<Arithmetic Expressions HTML Page>

Version <1.0>

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Revision History

|  |  |  |  |
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| <09/20/2023> | <1.0> | <this is the initial project plan> | <Aryamann Zutshi> |
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# 

# Introduction

The following will describe the purpose, scope, definitions, acronyms, abbreviations, references, and the overview of the Arithmetic Expressions HTML page being developed.

## Purpose

The aim off this SDP is to provide a comprehensive overview of the methodologies, development practices, and management strategies being used for the AE HTML page. All parties involved shall use this as a blueprint to engage in the project in the proper manner so that a structured, and unambiguous rollout of the product can occur. This can also be reflected on for when the document might need any kind of maintenance:

* 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.

## Scope

This SDP encompasses the creation of the AE (Arithmetic Expressions) HTML page. This will be a webpage capable of handling all PEMDAS expressions inputted by the user and returning the proper output after following the proper order of operations. It will also be capable of handling roots, otherwise known as fractional exponents.

## Definitions, Acronyms, and Abbreviations

* SDP: Software Development Plan
* AE: Arithmetic Expression
* PEMDAS: referencing common acronym used in arithmetic expressions to solve order of operation problems
* HTML: stands for “Hyper Text Markup Language,” it is the standard markup language used to create webpages
* CSS: stands for “Cascading Style Sheets,” stylesheet language used to format HTML doc, add color, explains how the render should look on the screen for the user interface
* PL: project lead
* FE: Front end
  + Front end development has to do with what you see and interact with on a website
* BE: Backend
  + Back end development has to do with the code that is running behind the scenes to make the front end functionable
* FEL: Front end lead
* BEL: Back end lead
* Push: committing a block of code to the main code repository
* Digital Ocean: an online cloud server host we will use to put our website available for all to see from their own hosts
* Oat++: open source C++ web framework available on github
* C++: coding language to be used on backend development
* JavaScript: code that can be integrated into an html page for the frontend
* Stakeholder: someone involved in the development process, whether it be directly working on development, funding development, or overseeing development

## References

* This subsection provides a detailed list of documents and resources cited within the SDP. Each document will be organized and recognizable by its title, report number, publication date, and/or the person who is responsible for its development. This way, if there is ever a problem regarding code integration or simply citations, this can be looked back at to resolve it.
  + Slides from EECS 388
    - Majority of plan used this as a reference
  + Iteration Plans
    - This is can be found in section 4.2
  + Digital Ocean
    - <https://www.digitalocean.com/go/developer-brand?utm_campaign=amer_brand_kw_en_cpc&utm_adgroup=digitalocean_exact_exact&_keyword=digitalocean&_device=c&_adposition=&utm_content=conversion&utm_medium=cpc&utm_source=google&gad=1&gclid=Cj0KCQjwvL-oBhCxARIsAHkOiu2-EyZwKVlsf-riHa1mgS0LzwrCJM2k6hu2t7dyAZwqQ_eQhOAK80MaAimsEALw_wcB>
  + Github
    - All our code will be stored on github, allows for everyone to pull and push code, (leads will approve code pushs)
    - <https://github.com/zmanna/SoftwareEngineering>

## Overview

* The rest of the plan will break down each major component into more detail.
  + It will go over the Project Purpose, scope, and objectives.
  + It will discuss the procedural development plan and the iterative approach behind each section’s implementation, and it will discuss team members and their individual roles.
  + There is also a management portion that will discuss managerial approach, if time constraints are being met, and other important details.

# Project Overview

## Project Purpose, Scope, and Objectives

* Purpose: The purpose of the AE HTML page is to create an interactive web-based tool in order to help users in understanding and practicing solving arithmetic expressions.
* Objectives:
  + develop code to correctly follow the PEMDAS order of operations
    - Addition: denoted with ‘+’
    - Subtraction: denoted with ‘- ‘
    - Multiplication: denoted with ‘\*’
    - Division: denoted with ‘/’
    - Modulo: ‘%’
    - Exponents: denoted with ‘^’
  + error proof the code (make sure it doesn’t crash from any unwanted inputs)
  + deploy that code in JavaScript within an HTML file
  + use CSS to make the webpage visually appealing and easily navigable
    - calculator will be formatted as a GUI
    - command line bar below as well for written commands
    - results displayed within calculator as well as within a result box on the page
* Scope: The project encompasses the design, development, testing, and deployment of the AE HTML page, along with user documentation and support materials

## Assumptions and Constraints

* Assumptions:
  + Primary user will have basic knowledge on how to use a computer and navigate to a webpage/use that webpage
  + Users have knowledge of basic algebra and understand PEMDAS
  + The device this program is ran on will be able to support the code we will have developed
    - Frontend: HTML/CSS/javascript
    - Backend: C++
  + All team members will be available to work on the project the entirety of the Fall Semester
    - The resulting web application will be able to be hosted on DigitalOcean
* Constraints:
  + 6 team members in total
    - Project manager
    - 2 backend developers
    - 3 frontend developers
  + Project Deadline
    - By the end of the Fall 2023 semester
  + Project must be open source and all documentation and deliverables can be found on github: (<https://github.com/zmanna/SoftwareEngineering>)

## Project Deliverables

* Project Management Plan
* Requirements Document
* Design Document
* Test Cases
  + We will have multiple test cases for each iteration
* Well documented C++ program
  + This is the backend work, should be explicitly clear how code works, who worked on what
* README file
  + Explain how the program works
  + Walk them through our webpage
  + Give them some example outcomes so they can test it themselves and ensure outputs are correct

## Evolution of the Software Development Plan

* The *Software Development Plan* will be revised prior to the start of each Iteration phase
* Current Revisions:
  + September 20
    - Went through plan, decided our approach on how to structure and organize, settled on using the examples given in class, following those to outline the proposal for the first iteration
    - Next scheduled iteration:
      * September 26
  + September 26

# Project Organization

## Organizational Structure

* All team members on the AE HTML page project are subject to review by Dr. Saiedian and the rest of the EECS 348 faculty.
* All external stakeholders will directly communicate with the PL (Aryamann Zutshi) who will be the focal point to relay information to and from the team to the stakeholders
* Two teams to tackle frontend and backend
  + FT (Frontend Team)
    - Led by John Mosely
      * Team members include Spencer Addis and Will Battey
      * Responsible for coordinating with BT leader and PL
  + BT (Backend Team)
    - Led by Zach Willingham
      * Team members include Matthew
      * Responsible for coordinating with FT leader and PL

## External Interfaces

* The project will use the DigitalOcean platform which is a cloud hosting service to be able to deploy a “droplet”, which is our project onto their servers. The deployment of our project to this server will be led by the FE team and headed by John Mosely(<https://github.com/jomo1217>)
* The project will also utilize Oat++ as a web framework. This can be found on GitHub at (github here). The backend team will be responsible for this and will be headed by Zach Willingham(<https://github.com/zachwillingham>)

## Roles and Responsibilities

* Aryamann Zutshi
  + Github:
  + Project Lead
    - responsible for coordinating with BEL and FEL, our teams quality assurers
    - focal point for communication with outside stakeholders
    - responsible for delegating tasks and filling out forms
    - responsible for making sure deadlines are met and the iterations of the project are done correctly
* John Mosely
  + Github: <https://github.com/jomo1217>
  + Front End Lead
    - Quality Assurance Engineer
    - responsible for all FE related development and testing
    - focal point for communication within team over the FE
    - also responsible for making sure FE team hits deadlines
    - responsible for communicating with BEL and ensuring integration between bases
* Zach Willingham
  + Github: <https://github.com/zachwillingham>
  + Back End Lead
    - Quality Assurance Engineer for the backend
    - responsible for BE related development and testing
    - focal point for communication within the team over BE
    - responsible for his team’s deadlines and communicating with FEL to ensure base integration
* Will Battey
  + Github: <https://github.com/willbtty>
  + Front End Developer
    - Responsible for UI/UX design
      * Create html layout for page after deciding what is most aesthetically pleasing as well as user friendly
        + Use CSS as well
      * Write the javascript to support the backend is C++
* Spencer Addis
  + Github: <https://github.com/spnkrrr>
  + Front End Developer
    - Responsible for UI/UX design
      * Create html layout for page after deciding what is most aesthetically pleasing as well as user friendly
        + Use CSS as well
      * Write the javascript to support the backend is C++
* Matthew Sullivan
  + Github: <https://github.com/matthewsullivan1>
  + Back End Developer
    - Responsible for hosting and maintaining codebase
    - Create user authentication and save user history using SQL
    - Integrate codebase with frontend

Anyone on the project can perform [Any Role](..\..\..\process\workers\wk_any.htm) activities.

# Management Process

## Project Estimates

* Cost Estimates
  + Financials: N/A
* Total time to complete
  + Finalized project by December 5
* Time spent per week
  + Estimated total: 3 hrs
  + Individual work: 2hrs
  + Team meetings: 1 hr
* Re-estimation
  + Will meet once a week so if needed, edits can be made, will be dictated by the leads

## Project Plan

### Phase Plan

N/A

### Iteration Objectives

* \*\*\*TESTING WILL BE DONE EVERY SINGLE ITERATION\*\*\*
* FE team
  + Iteration 1
    - Research and preliminary design
  + Iteration2
    - Basic UI development
  + Iteration 3
    - testing
  + Iteration 4
    - Integration and testing w/ BE
  + Iteration 5
    - User Testing/ Final Adjustments
* BE team
  + Iteration 1
    - Setup and Basic Infrastructure
  + Iteration2
    - Basic Arithmetic Design
  + Iteration 3
    - Advanced Arithmetic Features will be added on
  + Iteration 4
    - Integration and testing w/ FE
  + Iteration 5
    - User Testing/Final Adjustments

### Releases

* There will be 3 total software releases
  + 1st at end of iteration 2
    - Can support all the basic arithmetic functions
    - Beta
  + 2nd at end of iteration 4
    - Should be reaching completed project with support of advanced arithmetic functions at this time
    - Beta
  + 3rd iteration by the end of the fall semester
    - Final product with full functionality should be able to be rolled out
    - alpha

### Project Schedule

* Subject to change due to weekly re-evaluations
* 9/19
  + Begin Iteration 1
* 10/24
  + Begin Iteration 2
* 10/31
  + Begin Iteration 3
* 11/14
  + Begin Iteration 4
* 11/20
  + Begin Iteration 5
* 12/5
  + Iteration 5 should be complete by this time

### Project Resourcing

* All team members are expected to do the following
  + Team members will review basic html/CSS skills on youtube by September 30
    - FE will be ex[ected to go further in depth here
  + Team members will review basic C++ fundamentals by September 30
    - BE expected to go further in depth here
* PL, BEL, FEL
  + Expected to review organization of all documents
  + Expected to look at other examples to further refine our own documentation each iteration

## Project Monitoring and Control

## **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.

## **Quality Control**

* Defects will be recorded and tracked as Change Requests, and defect metrics will be gathered (see Reporting and Measurement below).
* All deliverables are required to go through the appropriate review process, as described in the Development Case. The review is required to ensure that each deliverable is of acceptable quality, using guidelines and checklists.
* Any defects found during review which are not corrected prior to releasing for integration must be captured as Change Requests so that they are not forgotten.
* Quality control will be the responsibility of the FEL(John Mosely) and BEL(Zach Willigham)

## **Reporting and Measurement**

* Updated schedule estimates, and metrics summary reports, will be generated at the end of each iteration.
* The Minimal Set of Metrics, as described in the RUP Guidelines: Metrics will be gathered on a weekly basis. These include:
* Earned value for completed tasks. This is used to re-estimate the schedule and budget for the remainder of the project, and/or to identify need for scope changes.
* Total defects open and closed – shown as a trend graph. This is used to help estimate the effort remaining to correct defects.
* Acceptance test cases passing – shown as a trend graph. This is used to demonstrate progress to stakeholders.
* All team members responsible for reporting their work
* Final reporting responsibility of the PL

## **Risk Management**

* Risks will be identified in 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.
* Responsibility of PL

## **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.

# Annexes

* The project will follow the UPEDU process.
* Other applicable process plans are listed in the references section, including Programming Guidelines.