**Experiment No.: 6**

**Title:** Risk Analysis and Management

**Batch: A2** **Roll No.: 16010421073** **Experiment No.: 6**

**Aim: To prepare risk analysis and management plan document.**

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**Resources needed:** Interent Explorer, LaTex Editor

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**Theory**

**Risk management** is the identification, assessment, and prioritization of risks followed by coordinated and economical application of resources to minimize, monitor, and control the probability and/or impact of unfortunate events or to maximize the realization of opportunities. Risks can come from uncertainty in financial markets, threats from project failures (at any phase in design, development, production, or sustainment life-cycles), legal liabilities, credit risk, accidents, natural causes and disasters as well as deliberate attack from an adversary, or events of uncertain or unpredictable root-cause. Several risk management standards have been developed including the Project Management Institute, the National Institute of Standards and Technology, actuarial societies, and ISO standards. The strategies to manage threats (uncertainties with negative consequences) typically include transferring the threat to another party, avoiding the threat, reducing the negative effect or probability of the threat, or even accepting some or all of the potential or actual consequences of a particular threat, and the opposites for opportunities (uncertain future states with benefits).Risk Management's goal is to increase the impact and probability of positive risks and decrease them for negative risks.

Thus, the understanding of risk management methodologies, tools and practices is extremely important for the future industry workforce to ensure better success of IT projects.

Risk management includes six main processes. These are risk management planning, risk identification, risk analysis, risk response planning, and risk monitoring and control.


**IT Project Risk Management Processes**

**Risk Planning:**

In the Risk Management Planning process, it is decided how to execute the risk management activities of a project. The level of risk management is decided as it needs to be in line with the risk and importance of the project as a whole.

**Risk Identification:**

Risk identification refers to the process of identifying dangerous or hazardous situations and trying to characterize it. The two main approaches to the identification of risks are the use of checklist and brainstorming.

**Risk Analysis:**

A common problem with risk identification particularly for the more anxious is that a list of risk is potentially endless. Some way is therefore needed of distinguishing the more damaging and likely risk using the formula

**Risk exposure = (potential impact) X (probability of occurrence)**

Once risks have been identified, they must then be assessed as to their potential severity of impact (generally a negative impact, such as damage or loss) and to the probability of occurrence.

**Risk Response Planning:**

Having identified the major risks and allocated priorities, the task is to decide how to deal with them. The project manager brainstorms and gathers all the positive and negative risks. It is important to note that this list of risks is not every possible thing that could happen, but rather the category of things that could happen. Consider, for example a project to build a house. Risks to consider would be on the order of slow progress, lack of material, lack of money, change of plans. Not run out of wood or the house catches fire. The purpose of risk planning is to have a plan on how to respond to a type of risk, not figure out all possible risks. So when a risk is realized and becomes an issue or problem, the team knows the steps to assess and respond. These risks would then be inputted into a report followed by the likelihood, impact, and rank of each risk.

**Risk Monitoring and Control:**

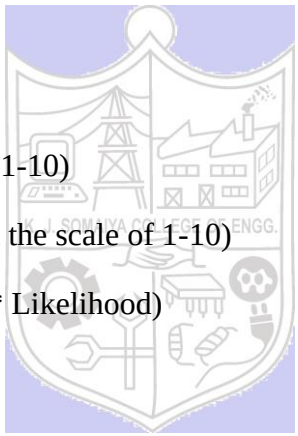
The final input for Risk Management would be the control/treatment plans for each risk in case the risk unfolds into the project down the time line. The Risk Monitoring and Control process is where the risks are diagnosed with treatment and control plans.

**Activity:**

1. Identify a list of at least 10 risks using the given check list, organizing a stakeholders brain storming session.
2. Estimate the probability of occurrence of each risk on the scale of 1-10, risk impact on the scale of 1-10 and calculate risk exposure.
3. Develop a contingency plan of risk as per the given template in LaTeX.

**Template:**

**Risk Assessment and Risk Management Plan.**



Risk #1:

Likelihood of risk: (on the scale of 1-10)

Potential impact on the project: (on the scale of 1-10)

Risk Exposure = (potential impact* Likelihood)

**Ways to address this risk:**

Risk #2……

Risk #n……

**Risk Checklist:**

It is the first stage of risk management. It is a systematic attempt to specify possible threats to the project plan.

| Risk | Risk Reduction Technique |
|---|---|
| Personal shortfalls | Staffing with top talent; job matching; team building; 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 function | Improved software evaluation; formal specification methods; user surveys ;prototyping; early user manuals |
| Developing the wrong user interface | Prototyping ;task analysis; user involvement |
| Gold plating | Requirement scrubbing ;cost benefit analysis ;design to cost |
| Late changes to requirements | Change control procedure; incremental development |
| Shortfalls in externally supplied components | Quality assurance procedures; competitive design or prototyping; contract incentives |
| Real-time performance shortfalls | Simulation; benchmarking; prototyping; tuning ;technical analysis |
| Development technically too difficult | Staff training and development ;prototyping; technical analysis |

**Results:** Risk Management Document in given format

**Weather Forecasting Application:**

| Risk | Ways to Address the risk |
|---|---|
| Uncertain API availability for weather data. | • Have backup API providers.<br>• Implement caching mechanisms for data. |
| Inaccurate weather predictions affecting user trust. | • Include disclaimers about prediction accuracy.<br>• Offer historical data comparison. |
| Server downtime due to high traffic during severe weather events. | • Implement scalable server architecture.<br>• Use load balancing techniques. |
| Unexpected changes in weather data format from API providers. | • Regularly monitor API documentation for updates.<br>• Implement flexible data parsing methods. |
| Compatibility issues with older mobile devices | • Perform thorough testing on various devices.<br>• Provide fallback options for older devices. |
| Lack of user engagement leading to low app usage. | • Implement push notifications for severe weather alerts.<br>• Offer personalized features like favorite locations. |
| Data privacy breaches leading to user trust | • Implement robust security measures. |

| | |
|---|---|
| issues. | • Comply with data protection regulations. |
| Slow API response times affecting user experience. | • Use asynchronous loading for weather data.<br>• Implement client-side caching for repeated requests. |
| Limited availability of historical weather data for analysis. | • Explore multiple data sources for historical data.<br>• Consider purchasing historical data from specialized providers. |
| User interface design not intuitive, leading to low user adoption. | • Conduct user testing for feedback.<br>• Follow best practices for UI/UX design. |



**Risk Management Table:**

| Risk | Likelihood | Potential Impact | Risk Exposure |
|---|---|---|---|
| Uncertain API availability for weather data. | **7** | **8** | **56** |
| Inaccurate weather predictions affecting user trust. | **6** | **9** | **54** |
| Server downtime due to high traffic during severe weather events. | **5** | **9** | **45** |
| Unexpected changes in weather data format from API providers. | **4** | **7** | **28** |
| Compatibility issues with older mobile devices | **3** | **6** | **18** |
| Lack of user engagement leading to low app usage. | **6** | **8** | **48** |
| Data privacy breaches leading to user trust issues. | **5** | **9** | **45** |
| Slow API response times affecting user experience. | **6** | **7** | **42** |
| Limited availability of historical weather data for analysis. | **4** | **8** | **32** |
| User interface design not intuitive, leading to low user adoption. | **5** | **7** | **35** |

**Questions:**

1. **Explain RMMM plan.**

**Ans:** RMMM stands for Risk Mitigation, Monitoring, and Management. It's a structured approach used in project management to identify potential risks, develop strategies to address them, and continuously monitor and manage these risks throughout the project lifecycle. Here's a breakdown of each component:

**Risk Identification:**

- ***Risk Identification:*** The first step is to identify potential risks that could impact the project's objectives. This involves brainstorming with project stakeholders, reviewing historical data from similar projects, and using various techniques such as SWOT analysis, brainstorming sessions, and risk checklists.

**Risk Mitigation:**

- ***Risk Assessment***: After identifying risks, they are assessed based on their probability of occurring and the impact they would have on the project.
- ***Risk Prioritization:*** Risks are then prioritized based on their severity, so the team can focus on addressing the most critical ones first.
- ***Risk Mitigation Strategies:*** Next, the team develops strategies to mitigate these risks. This might involve avoiding the risk, reducing its likelihood or impact, transferring the risk to another party (like through insurance), or accepting the risk.

**Risk Monitoring:**

- ***Monitoring:*** Throughout the project, the team keeps a close eye on identified risks and any new risks that may arise. Regular project meetings often include updates on risk status.
- ***Trigger Events:*** Teams establish trigger points or events that indicate a risk is about to occur or has occurred. These trigger events prompt predefined responses to manage the risk effectively.

**Risk Management:**

- ***Contingency Planning:*** In the event that a risk does materialize, there should be contingency plans in place. These plans outline what actions will be taken to minimize the impact of the risk on the project.

- ***Communication:*** Communication is vital in risk management. Stakeholders need to be informed about potential risks, the steps being taken to mitigate them, and any changes to the project plan as a result.
- ***Documentation:*** All aspects of the RMMM plan should be documented thoroughly. This includes the identified risks, their potential impacts, mitigation strategies, and the monitoring and management processes.

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**Outcomes:**

**CO2 Describe software planning and management**

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**Conclusion:**
**Thus we analysed the risk table for weather forecasting app and addressed the ways to minimize the risks.**


**Grade: AA / AB / BB / BC / CC / CD /DD**

**Signature of faculty in-charge with date**

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**References:**

**Books / Websites:**

1. Roger S. Pressman, Software Engineering: A practitioners Approach, 7th Edition, McGraw Hill, 2010.
2. Technical report on Guidelines for Documents Produced by Student Projects In Software Engineering based on IEEE standards
3. https://www.pmi.org/learning/library/risk-analysis-project-management-7070