What is Risk based Testing?

There are various approaches to Software Testing and Quality Assurance. Risk-Based Testing is one such approach that centres around the potential risks associated with the software system. It involves planning testing activities based on risk factors identified through a risk assessment. A risk factor is an unforeseen element that could lead to negative outcomes in the future, ultimately impacting the success of the software project adversely. The Risk-Based Testing method aims to structure testing efforts in a way that mitigates risks before the software product or service is launched. Often, during Risk-Based Testing, there may be time constraints within the project, wherein risk factors are used to determine QA project goals. Projects may involve critical functionalities with tight schedules, testing modules related to crucial financial areas or data, and so forth. Overall, this approach helps manage software testing efforts more effectively and efficiently by concentrating on high-risk areas of the system.

Risk Identification

Risk identification is the initial and highly significant activity involved in risk-based testing. Several stakeholders of the software project participate in risk identification, including Product Owners, Project Managers, Development Teams, Testing Teams, Business Analysts, Domain Experts, and Management Teams. These stakeholders employ various methods to identify risks associated with the project, as outlined below.

* Reviewing Project Documents

There can be risks associated with software project documents, such as Business Requirement Documents, Technical Requirement Documents, Design Documents, and Test Plans. Reviewing these documents helps to identify risks such as unclear requirements, incomplete requirements, inaccurate designs, unrealistic schedules, and incorrect priorities.

* Risk Workshops

Risk workshops are necessary to conduct with relevant stakeholders to ensure productive outcomes. These stakeholders can be internal or external parties connected to the project, collaborating to identify risks. Multiple workshops may be held during different project stages. Various techniques are employed to enhance workshop productivity. Identified risks are then assessed and prioritized to determine the associated areas within the system and plan testing accordingly.

* Brainstorming Sessions

Brainstorming is a technique employed by project stakeholders to identify risks. During this process, all participants are encouraged to freely share their ideas and thoughts about potential risks. Once the idea generation is complete, the identified risks should be categorized, evaluated, and prioritized accordingly.

* Analysis of Past Project Data

Analysing past project data is another technique to gain insight into the risk factors that existed in similar projects. It is highly beneficial for identifying areas that require attention in the current project. This approach provides stakeholders with early awareness of potential risk factors, leading to more efficient risk identification overall.

* Interviews / Surveys

This risk identification technique involves gathering information or feedback from various stakeholders and using that information to identify risk factors. When applying this technique, the main advantage is that people will be more open to sharing their ideas, experiences, and thoughts based on the roles they perform in the organization, adding extra value to the collection of potential risks.

* Checklists

Checklists play a crucial role in risk identification within risk-based testing. Those offer a methodical framework for identifying potential risks linked to the testing process in a structured manner.

**Common Errors in Risk Identification**

1. Lack of Stakeholder participation: All relevant stakeholders should participate in risk identification to enhance its productivity. Failure to involve all stakeholders can result in missing some potential risks.
2. Insufficient / ineffective Communication between Stakeholders: Lack of effective communication among stakeholders can result in misunderstandings, overlooked risks, and ineffective risk management approaches.
3. Failing to detect risks in their early stages Failing to identify risks in their early stages is costly for any project. Risk mitigation becomes less cost-effective when risks are identified at later stages.
4. Not using adequate risk identification methods: As described earlier in this article, organizations must decide which techniques to use in the risk identification process. Failing to employ a combination of suitable techniques can result in overlooking potential risks.
5. Excessive dependency on Past project data.

Checking past project data during risk identification is valuable, but it should only be a part of the process. Relying solely on past project data for risk identification, without considering the current project being assessed, can render the effort unproductive. Additionally, it's essential to utilize various techniques for risk identification beyond solely relying on past project data.

**Risk Assessment**

Once risk identification is completed, it is important to analyse the identified risks in terms of their nature, potential impact, and consequences, triggering factors, and so on. There are several techniques for analysing risks, such as categorizing risks and performing root cause analysis to gather more information about them. Once the required information about risks is gathered and investigated, it is necessary to assess the likelihood and priority of each risk. This process is known as risk evaluation. Evaluation helps in making certain decisions, such as determining which risks should receive more attention or be addressed first, how to allocate resources to manage the risks, the cost of handling risks, and what actions should be taken to align the project with its objectives while considering potential risks.

**Risk Mitigation and Management**

Risk mitigation involves taking appropriate actions to control or prevent identified risks. Organizations must develop effective strategies to mitigate risks that could negatively impact project success. Once the risk factors are identified, analysed, and evaluated, testers can take certain actions such as assessing additional testing efforts needed, prioritizing test cases based on high-risk areas, planning, and performing regression tests considering risks, allocating appropriate resources to test high-risk areas, and collaborating closely with other stakeholders to control risks.

**Factors Influencing Risk Occurrence Probability**

There can be many reasons behind likelihood of risk occurrence such as internal reasons, external reasons, project related reasons, human reasons, and environmental reasons. Organizations should be able to understand these reasons to apply proper risk management techniques.

**Factors Influencing Risk Occurrence Probability**

**Internal Factors**

* Complicated process and practices
* Resource limitations
* Lack of knowledge

**External Factors**

* Legal implications
* Market changes
* Technology upgrades/changes

**Human Factors**

* Communication issues
* Staff turnover
* Human errors
* Training needs

**Environmental Factors**

* Natural disasters
* Political issues

**Project Related Factors**

* Time limitations
* Budget limitations
* Scope changes

**Risk Base Testing Benefits**

1.Supports conducting testing in a more optimized manner.

2. Provides guidance on resource allocation.

3. Improves product quality.

4. Increases stakeholder confidence.

5. Reduces the level of risk occurrence.

**Conclusion**

In conclusion, risk-based testing is a method of test selection that follows an analytical strategy, prioritizing testing efforts based on risk factors. Therefore, risk-based testing can be considered as a fundamental component of robust risk management practices, making it crucial for ensuring the success of projects and product releases.