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|  | Knot Identifying Program  Software Design Document |
|  |  |
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# Introduction

We are using this document to give an overview of our project as a whole.

## Purpose

This project is meant to be an aid to those that are studying Knot Theory and are constructing different knots and want a tool that helps identify them.

## Scope

The scope is making the tool which allows the user to draw the knots and then calculate different invariants of those knots.

## Reference Material

Greenwell, J. (2011). Study of Engagement of diverse and non-traditional student groups. *Journal of Academic Studies*, 21-32.

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## Definition and Acronyms

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| Full Term | Acronym/Abbrev. | Definition |
| Agile | N/A | A project management methodology which uses cycles of planning, building, deploying, and evaluating to build software or systems in an iterative and incremental fashion. Most used for software development but also used for other types of projects. |
| Software Design Document | SDD, SWDD, SDS | A design document used to describe the high-level (and some low-level) architecture and design goals & planning of a software project. |
| Software Development Lifecycle | SDLC | Umbrella Term for methodologies used to make a structured process for producing software systems and applications. |
| Knot | N/A | A mathematical knot which is defined to be a closed loop in 3D Space |
| Invariant | N/A | Property of a knot that does not change under local moves |
| Local Moves | N/A | Any change to a knot that does not change what the knot is. Examples would be rotation, stretching, Reidemeister moves. |

# Human Interface Design

The application will function as a drawing program that allows the user to draw the shape of their knot and customize how the crossings are oriented.

## UI Design Images

# A screenshot of a computer game Description automatically generatedA screenshot of a computer game Description automatically generatedA screenshot of a graph Description automatically generated

# System Architecture

Front-end: Knot Drawer

Back-end: Knot Database

## Epics and Use-cases

“As a math researcher, I want to calculate an invariant of a complicated knot so I can distinguish it from others.”

“As a student, I want to see different examples of a knot so I can get a better understanding of them.”

“As a math researcher, I want to find all knots that have a particular invariant to compare to other knots.”

“As a student, I want to see all knots with 6 crossings so I can study what they look like.”

# Appendices

N/A