product support for bad quality products is a top policy among software vendors.

  ➢ So an elaborate set of quality constraints are imposed from the start of the project to the finish. In fact, nowadays, a separate software process group is formed that oversees the quality of projects.

  ➢ Meeting quality requirements is a big risk for all projects.

- **Resource Unavailability**:

  ➢ Resource unavailability is one of the major risk factors, as software professionals are in great demand the world over.

  ➢ Finding and procuring a good software professional is a complete project in itself. Retaining him within the organization is yet another challenge.

- **Disinterest**:

  ➢ Lack of interest is a concern that needs to be mitigated by project managers as it severely affects productivity.

  ➢ A good motivation program for individuals who lack interest in the project can be organized.

- **Attrition**:

  ➤ Due to the high demand for software professionals, most professionals have many job offers in hand at any given time.

  ➤ When they find a lucrative offer, they quit an organization to join another organization, thus leaving a project midway.

  ➤ Attrition has become such a big issue that managements at big corporations have specialized programs to tackle it.

- **Scope Creep**:

  - ➢ Scope creep is one risk that affects most software projects, and it always impacts the project severely.

  - ➢ Requirements keep changing and new requirements keep piling up even after the project has completed the testing phase and is into the implementation phase.

  - ➢ A good change management mechanism can tackle this menace effectively.

- **Cost Constraints:**

  - ➢ Once a project is approved for commencement, a budget is allocated and procured for the project. But due to unavoidable reasons, the budget can be constrained.

  - ➢ In such situations, the project cannot proceed as sources of funds have dried up and project expenses cannot be met.

  - ➢ There is no solution for this problem, but if this risk is known in advance (an unlikely occurrence), then the project could be cut short and scrapping of the project could be avoided.

- **Bad Negotiation:**

  - ➤ If the project manager has good negotiation skills, then he can procure an additional/modified budget, support, and resources, whenever the need arises.

  - ➤ But sometimes due to bad negotiation skills or for lack of foresight on the part of the customer, this kind of support is not provided and the project lands in troubled waters.

- **Unrealistic Estimate:**

  - ➢ An unrealistic estimate is yet another risk that is very common on most projects.

  - ➢ It is also a fact that effort estimates for software projects are difficult to make because of the uncertainties involved.

  - ➢ So, it is always possible that it is understated. It is always better to keep a buffer when an estimate is made, to take care of uncertainties.

- **Human Error:**

  - ➤ The human brain has a processing power that no computer can match, but it has a limitation. It cannot do repetitive work without making errors.

  - ➤ These human errors are caused by the distractions of the brain which results in errors in the work.

  - ➤ Due to human error, the requirements or design, or the construction may get injected with defects.

  - ➤ To overcome this, we must have review processes for the work done to remove any defects.

- **Poor Management:**

  - ➤ Poor management is yet another human risk factor.

  - ➤ If a project manager lacks experience in managing a project, then it is a big liability for the project and it will show up in project results.

  - ➤ Even if a project manager has experience, personal traits dictate whether he can handle the project well or not.

  - ➤ So the project manager for a project must be chosen carefully, taking into account his experience and personal traits.

- **Budget Risks:**

  - ➢ Risks that impact the project budget need the foremost consideration, and they need to be controlled throughout the project.

  - ➢ If for some reason the budget goes above the permissible limit, then the project manager must do something to control it.

  - ➢ To reduce the impact of budget risks, the budget allowance should include reserve funds.

  - ➢ So when such risks occur, allowances can be taken up from the reserves to avoid the project from failing.
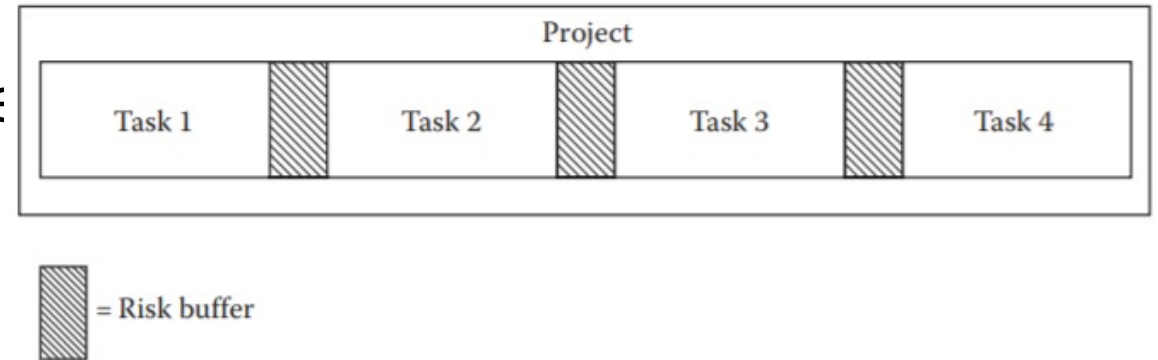
- **Time (Schedule) Risks:**

  ➢ If the project looks to be slipping away from the targeted date of deployment, then it will be a great business opportunity loss for the customer.

  ➢ For this reason, the project should never be allowed to cross the targeted release dates.

  ➢ Nevertheless, due to unforeseen circumstances, the project dates may get affected.

  ➢ Sometimes, unexpected rework to be done on software construction will lead to the slippage of the task schedule.
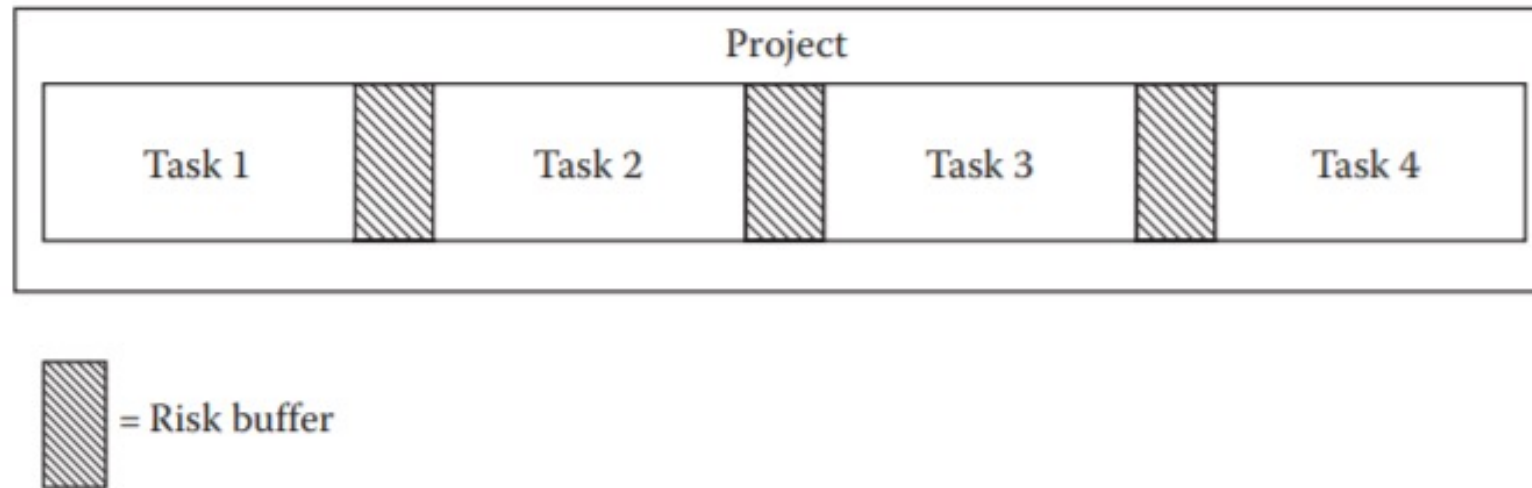
- **Time (Schedule) Risks:**

  - ➤ There may also be instances when due to a lack of proper communication, customer requirements are completely misunderstood, resulting in an inappropriate product being delivered to the customer, and thus, complete rework is required to prepare the software.

  - ➤ This will again lead to project schedule slippage.

  - ➤ To reduce the impact of schedule should be taken for each time-re

Schedule risk buffer provisions in a project.

- **Time (Schedule) Risks:**

Schedule risk buffer provisions in a project.

- **Resource Risks:**

  ➤ Project team members are the most costly resources in software projects.

  ➤ So, creating reserved resources for the project is a difficult proposition.

  ➤ On one hand, the project manager needs to keep project costs at the bare minimum, and on the other, he has to make a provision for reserved project resources as contingency for any risk of losing any project team member at any time during the execution of the project.

- **Resource Risks:**

  - ➢ It is a reality that software professionals are in great demand, and most projects run the real risk of team members leaving the project for more lucrative offers.

  - ➢ In such a situation, a project may suffer if any team member decides to leave the project midway.

  - ➢ This risk can be mitigated by keeping a reserve in the project schedule for any delay in resource replacement.

  - ➢ This reserve pool can consist of people sitting on the bench or list of people who are working on other projects and the dates on they will be available.

- **Resource Risks:**

  ➢ Project team members leaving in the middle of the project is one of the biggest risks any project may face.

  ➢ Such team members take the project task (the task he was working on) knowledge with them as well. This results in a big loss to the project.

  ➢ This risk can be mitigated to some extent by implementing a knowledge management system that will store all the knowledge acquired by team members during the project.

  ➢ It will also store all the work performed by the project team.

- **Resource Risks:**

  ➤ So, when a team member leaves the project, the knowledge acquired and the work done by him is in the knowledge management system. Thus, the project team will not lose all the work that has been done and the knowledge acquired by the person who is leaving.

Knowledge management system	→	Project team	←	Pool of talent (people on bench + dates when released from ongoing projects)

Resource risk strategy.

- **Quality Risks:**

  - ➤ The quality of the software product is always a concern and a big risk.

  - ➤ The quality of the product may be poor due to bad software design or bad software construction.

  - ➤ Even if it is good, there is still a chance of defects inadvertently creeping in due to complexity, large integration interfaces, or due to the large number of changes in the design when the requirements are altered.

  - ➤ To deal with quality risks, the best policy is to have a check for quality integrated in the project schedule itself (quality planning).
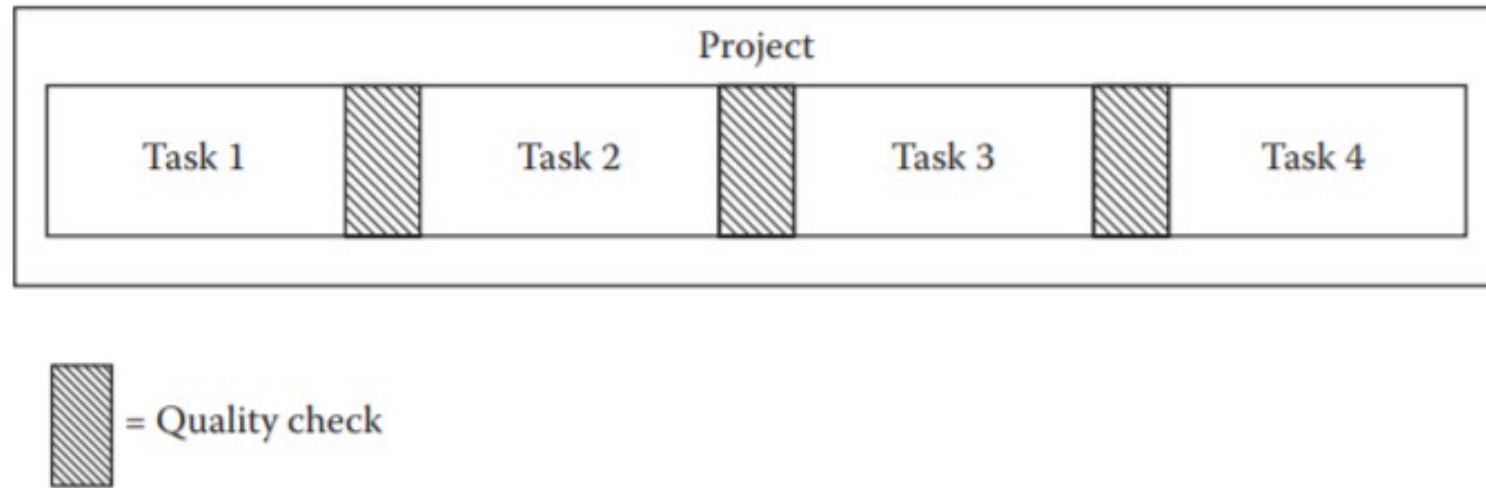
- **Quality Risks:**

  - ➢ This will ensure that the quality at the work product level is on par with the desired level, which in turn will ensure overall product quality.

  - ➢ Peer reviews, code reviews, and other formal quality review processes should be strictly followed for all work products.

  - ➢ In fact, ensuring quality of the software product being developed has become so critical. Quality planning must be integrated tightly in the entire project plan to reduce quality related risks.

- **Quality Risks:**

Quality checks at the end of a project task.

- **Technology Risks:**

  ➢ Technology obsolescence is a fact of life.

  ➢ Many projects face the prospect of having an outdated technology on which the software product is being built.

  ➢ In such cases, the software product becomes unusable even before it is implemented.

  ➢ Similarly, if any hardware component that may have been integrated with the software and the hardware becomes obsolete, the software product becomes unusable.

- **Technology Risks:**

  - ➢ An appropriate selection of programming language, hardware platform, and user access methods will make sure that the software product does not become obsolete during the expected lifespan usage of the product.

  - ➢ When selecting technology tools and techniques, contact the vendors to make sure that they will be providing support in future as well for the tools you are buying from them.

- Dealing with any kind of risk requires some risk analysis.

- The analysis should consider the kind of impact risk can have on the project as well as the chance of it happening. Based on the analysis, you then need to sort risks and put them in order.

- Risks with high probability and high impact will be put on top of this list, while risks with low impact and low probability will be put at the bottom.

- The project manager will then be better prepared to deal with all kinds of risks in a systematic manner .

- Different risks occur at different times in the project.
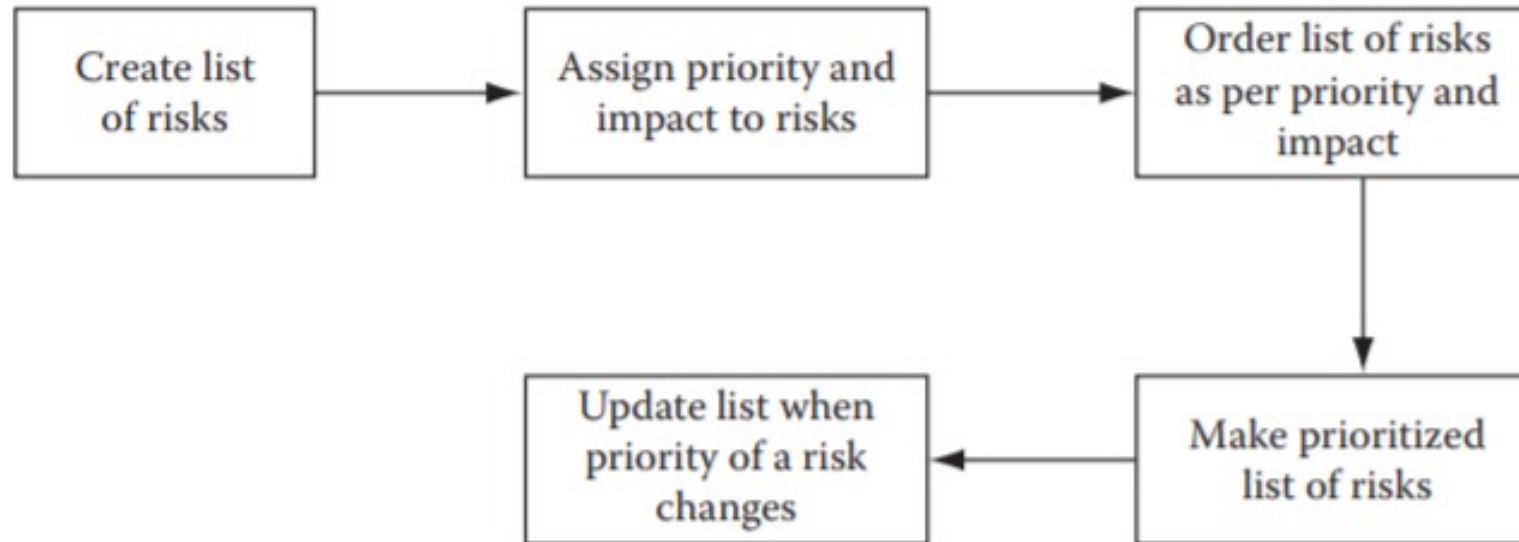
Risk Analysis

Matrix of Risks: Their Impact and Probability

Risk Category	Risk	Probability	Impact
Budget	Task budget overrun	High	High
Budget	Wrong budget estimate of a task	Medium	High
Resource	Not available	High	Medium
Resource	Skill training	Medium	Medium
Schedule	Wrong estimate of a task		
Project scope	Scope creep		
Quality	Bad quality of product		
Quality	Product reliability issues		
Technology	Technology obsolescence		

- In a nutshell, project risks are dynamic in nature. They can occur at any stage of the project.

- So the project risk matrix where the project manager has listed risks and their impact as well as their probability needs to be revised at regular intervals and the risks that are likely to happen at that moment in time need to be assessed and remedial action should be taken.

Risk analysis life cycle.

That's all for today!

Any questions?

Thank you!