SE 4485: Software Engineering Projects

Fall 2024

Project Management Plan

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| --- | --- |
| Group Number | 5 |
| Project Title | Knowledge Management Assistant |
| Sponsoring Company | Fellows Consulting Group |
| Sponsor(s) | Jeff Buchmiller |
| Students | 1. Kent Hoang  2. Rukhsana Ibrahim  3. Azifa Chowdhury  4. Reuben John  5. Aneetta Betty  6. Derek Zhou |

# TITLE PAGE

## ABSTRACT

This document defines how the project will be executed, monitored, and controlled. It also provides a summary of the project’s goals and roles, as well as the chosen lifecycle model. The plan also specifies the project’s structure, team responsibilities, deliverables, schedule, and risk-management measures.

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INTRODUCTION

# 1.1 Introduction to The Entire Document

This document provides a guide to the development of a search-enhancement software application, outlining the management of the project. It serves to provide transparency on the project's goal, scope, and organization, ensuring that all team members and stakeholders understand the objectives and processes. The Knowledge Management Assistant project intends to create software that helps users collect, filter, summarize, and organize search results in order to increase the effectiveness of online search operations.

# 1.2 Purpose and Scope of the Document

The primary objective of this document is to define the strategic strategy for creating a software solution to improve internet search procedures. It addresses all key components, such as project structure, lifecycle modeling, risk assessment, resource requirements, deliverables, and scheduling. The scope includes a full description of the software's capabilities, the resources needed, and the requirements that will guide the project.

# 1.3 Brief Overview of the Product

The product being made is a software application designed to improve the efficiency of internet searches. The software's major goal is to save users time and effort navigating search results by presenting brief, relevant summaries and storing accumulated information for later use.

## 1.3.1 Some capabilities include:

* Keyword Identification: Extracts key terms from user input to help narrow search
* Search Result Processing: Search results are filtered and summarized to give the most relevant information.
* Knowledge Management: Manages and stores search results, allowing users to review and use previously acquired knowledge.

## 1.3.2 Scenarios:

Preparing what architecture/programming language to use to being a new project; the knowledge manager should have a database that holds key words that can then respond back to the user to recommend an architecture and language that best suits the current problem task.

Keeping information on customer data allows the user to ask the knowledge manager what customers have been buying and what they have not been buying. This can then be stored for future use if the user needs to ask the question again for further clarity.

## 1.3.3 Description of the structure of the document

This paper is structured to give a clear and logical flow of information, guiding the reader through the many stages of the project. The document first begins with the Project Organization section describing the team structure, duties, and justification for the organizational architecture. The Lifecycle Model section, which explains the lifecycle model used for the project and the rationale behind it. Risk Analysis, which discussed potential dangers, their likelihood, and mitigation options. The Software and Hardware Resource Requirements section explains the necessary resources, verifies their availability in the lab, and provides a rationale for each selection. The Deliverables and Schedule section defines project activities, dependencies, timetables, team assignments, and the reasons behind these plans. Monitoring, Reporting, and Controlling Mechanisms outlines the management reports and control mechanisms. The Professional Standards explain the expected behavior of team members, including commitment to academic honesty and meeting quality and scheduling provided by the entire team, describes the standards and constraints identified in consultation with project sponsors to ensure that the document is consistent with professional engineering methods.

# 1.4 Project Organization

Development teams need to be set up in a way that enhances their understanding of software business operations and performance. The project organization's function as a knowledge management assistant is to innovate and take advantage of new technological options for information gathering, sharing, and collection. It needs knowledge to transfer to a team and keep processes profitable and efficient. The team needs to be ensuring that a company has the knowledge necessary to succeed. Knowledge management strategies help organizations develop as an organization and improve teamwork, which leads to faster profitable outcomes. This task should be done by three people in a team. Additionally, their efforts have to contribute to the proper and widespread use of the software business's understanding base.

The organizational boundaries that separate the project from outside entities are described by the project organization. External interfaces must be included, which means the external interfaces of the project may be represented through diagrams and organizational charts. Explain the internal organization of the project, taking notice of the connections between the various software development team units. It is suggested that visual tools like organizational charts or diagrams be used to illustrate the chains of command, accountability, and correspondence within the project. Each primary work activity and its supporting processes are described in roles and responsibilities, together with the organizational units in charge of those processes and activities.

The rationale for our project is that the team needs to establish rules regarding the data that is collected. Furthermore, the two most important aspects of project management are planning and controlling. Therefore, controlling and planning lowers the risk involved in working in a fast-changing environment and in managing deadlines, resources, budgets, and quality.

# 1.5 Lifecycle Model Used

For our project, we have opted to use the Waterfall methodology. In this model, the project will start with requirements analysis in which all specifications and expectations are clearly stated. Following that, the design phase will entail developing a detailed blueprint for the system architecture and user interface. The implementation phase will consist of creating and integrating the software components, followed by rigorous testing to discover and resolve any difficulties. Once testing is completed, the program will be deployed.

The rationale for using the Waterfall technique on our project is related to the project's set timeline, which is contained within a single semester. Given the limited timeline, the Waterfall method offers a structured approach that enables us to define and complete each step of the project before moving on to the next. This linear sequence is especially useful in a semester-long project since it assures that all important phases are performed in logical order, limiting the chance of substantial modifications or alterations later on.

# 1.6 Risk Analysis

Several risks are inherent with the development and implementation of the project, The most significant one is poor integration of data from internal and external sources. If the information from these sources is incomplete, outdated, or wrong, the response to the questions by executives will be incorrect, hence poor decision-making. The impact of this risk is medium since it involves a lot of complexities in managing and validating large volumes of data. This could be mitigated by using a strong system of data validation that ensures information obtained is accurate and up to date.

Another major risk is system scalability. During the project life cycle, as more and more stakeholders start to use the system, it may reach performance bottlenecks in the event of sudden growth of data volume and number of queries. If the initial design of the system does not consider scaling needs, this risk would not be moderate to high ranking. The system architecture should be designed at inception for scalability with cloud infrastructure, and its modular components should easily expand or be optimized to lower this risk.

A third risk could be the issues of user adoption and training. Even if the system works perfectly, organizational leaders and knowledge managers will not use it effectively if they don’t know how to use the system more effectively. This is a moderate risk since it will be influenced by the training and support given during and after the implementation. The plan should, therefore, also include comprehensive user training and ongoing support as part of the project to make the users confident in the system’s capabilities and comfortable using it for decision-making.

After risks have been identified, the following action is to assess:

## 1.6.1 Likelihood:

The chance that any given risk will materialize. Generally, risks are categorized as having a low, medium, or high chance.

## 1.6.2 Impact:

The possible harm or consequences if the risk comes to pass. Affected areas may include the timeframe, the money, or the caliber of the final output. In addition, the impact is rated as low, medium, or high. Risks can be prioritized using this likelihood and impact combination. While low likelihood and low impact threats do not need as much urgent attention, high likelihood and high impact dangers should.

(Rationale)

## 1.6.3 Decreasing overall project uncertainty:

The team can lessen the likelihood of unforeseen surprises later in the project by discussing possible risks early and developing measures to tackle them. Preserving the

## 1.6.4 Project budget and schedule:

Prompt risk assessment enables the team to budget for delays or overspending, keeping the project moving forward.

## 1.6.5 Product quality assurance:

A risk management initiative contributes to the protection of the end product's quality, guaranteeing that the software satisfies the needs and expectations of stakeholders and users.

# 1.7 Software and Hardware Resource Requirements

In hardware, this requires an Intel Core i5 or an equivalent mid-range processor, which is highly necessary for multitasking and multi-threaded processes in software development and testing. A decent amount of RAM of at least 16GB is necessary to handle modern development environments and multitasking, while SSD storage of at least 512GB ensures faster access to data and smoothens the workflow. A dedicated GPU with at least 4GB VRAM may also be in order for those who require heavy graphics rendering or machine learning tasks.

The software tools that will be used in our project will vary. For the IDE (integrated development environment) we will primarily use Visual Studio Code. In terms of programming languages and frameworks, it could vary but as of now we could lean towards React.js (JavaScript) and any Python backend framework such as Flask or Django due to its ease of use. For this project, some sort of NLP (Natural Language Processing) libraries such as Natural Language Toolkit (NLTK) and spaCy to take in sentences and phrases used in everyday language and transform it into a relevant result for the user. Lastly, we will be using GitHub as our source of version control to aid in our development process. The hardware tools required are laptops capable of executing our code. All equipment and tools required are available in the lab.

It also involves efficient data handling with database management systems like MySQL, virtualization with Docker that allows running the system in isolated environments for testing, and security tools of high importance in protecting both the system and sensitive data regarding application development or working in the cloud. This set of tools will provide the developer with efficiency, scalability, and security.

# 1.8 Deliverables and Schedule

* Project Management Plan
* Develop project goals, objectives, and scope
* Define team roles and responsibilities
* Outline the project lifecycle, risk management, and resource allocation.
* Due Date September 6th, 2024
* Requirements Documentation
* Identify functional and nonfunctional requirements
* Make sure requirements adhere to customer demands
* Due Date September 20th, 2024
* Architecture Documentation
* Create system architecture and system features
* Display external tools such as APIs and database schemas
* Due Date October 18th, 2024
* Detailed Design Documentation
* Create wireframes for UI
* Create use case diagrams and component diagrams
* Due Date November 1st, 2024
* Test Plan
* Create test cases and desired outcomes
* Make sure all tests pass
* Due Date November 15th, 2024
* Final Project Demonstration (Slides and Demo)
* Presentation
* Due Date November 30th, 2024
* Final Project Report
* Final analysis of project
* Due Date December 2nd, 2024

In line with the Waterfall methodology, the project is split into a set of linear work blocks to provide a structure to this project due to the limited timeframe. Each phase has tentatively been assigned two weeks before the due date, apart from the programming section, which will most likely be the largest and most extensive phase. This should provide ample time for each other section, and if all parties agree to accelerate the process, can move through the phases as needed.

# 1.9 Monitoring Reporting and Controlling Mechanism

Monitor and Control to accomplish the performance goals outlined in the project management plan, project work is the act of monitoring, evaluating, and controlling the progress. Status reporting, monitoring progress, and estimating are all part of monitoring. Reports on performance can be applied as inputs to other processes since they include details on the project's scope, time, cost, resources, quality, and risk. The report formats and information flows that will be used to notify those involved in the project and organizations outside the project about the progress of the requirements, schedule, budget, quality, and other preferred or necessary status criteria. The criticality, risk, and visibility of the project must all be considered for consideration when determining the frequency and accuracy of communications regarding monitoring and control.

The rationale will be monitoring the project's actual completion as well as its indicators, which include designs, schedules, and standards. Reporting differences so that the required steps can be taken to bring the desired level of quality back. Early detection of problems by control effectiveness helps to avoid developing into more serious issues that could compromise project timeframes or overall goals.

# 1.10 Professional Standards

During the lifespan of this project, team members are expected avoid problematic or abrasive behavior, including but not limited to:

* Sexism
* Racism
* Homophobia/Transphobia
* Continuous and significant usage of inappropriate language in official channels
* Harassment

Team members are also expected to conduct themselves professionally. Unacceptable behavior includes but is not limited to:

* Consistent tardiness without reason
* Inability to provide/complete assignments without reason
* Consistent poor quality of work
* Consistent absence from team meetings without reason
* Academic dishonesty/plagiarism without citation or credit

Where valid reasons are restricted to reasons acceptable for incomplete standing in a course, or at the discretion of the remaining team members/instructor.

If such behavior is to occur, open communication during a meeting should be held, and attempt a resolution between team members, documented in meeting minutes. On a second offense from the same team member, an instructor should be notified and incorporated into further meetings to resolve the problem. Third or further offenses from the same team member will give other team members the option to remove the team member from the group, and the team member will receive a pro-rated grade based on their participation at the time of removal.

These rules are set in place to provide a consistent and strict set of rules to prevent conflict during the project. Having a distinct pathway for conflict resolution will prevent “grey zones” where team members are unable to resolve a conflict, which then results in loss of productivity.

# EVIDENCE THE DOCUMENT HAS BEEN PLACED UNDER CONFIGURATION MANAGEMENT

**Github Link:** https://github.com/KentHoang12/SE4385-Group5-Knowledge-Management-Assistant.git

# ENGINEERING STANDARDS AND MULTIPLE CONSTRAINTS

* IEEE Std 1058-1998: Software Project Management Plans
* IEEE Std 12207: Software Life Cycle Processes

# ADDITIONAL REFERENCES

* [1] Asia, Assist. “The Roles of Knowledge Management for the Development of Organizations.” *ASSIST CreativeLab*, 26 Dec. 2023.
* "IEEE Standard for Software Project Management Plans," in IEEE Std 1058-1998 , vol., no., pp.1-28, 22 Dec. 1998, doi: 10.1109/IEEESTD.1998.88822.
* Larson, E. and Gray, C., 2014. Project Management: The Managerial Process. McGraw Hill.
* Humphrey, W.S. and Thomas, W.R., 2010. Reflections on Management: How to Manage Your Software Projects, Your Teams, Your Boss, and Yourself. Pearson Education.