THE SOFTWARE DEVELOPMENT PROCESS

Software Development – Risk Management

RISK MANAGEMENT

- A software development project contains elements of uncertainty, which constitute the project risks
- The success of a software development project depends quite heavily on the amount of risk that corresponds to each project activity
- To achieve a successful outcome, risks must be identified, assessed, prioritized, and managed
- If in the development you need to introduce new features, add more efficiency, or implement enhancement in existing software components, this will increase risks

RISK MANAGEMENT

- Risk is an expectation of loss, a potential problem that may or may not occur in the future
- It is generally caused due to lack of information, control or time
- Loss can be anything:
  - *increase in production cost*
  - *development of poor quality software*
  - *not being able to complete the project on time*
- Software risk exists because the future is uncertain and there are many known and unknown things that cannot be incorporated in the project plan

RISK MANAGEMENT

- A software risk can be of two types:
  1. *internal risks that are within the control of the project manager*
  2. *external risks that are beyond the control of project manager*
- Risk management is carried out to:
  1. *Identify risks and their triggers*
  2. *Classify and prioritize all risks*
  3. *Craft a plan that links each risk to a mitigation*
  4. *Monitor for risk triggers during the project*
  5. *Implement the mitigating action if any risk materializes*
  6. *Communicate risk status throughout project*

RISK MANAGEMENT

- For most software development projects, we can define five main risk impact areas:
  1. *New, unproven technologies*
  2. *User and functional requirements*
  3. *Application and system architecture*
  4. *Performance*
  5. *Organizational*

New, unproven technologies

The majority of software projects entail the use of new technologies

Ever-changing tools, techniques, protocols, standards, and development systems increase the probability that technology risks will arise

Training and knowledge are of critical importance, and the improper use of new technology most often leads directly to project failure

User and functional requirements

Software requirements capture all user needs with respect to the software system features, functions, and quality of service

Too often, the process of requirements definition is lengthy, tedious, and complex

Moreover, requirements usually change with discovery, prototyping, and integration activities

Change in elemental requirements will likely propagate throughout the entire project, and modifications to user requirements might not translate to functional requirements

These disruptions often lead to one or more critical failures of a poorly-planned software development project

Application and system architecture
Taking the wrong direction with a platform, component, or architecture can have disastrous consequences
As with the technological risks, it is vital that the team includes experts who understand the architecture and have the capability to make sound design choices

Performance
It's important to ensure that any risk management plan encompasses user and partner expectations on performance
Consideration must be given to benchmarks and threshold testing throughout the project to ensure that the work products are moving in the right direction

Organizational
Organizational problems may have adverse effects on project outcomes
Project management must find a balance between the needs of the development team and the expectations of the customers
Of course, adequate staffing includes choosing team members with skill sets that are a good match with the project
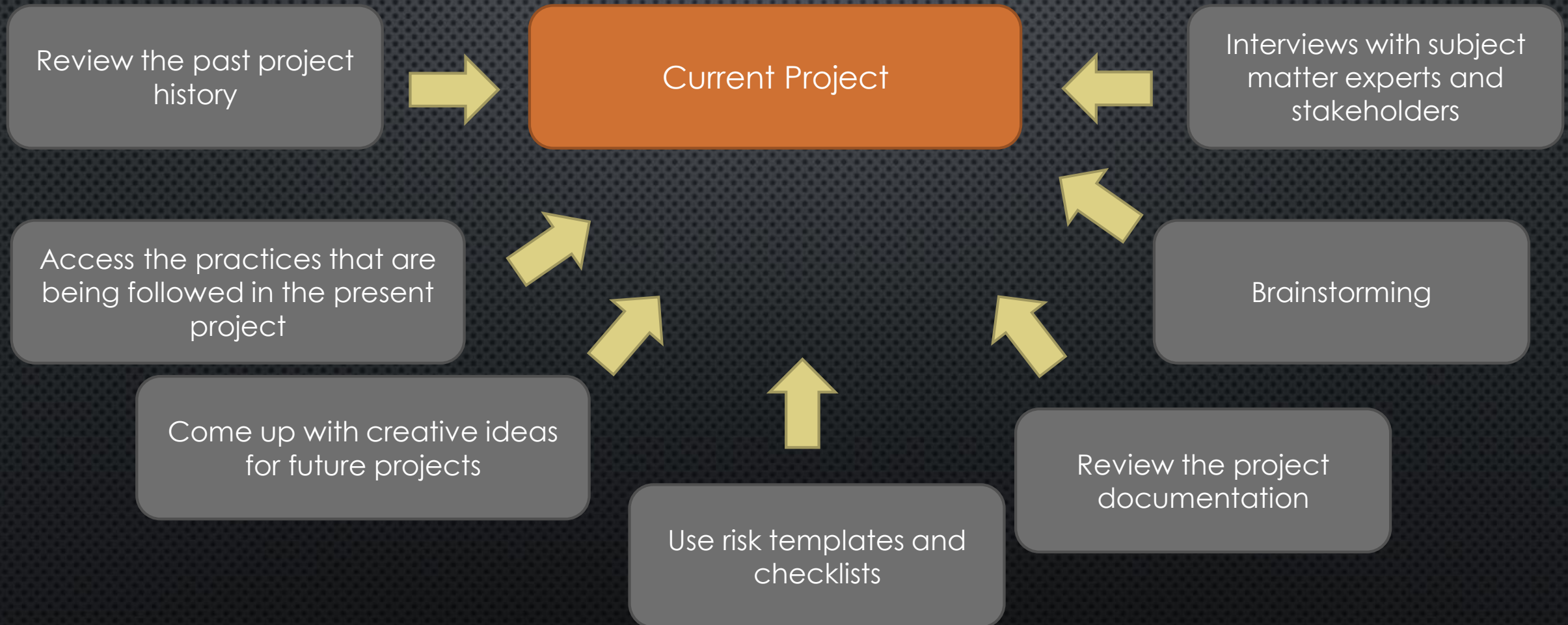
RISK MANAGEMENT

- Software risk management is all about risk quantification of risk
- To perform risk qualification you need to do the following:
  1. *Give a precise description of risk event that can occur in the project*
  2. *Define risk probability for a risk to occur*
  3. *Define how much loss a particular risk can cause*
  4. *Define the liability potential of risk*

SOFTWARE RISK IDENTIFICATION

- In order to identify new risks, it is important to first retrieve and analyze the problems faced in previous projects
- Study the project plan properly and check for all the possible areas that are vulnerable to some or the other type of risks
- The best ways of analyzing a project plan is to build the processes and break them down in flowchart format and examine all areas
- It is important to conduct few brainstorming sessions to identify the known unknowns that can affect the project
- Any decision taken related to technical, operational, political, legal, social, internal or external factors should be evaluated properly

In this phase of Risk management you have to define processes that are important for risk identification
All the details of the risk such as unique Id, date on which it was identified, description and so on should be clearly mentioned

Review the past project history

Current Project

Interviews with subject matter experts and stakeholders

Access the practices that are being followed in the present project

Brainstorming

Come up with creative ideas for future projects

Use risk templates and checklists

Review the project documentation

SOFTWARE RISK ANALYSIS

- In this phase the risk is identified and then categorized
- After the categorization of risk, the level, likelihood (percentage) and impact of the risk is analyzed
- Likelihood is defined in percentage after examining what are the chances of risk to occur due to various technical conditions

SOFTWARE RISK ANALYSIS

These technical conditions can be:

- Complexity of the technology
- Technical knowledge possessed by the testing team
- Conflicts within the team
- Teams being distributed over a large geographical area
- Usage of poor quality testing tools

SOFTWARE RISK ANALYSIS

Risk impact is the consequence of a risk in case it happens
It is important to know about the impact because it is necessary to know how a business can get affected:

- What will be the loss on the customer side?
- How would the business be affected?
- Can it cause loss of reputation or harm to society?
- Can it cause any financial loss?
- Can it cause legal actions against the company
- Can it cause the cancellation of a business license

LEVEL OF RISK ASSESSMENT

Level of risk is identified with:

- **Qualitative Risk Analysis**: a risk is defined according to a severity or priority as follows:
  - High
  - Low
  - Medium
- **Quantitative Risk Analysis**: it is measure in %. This might not give a very clear picture

SOFTWARE RISK PLANNING

- Once you have identified and analyzed the risks you need to plan the tasks to fix/mitigate them
- The standard process for risk planning is the following:
  1. Define preventive measure to reduce the likelihood of the risks
  2. Define measures to reduce the impact in case of risk occurrence
  3. Constant monitor the processes to identify risks as early as possible

SOFTWARE RISK PLANNING

- There are four standard ways to handle a risk:

  - **Avoid**: Prevent a risk, it will never hurt your project. Sometimes it is not possible to avoid a risk. You need to analyze
  - **Mitigate**: If you can't avoid the risk, you can take action to cause it to do as little damage to your project as possible
  - **Transfer**: One effective way to deal with a risk is to pay someone else to accept it for you
  - **Accept**: When you can't avoid, mitigate, or transfer a risk, then you have to accept it

SOFTWARE RISK PLANNING

- The risk management plan is to define how to handle risks in a project
- It documents how you should assess risk, who is responsible/owner for doing handling it, and how to mitigate it
- You should deliver guidelines to figure out the impact of a risk
- The impact tells you how much damage the risk would cause
- A risk management plan should give you a scale to help figure out the probability of the risk

SOFTWARE RISK PLANNING

- Sometimes the mitigation of a risk has a relevant impact on a project
- The project team often develops an alternative method for accomplishing a project goal when this happens and deliver an alternative project plan
- These plans are called **contingency plans**
- The risk of a new button on a form to impact the layout of a form may be mitigated introducing a text link with a contingency plan that the layout of the form is not changed

Show report example for risk plan

Risk	Mitigation	Closeout
Items lost by movers	Mover's insurance plus digital image inventory	Confirm all of the numbered boxes are present and still sealed
Antique furniture damaged	Mover's insurance plus personal supervision of wrapping and loading	Supervise unloading and unwrapping; visually inspect each piece
House plants	Ask Carlita to bring half of them in her van when she visits	Confirm that the plants are healthy and that Carlita brought about half of them

SOFTWARE RISK MONITORING

- Software risk monitoring is integrated into project activities and regular checks are conducted especially on top risks
- Software risk monitoring comprises of:

  - Tracking of risk plans for any major changes
  - Preparation of status reports for project management
  - Review risks
  - Close risks whose impact or likelihood value became low
  - Regularly identify new risks