**EECS 348**

**Calculator Project**

**Software Development Plan**

**Version 1.0**

| Calculator Project | Version: <1.0> |
| --- | --- |
| Software Development Plan | Date: 24/09/23 |
| <document identifier> | |

**Revision History**

| **Date** | **Version** | **Description** | **Author** |
| --- | --- | --- | --- |
| 24/09/23 | 1.0 | Completed Development Plan | <name> |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |

**Table of Contents**

**1. Introduction ......................................................................................................................................................... 4**

*1.1 Purpose.......................................................................................................................................................... 4 1.2 Scope.............................................................................................................................................................. 4 1.3 Definitions, Acronyms, and Abbreviations .................................................................................................... 4 1.4 References...................................................................................................................................................... 4 1.5 Overview........................................................................................................................................................ 5*

**2. Project Overview ................................................................................................................................................. 5**

*2.1 Project Purpose, Scope, and Objectives........................................................................................................ 5 2.2 Assumptions and Constraints......................................................................................................................... 5 2.3 Project Deliverables...................................................................................................................................... 5 2.4 Evolution of the Software Development Plan ................................................................................................ 5*

**3. Project Organization ........................................................................................................................................... 6**

*3.1 Organizational Structure ............................................................................................................................... 6 3.2 External Interfaces......................................................................................................................................... 6 3.3 Roles and Responsibilities............................................................................................................................. 6*

**4. Management Process........................................................................................................................................... 6**

*4.1 Project Estimates........................................................................................................................................... 6 4.2 Project Plan................................................................................................................................................... 6 4.3 Project Monitoring and Control.................................................................................................................... 7 4.3.1 Requirements Management............................................................................................................................ 7 4.3.2 Quality Control.............................................................................................................................................. 7 4.3.3 Reporting and Measurement.......................................................................................................................... 8 4.3.4 Risk Management........................................................................................................................................... 8 4.3.5 Configuration Management........................................................................................................................... 8*

**5. Annexes................................................................................................................................................................. 8**

| Calculator Project | Version: <1.0> |
| --- | --- |
| Software Development Plan | Date: 24/09/23 |
| <document identifier> | |

**Software Development Plan**

**1. Introduction**

**1.1 Purpose**

The purpose of the *Software Development Plan* is to gather all information necessary to control the project. It describes the approach to the development of the software and is the top-level plan generated and used by managers to direct the development effort.

The following people use the *Software Development Plan*:

• The **project manager** uses it to plan the project schedule and resource needs, and to track progress against the schedule.

• **Project team members** use it to understand what they need to do, when they need to do it, and what other activities they are dependent upon.

**1.2 Scope**

This *Software Development Plan* describes the overall plan to be used by the Calculator project, including deployment of the product. The details of the individual iterations will be described in the Iteration Plans.

The plans as outlined in this document are based upon the product requirements as defined in the *Vision Document*.

**1.3 Definitions, Acronyms, and Abbreviations**

Arithmetic Expression Evaluator: AEE

PEMDAS: Representing the order of operations (Parentheses, Exponents, Multiplication, Division, Addition, Subtraction)

Github: Website used to store the source code for a project and track the complete history of all changes to that code

**1.4 References**

• Iteration Plans: Described further in project schedule 4.2.3

• Vision: Our vision is to build a versatile arithmetic expression evaluator in C++, providing users with a powerful and user-friendly tool for precise mathematical computations.

| Calculator Project | Version: <1.0> |
| --- | --- |
| Software Development Plan | Date: 24/09/23 |
| <document identifier> | |

**1.5 Overview**

This *Software Development Plan* contains the following information:

Project Overview — provides a description of the project's purpose, scope, and objectives. It also defines the deliverables that the project is expected to deliver.

Project Organization — describes the organizational structure of the project team.

Management Process — explains the estimated cost and schedule, defines the major phases and milestones for the project, and describes how the project will be

monitored.

Applicable Plans and Guidelines — provide an overview of the software development process, including methods, tools and techniques to be followed.

**2. Project Overview**

**2.1 Project Purpose, Scope, and Objectives**

This project seeks to deliver an arithmetic expression evaluator that takes an arithmetic expression as input and calculates the result using the order of operations (PEMDAS) as well as handle numeric constants and parentheses.

**2.2 Assumptions and Constraints**

Assumptions

* There will be 5 members on this team developing the arithmetic expression evaluator.
* This will be a semester-long project, with each release of this project expected to be complete a couple days before the due date to leave enough time for quality control and review.

Constraints

* The project’s evaluator will be written in C++.
* Versions of the evaluator will be stored on Github.

**2.3 Project Deliverables**

Deliverables for each project phase are identified in the Development Case. Deliverables are delivered towards the end of the iteration, as specified in section *4.2.4 Project Schedule*.

External Deliverables

* The arithmetic expression evaluator will be the only external deliverable for this project

Internal Deliverables

* The project management plan (this document) / Requirements & design document / test cases.
* All C++ code and files

**2.4 Evolution of the Software Development Plan**

The *Software Development Plan* will be revised prior to the start of each Iteration phase.

| Phase Description | Date |
| --- | --- |
| Created and completed Project Management Plan | 24/09/23 |

**3. Project Organization**

**3.1 Organizational Structure**

Project Leader: Ethan Doughty

Quality Assurance Engineer: Bisshoy Bhattacharjee

Configuration Management Engineer: Minh Vu

Designer: Barrett Brown  
Integrator: Adam Berry

**3.2 Roles and Responsibilities**

| **Person** | **Unified Process for EDUcation Role** | **Contact Info** |
| --- | --- | --- |
| Ethan Doughty | Project Leader | e073d959@ku.edu |
| Bisshoy Bhattacharjee | Quality Assurance Engineer | b167b064@ku.edu |
| Minh Vu | Configuration Management Engineer | minhtvu@ku.edu |
| Barrett Brown | Designer | barrettbrown@ku.edu |
| Adam Berry | Integrator | a130b319@ku.edu |

Anyone on the project can perform any role activities.

**4. Management Process**

**4.1 Project Estimates**

Estimated Cost: This project should not cost anything to produce.

Schedule: This project should be ready for release by December 5th-7th, 2023. Each Iteration should take about 2 weeks. Time re-estimation will occur after each iteration is complete or if there are any errors that set us back.

**4.2 Project Plan**

*4.2.1 Iteration Objectives*

Expression Parsing:

* Create data structure to handle expression’s structure
* Implement a function to tokenize the input expression

Operator Precedence:

* Define precedence of operators according to PEMDAS
* Implement logic to calculate according to precedence defined

Parentheses Handling:

* Develop a way to handle excess parentheses and evaluate equations inside of parentheses.

Numeric Constants:

* Recognize numeric constants inside of the given equations
* Handle floating point as well as integers

User Interface:

* Create a user-friendly and legible command-line interface that allows users to enter expressions and displays the calculated results.

Error Handling:

* Handle invalid expressions and divide by 0 errors.

*4.2.2 Releases*

No current releases, this project is still in development

*4.2.3 Project Schedule*

| **Iteration Description** | **Scheduled Completion Date** |
| --- | --- |
| Expression Parsing | 10/2/23 |
| Operator Precedence | 10/16/23 |
| Parenthesis Handling | 10/30/23 |
| Numeric Constants | 11/13/23 |
| User Interface | 11/27/23 |
| Error Handling | 12/7/23 |

**4.3 Project Monitoring and Control**

4.3.1 Requirements Management

The requirements for this system are captured in the Vision document. Requested changes to requirements are captured in Change Requests, and are approved as part of the Configuration Management process.

4.3.2 Quality Control

Defects, or bugs, will be recorded and tracked using the issues tab in the shared github. When creating an issue it should include the bug itself, how to replicate the bug, and how the software should behave under said circumstances.

All deliverables are required to be reviewed by at least two developers before being merged to a testing branch for QA to ensure that the features are functioning as expected. If any defects are found during this process they should be sent back to the developer to work on.\*

4.3.3 Reporting and Measurement

Updated schedule estimates, and progress reviews, will be generated at the end of each iteration.

Progress for each iteration will be assessed every week, and the schedule will be changed accordingly.

Bugs and Defects will be documented on GitHub so that all members of the team can work together on those.

4.3.4 Risk Management

Risks will be identified in the Inception Phase using the steps identified in the RUP for Small Projects activity “Identify and Assess Risks”. Project risk is evaluated at least once per iteration and documented in this table.

| **Risk** | **Iteration Name** | **Date Reported** | **Solved? (Y/N)** |
| --- | --- | --- | --- |
|  |  |  |  |

4.3.5 Configuration Management

Appropriate tools will be selected which provide a database of Change Requests and a controlled versioned repository of project artifacts.

All source code, test scripts, and data files are included in baselines. Documentation related to the source code is also included in the baseline, such as design documentation. All customer deliverable artifacts are included in the final baseline of the iteration, including executables.

The Change Requests are reviewed and approved by one member of the project, the Change Control Manager role.

**5. Annexes**

The project will follow the UPEDU process.

Other applicable process plans are listed in the references section, including Programming Guidelines.