**Chapter-05**

**Risk Engineering**

A risk is a serious problem that might or might not happen. It is necessary to analyze the potential risks in a project. If the risks of a software project are not properly analyzed and estimated, many problems can plague the software project. Anyone developing ant type of system encounter with it and it has to be managed.

**5.1 Risk Management**

Risk analysis and management are a series of steps that help a software team understand and manage uncertainty. Many problems can plague of software project. A risk is a potential problem; it might happen, it might not. But regardless of the outcome, it’s a really good idea to identify it, assess its probability of occurrence, and estimate its impact, and establish a contingency plan should the problem actually occur. Risk analysis and management are a series of steps that help a software them to understand and manage uncertainty.

To establish a risk management model the following phases are followed:

**Identification:** Risk identification is the process of detecting potential risks or hazards through data collection. A range of data collection and manipulation tools and techniques exists. The team is using both automated and manual techniques to collect data and begin to characterize potential risks to Web resources. Web crawling is one effective way to collect information about the state of Web pages and sites.

**Classification:** Risk classification is the process of developing a structured model to categorize risk and fitting observable risk attributes and events into the model. The team combines quantitative and qualitative methods to characterize and classify the risks to Web pages, Web sites, and the hosting servers.

**Assessment:** Risk assessment is the process of defining relevant risk scenarios or sequences of events that could result in damage or loss and the probability of these events. Rosenthal describe the characteristics of a generic standard for risk assessment as "transparent, coherent, consistent, complete, comprehensive, impartial, uniform, balanced, defensible, sustainable, flexible, and accompanied by suitable and sufficient guidance.

**Analysis:** Risk analysis determines the potential impact of risk patterns or scenarios, the possible extent of loss, and the direct and indirect costs of recovery. This step identifies vulnerabilities considers the willingness of the organization to accept risk given potential consequences, and develops mitigation responses.

**Implementation:** Risk management implementation defines policies, procedures, and mechanisms to manage and respond to identifiable risks. The implemented program should balance the value of assets and the direct and indirect costs of preventing or recovering from damage or loss.

To take comprehensive care of a web-based system we must consider the following points:

1. Hardware and software environment including any upgrades to the operating system and Web server, the installation of security patches, the removal of insecure services, use of firewalls, etc.

2. Administrative procedures such as contracting with reputable service providers, renewing domain name registration, etc.

3. Network configuration and maintenance including load balancing, traffic management, and usage monitoring.

4. Backup and archiving policies and procedures including the choice of backup media, media replacement interval, number of backups made and storage location.

There are different categories of risks that should be considered in any software project. The following categories of risks have been considered in this software project.

1. **Project risks:** These risks threaten the project plan. If these risks become real, it is likely that the project schedule will slip and that costs will increase. Project risks identify potential budgetary, schedule, personnel, resource, customer and requirement problems and their impact on the software project.
2. **Technical risks:** These risks threaten the quality and timeliness of the software to be produced. If a technical risk becomes a reality, implementation may become difficult or impossible. Technical risks identify potential design, implementation, interface, verification and maintenance problems. Moreover, specification ambiguity, technical uncertainty, technical obsolescence are also risk factors.
3. **Business risks:** These risks threaten the viability of the software to be built. The business risks can be market risks, building a system that no one really wants. Strategic risks, building a system that no longer fits into the overall business strategy for the company. Management risks, losing the support of senior management due to a change in focus or a change in people. Budget risks, losing budgetary or personnel commitment.

**5.2 The RMMM Plan**

* **Risk Mitigation:** Proactive planning for risk avoidance.
* **Risk Monitoring:** Assessing whether predicted risks occur or not, ensuring¬ preventive steps are being properly applied, collect information for future risk analysis, attempt to determine which risks caused which problem.
* **Risk Management:** Actions to be taken in the event that mitigation steps have failed¬ and the risk has become a live problem

**Type of Impact:** Catastrophic (1), Marginal (2), Tolerable (3), Critical (4).

**Type of Probability:** very low (75%).

**Project Risks:** Threaten the project plan. In my system, the bellow mentioned projects risks I needed manage.

**Table XIV. Project Risk (P01)**

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| --- | --- | --- |
| **Project Risk (P01)** | | **Date: 22-09-19** |
| Name | Changes the requirements | |
| Probability | Low (25%) | |
| Impact | Marginal (2) | |
| Description | Customer may change their requirements. | |
| Mitigation & Monitoring | Requirements are redefined by the company due to time or business needs. Meeting will be held with the company regularly. This insures that the product we are producing solves a problem. | |
| Management | Emergency meeting between both parties to identify new project requirements and goals. | |
| Status | Not occur | |

**Table XV. Project Risk (P02)**

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| --- | --- | --- |
| **Project Risk (P02)** | | **Date: 30-09-19** |
| Name | Poor Quality Documentation | |
| Probability | Low (15%) | |
| Impact | Catastrophic (1) | |
| Description | Poor quality documentation of the members. | |
| Mitigation & Monitoring | Meeting will be held routinely to offer documentation suggestions and topics. The progress on documentation will also have a monitor in each meeting | |
| Management | The addition of new topics or removal of unnecessary topics into the documentation will assigned to responsible person. | |
| Status | Monitoring it. | |

**Table XVI. Project Risk (P03)**

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| --- | --- | --- |
| **Project Risk (P03)** | | **Date: 05-10-19** |
| Name | Lack of Development Experience. | |
| Probability | Moderate (30%) | |
| Impact | Catastrophic (1) | |
| Description | Lack of developmental experience of the members. | |
| Mitigation & Monitoring | Each member of the team should watch and see areas where another team member may be weak. | |
| Management | The members who have the most experience in a particular area will be required to help for overcome problem arises for this risk. | |
| Status | We have not encountered such issues yet | |

**Table XVII. Project Risk (P04)**

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| **Project Risk (P04)** | | **Date: 10-10-19** |
| Name | Poor Comments in Code | |
| Probability | Low (15%) | |
| Impact | Marginal (2) | |
| Description | Code of the developed system is not up to the mark. | |
| Mitigation & Monitoring | A formal written standard must be established to ensure quality of comments in all code. | |
| Management | We should call a meeting with the development team to get rid of this problem and improve the quality of comments in code. | |
| Status | We are monitoring the issue. | |

**Technical Risks:** threaten product quality and the timeliness of the schedule. As this is my practicum project, therefore these types of risks need to be take care of properly.

**Table XVIII. Technical Risk (TR01)**

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| --- | --- | --- |
| **Technical Risk (TR01)** | | **Date: 15-10-19** |
| Name | Computer Crash | |
| Probability | Moderate (25-40%) | |
| Impact | Catastrophic (1) | |
| Description | Computer may crash due to several reasons. | |
| Mitigation & Monitoring | We should take proper follow up of computers. We also take regular data backup every day, We can use IPS to stop unexpected shutdown. | |
| Management | If our computer has been crashed then we will restore backup. | |
| Status | We have not encountered such issue yet | |

**Table XIX. Technical Risk (TR02)**

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| **Technical Risk (TR02)** | | **Date: 25-10-19** |
| Name | Technology Doesn’t Meet Specifications. | |
| Probability | Low (25%) | |
| Impact | Catastrophic (1) | |
| Description | Customer doesn’t have the technology to their desired specification. | |
| Mitigation & Monitoring | That ensures that the product we are producing, and the specifications of the customer are equivalent. | |
| Management | The customer should be immediately notified and whatever steps necessary to rectify this problem should be done. Preferably a meeting should be held between the development team and the customer to discuss at length this issue. | |
| Status | We have not encountered such issue yet | |

**Table XX. Technical Risk (TR03)**

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| --- | --- | --- |
| **Technical Risk (TR03)** | | **Date: 01-09-19** |
| Name | Poor Training Skill in Team Members. | |
| Probability | Moderate (30%) | |
| Impact | Catastrophic (1) | |
| Description | Poor Training Skill in Team Members to Train the Client. | |
| Mitigation & Monitoring | The training team should have a clear knowledge about the entire functionality of the software. System analyst need to ensure and monitor it while training session start. | |
| Management | We should arrange a meeting with the train team and come to a point to solve this problem. | |
| Status | We have not encountered such issue yet | |

**Business Risk:** Threaten the viability of the software to be built (market risks, strategic risks, management risks, budget risks). As I am developing it as my practicum project by myself, classic business risks won’t be encountered here. The Probability of all type of Business Risks is therefore, determined as Low.

**Table XXI. Business Risk (B01)**

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| **Business Risk (B01)** | | **Date: 10-09-19** |
| Name | Insufficient Budget | |
| Probability | Low (10%) | |
| Impact | Marginal (2) | |
| Description | If the budget is low project may not complete. | |
| Mitigation & Monitoring | The project needs streaming server that is costly to set-up. We find several alternative streaming services to reduce the budget risk. | |
| Management | Refinement in project goal. A new plan for regulate the budget. | |
| Status | Not encountered | |

**Table XXII.** **Business Risk (B02)**

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| **Business Risk (B02)** | | **Date: 26-10-19** |
| Name | End Users Accept System | |
| Probability | Low (10%) | |
| Impact | Critical (4) | |
| Description | The system fails to gain user’s faith. | |
| Mitigation & Monitoring | In order to prevent this from happening, the software will develop with the end user in mind. The user-interface will design in a way to make use of the program convenient and pleasurable. | |
| Management | Training the users to familiarize them with the new system. Releasing patches/bug fixes for greater user satisfaction. | |
| Status | The risk has not been arisen yet. | |

**Table XXIII. Business Risk (B03)**

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| --- | --- | --- |
| **Business Risk (B03)** | | **Date: 28-11-19** |
| Name | Not pay the installment of Software Cost. | |
| Probability | Very Low (05%) | |
| Impact | Catastrophic (1) | |
| Description | Customer doesn’t pay for the installment of Software Cost. | |
| Mitigation & Monitoring | We should make a good communication between customers and ensure that the entire Installment will be completed | |
| Management | The only course of action available would be find out the reason and come in a solution. | |
| Status | Not encountered. | |

**Table XXIV. Business Risk (B04)**

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| **Business Risk (B04)** | | **Date: 01-12-19** |
| Name | Late delivery of the project | |
| Probability | Very Low (05% | |
| Impact | Catastrophic (1) | |
| Description | The project may take more time to complete what was estimated | |
| Mitigation & Monitoring | Steps have been taken to ensure a timely delivery by determining the scope of project. | |
| Management | The only course of action available would be to request an extension to the deadline from customer. | |
| Status | My project is completed in time. | |