Version <1.0>

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Revision History

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| **Date** | **Version** | **Description** | **Author** |
| <dd/mmm/yy> | <x.x> | <details> | <name> |
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# Introduction

[The introduction of the **Software Requirements Specification (SRS)** provides an overview of the entire **SRS**. It includes the purpose, scope, definitions, acronyms, abbreviations, references, and overview of the **SRS**.]

[Note: The **SRS** captures the complete software requirements for the system, or a portion of the system. Following is a typical **SRS** outline for a project **using use-case modeling**. This artifact consists of a package containing use cases of the use-case model and applicable Supplementary Specifications and other supporting information.]

[Many different arrangements of an **SRS** are possible. Refer to [IEEE830-1998] for further elaboration of these explanations, as well as other options for **SRS** organization.]

## Purpose

[Specify the purpose of this **SRS**. The **SRS** fully describes the external behavior of the application or subsystem identified. It also describes nonfunctional requirements, design constraints, and other factors necessary to provide a complete and comprehensive description of the requirements for the software.]

## Scope

[A brief description of the software application that the **SRS** applies to, the feature or other subsystem grouping, what Use-Case model(s) it is associated with, and anything else that is affected or influenced by this document.]

## Definitions, Acronyms, and Abbreviations

[This subsection provides the definitions of all terms, acronyms, and abbreviations required to properly interpret the **SRS**. This information may be provided by reference to the project’s Glossary.]

## References

[This subsection provides a complete list of all documents referenced elsewhere in the **SRS**. Identify each document by title, report number if applicable, date, and publishing organization. Specify the sources from which the references can be obtained. This information may be provided by reference to an appendix or to another document.]

## Overview

[This subsection describes what the rest of the **SRS** contains and explains how the document is organized.]

# Overall Description

[This section of the **SRS** describes the general factors that affect the product and its requirements. This section does not state specific requirements. Instead, it provides a background for those requirements, which are defined in detail in Section 3, and makes them easier to understand. Include such items as:

**2.1 Product Perspective**

**2.1.1 System Interfaces:** The system interfaces with the user through a command-line interface for input of the expressions and also to display the results. It also interacts with system resources for memory management and error handling.

**2.1.2 User Interfaces:** The user interface has of a command-line interface where users input arithmetic expressions and view the calculated results. The interface should be user-friendly and provide clear prompts and feedback.

**2.1.3 Hardware Interfaces:** The program does not have direct hardware interfaces as it operates solely in software. However, it relies on the underlying hardware for memory allocation and CPU processing.

**2.1.4 Software Interfaces:** The software interfaces with the C++ standard library for input/output operations, string manipulation, and other functionalities. Additionally, it may interface with external libraries or modules for specific tasks such as parsing or mathematical calculations.

**2.1.5 Communication Interfaces:** There are no explicit communication interfaces required as the program operates locally on the user's machine without any network interaction.

**2.1.6 Memory Constraints:** The program should manage memory efficiently to handle expressions of varying complexity while adhering to memory constraints of the system. This includes proper memory allocation and deallocation to avoid memory leaks.

**2.1.7 Operations:** The program performs operations such as expression parsing, evaluation, error handling, and user interaction. It also involves managing data structures to represent expressions and their evaluation.

**2.2 Product Functions:**

* Parse arithmetic expressions containing operators (+, -, \*, /, %, ^) and numeric constants.
* Evaluate the parsed expressions according to operator precedence rules (PEMDAS).
* Handle parentheses to determine the order of evaluation within expressions.
* Recognize and calculate numeric constants within expressions.
* Provide a user-friendly command-line interface for inputting expressions and displaying results.
* Implement robust error handling to manage scenarios like division by zero or invalid expressions.

**2.3 User Characteristics:** Users of the program are expected to have basic knowledge of arithmetic expressions and the operators involved. They should be comfortable using a command-line interface for input and output.

**2.4 Constraints:**

* The program should adhere to the specified requirements and constraints outlined in the project description.
* Memory usage should be optimized to handle expressions of varying sizes without exceeding system limits.
* Error handling should be comprehensive to handle all possible scenarios gracefully.

**2.5 Assumptions and Dependencies:**

* The program assumes that the input expressions provided by users are well-formed and adhere to mathematical rules.
* Dependencies include the C++ standard library for input/output operations and possibly external libraries for specific functionalities like parsing or mathematical calculations.

**2.6 Requirements Subsets:** Requirements subsets include tasks related to expression parsing, operator precedence, parenthesis handling, numeric constants recognition, user interface development, error handling, and any additional features or optimizations beyond the specified requirements. These subsets are essential for organizing and prioritizing tasks during development.

# Specific Requirements

[This section of the **SRS** contains all software requirements to a level of detail sufficient to enable designers to design a system to satisfy those requirements, and testers to test that the system satisfies those requirements. When using use-case modeling, these requirements are captured in the Use Cases and the applicable supplementary specifications. If use-case modeling is not used, the outline for supplementary specifications may be inserted directly into this section, as shown below.]

## Functionality

[This section describes the functional requirements of the system for those requirements that are expressed in the natural language style. For many applications, this may constitute the bulk of the **SRS** package and thought should be given to the organization of this section. This section is typically organized by feature, but alternative organization methods may also be appropriate; for example, organization by user or organization by subsystem. Functional requirements may include feature sets, capabilities, and security.

Where application development tools, such as requirements tools, modeling tools, and the like, are employed to capture the functionality, this section of the document would refer to the availability of that data, indicating the location and name of the tool used to capture the data.]

### <Functional Requirement One>

[The requirement description.]

## Use-Case Specifications

[In use-case modeling, the use cases often define the majority of the functional requirements of the system, along with some non-functional requirements.]

## Supplementary Requirements

[Supplementary Specifications capture other requirements, e.g., non-functional requirements and development constraints, that are not included in the use cases and non-functional requirements.]

# Classification of Functional Requirements

[List, usually in a table, all functional requirements and order them by Type (Essential, Desirable, and Optional) or by order of appearance in the document.]

|  |  |
| --- | --- |
| **Functionality** | **Type** |
| ... |  |
| ... |  |

# Appendices

[When appendices are included, the **SRS** should explicitly state whether or not the appendices are to be considered part of the requirements]