**Practical No – 5**

**AIM:** Preparation of Software Configuration Management and Risk Management related documents.

**Software Configuration Management**

1. **What is Software Configuration Management?**

Software configuration management (SCM) is a software engineering discipline consisting of standard processes and techniques often used by organizations to manage the changes introduced to its software products. SCM helps in identifying individual elements and configurations, tracking changes, and version selection, control, and baselining.

SCM is also known as software control management. SCM aims to control changes introduced to large complex software systems through reliable version selection and version control.

* 1. **Why SCM is important?**

**SCM** is important due to the following:

* Manages evolving software systems.
* Controls the costs involved in making changes to a system.
  1. **What are the benefits of Software configuration Management System?**

Following are the benefits of Software Configuration Management system:

* Reduced redundant work.
* Effective management of simultaneous updates.
* Avoids configuration-related problems.
* Facilitates team coordination.
* Helps in building management; managing tools used in builds.
* Defect tracking: It ensures that every defect has traceability back to its source.

1. **SCM Components**
   1. **Configuration Identification**

It is the process of identification of Configuration Items (CI) and developing a method to uniquely identify each individual CI. It helps answers the following questions:

* Which items are placed under configuration management?
* What are the components of the product?
* What is the structure (or configuration) of components in the product?
* What are the versions of the configuration items?
  1. **Change Control.**

Change control is function of configuration management, which ensures that all changes made to software system are consistent and made as per organizational rules and regulations.

A change in the configuration of product goes through following steps:

* Identification - A change request arrives from either internal or external source. When change request is identified formally, it is properly documented.
* Validation - Validity of the change request is checked and its handling procedure is confirmed.
* Analysis - The impact of change request is analyzed in terms of schedule, cost and required efforts. Overall impact of the prospective change on system is analyzed.
* Control - If the prospective change either impacts too many entities in the system or it is unavoidable, it is mandatory to take approval of high authorities before change is incorporated into the system. It is decided if the change is worth incorporation or not. If it is not, change request is refused formally.
* Execution - If the previous phase determines to execute the change request, this phase take appropriate actions to execute the change, does a thorough revision if necessary.
* Close request - The change is verified for correct implementation and merging with the rest of the system. This newly incorporated change in the software is documented properly and the request is formally is closed.

1. **Tools, Techniques & Methodologies**

* VSS – Visual source safe
* CVS- Concurrent version system
* Rational Clear Case
* SVN- Subversion
* Perforce
* TortoiseSVN
* IBM Rational team concert
* IBM Configuration management version management
* Razor
* Quma version control system
* SourceAnywhere

**Risk Management**

**1. Introduction**

Risk Management is the process of identifying, analyzing and responding to risk factors throughout the life of a project and in the best interests of its objectives. Proper risk management implies control of possible future events and is proactive rather than reactive.

**2. Risk Management Strategies**

As the project manager, there are four basics of risk management that you can use to manage your project's risks.

* Identify Risks
* Risk Assessment
* Risk Response Development
* Monitor and Control Risks

**2.1. Risk Identification**

Risk identification is the first stage of the risk management process. It is concerned with identifying the risks that could pose a major threat to the software engineering process, the software being developed, or the development organization. Risk identification may be a team process where a team get together to brainstorm possible risks. Alternatively, the project manager may simply use his or her experience to identify the most probable or critical risks.

**2.2. Risk Responsibility**

The responsibility for managing risk is shared amongst all the stakeholders of the project.

However, decision authority for selecting whether to proceed with mitigation strategies and implement contingency actions, especially those that have an associated cost or resource requirement rest with the Project Manager who is responsible for informing the funding agency to determine the requirement for a contract modification. The following tables details specific responsibilities for the different aspects of risk management.

* Risk Activity Responsibility
* Risk Identification: All project stakeholders
* Risk Registry: Project Manager
* Risk Assessment: All project stakeholders
* Risk Response Options Identification: All project stakeholders
* Risk Response Approval: PM with concurrence from CO/PO/COTR
* Risk Contingency Planning; Project Manager(s)
* Risk Response Management; Project Managers
* Risk Reporting; Project Manager

* 1. **Risk Assessment**

Risk assessment is the act of determining the probability that a risk will occur and the impact that event would have, should it occur. This is basically a “cause and effect” analysis. The “cause” is the event that might occur, while the “effect” is the potential impact to a project, should the event occur. Assessment of a risk involves two factors. First is the probability which is the measure of certainty that an event, or risk, will occur

**Response**

Risk response is the process of developing strategic options, and determining actions, to enhance opportunities and reduce threats to the project's objectives. A project team member is assigned to take responsibility for each risk response.

**Mitigation**

Risk mitigation involves two steps:

• Identifying the various activities, or steps, to reduce the probability and/or impact of an adverse risk.

• Creation of a Contingency Plan to deal with the risk should it occur.

Taking early steps to reduce the probability of an adverse risk occurring may be more effective and less costly than repairing the damage after a risk has occurred. However, some risk mitigation options may simply be too costly in time or money to consider. Mitigation activities should be documented in the Risk Register, and reviewed on a regular basis. They include:

• Identification of potential failure points for each risk mitigation solution.

• For each failure point, document the event that would raise a “flag” indicating that the event or factor has occurred or reached a critical condition.

• For each failure point, provide alternatives for correcting the failure

**Tracking and Processing**

As project activities are conducted and completed, risk factors and events will be monitored to determine if in fact trigger events have occurred that would indicate the risk is now a reality. Based on trigger events that have been documented during the risk analysis and mitigation processes, the project team or project managers will have the authority to enact contingency plans as deemed appropriate. Day to day risk mitigation activities will be enacted and directed by the project managers. Contingency plans that once approved and initiated will be added to the project work plan and be tracked and reported along with all of the other project activities. Risk management is an ongoing activity that will continue throughout the life of the project. This process includes continued activities of risk identification, risk assessment, planning for newly identified risks, monitoring trigger conditions and contingency plans, and risk reporting on a regular basis. Project status reporting contains a section on risk management, where new risks are presented along with any status changes of existing risks. Some risk attributes, such as probability and impact, could change during the life of a project and this should be reported as well.

**Processes to Address Immediate Unforeseen Risks**

The individual identifying the risk will immediately notify the project managers. The individual notified will assess the risk situation. If required, the project managers will identify a mitigating strategy, and assign resources as necessary. The project risk manager will document the risk factor and the mitigating strategy.