Functional Specification

1. **Background**. The problem being addressed.

The combined kinetics of HIV RT and CRISPR-Cas enzymes remain largely unexplored. Our lab has recently developed a platform that harnesses the collateral cleavage ability of CRISPR Cas12a to generate fluorescence. We combined the CRISPR Cas12a system with reverse transcriptase to measure levels of HIV treatment and prevention regimens. With the increasing need for mathematical models that can predict how the reaction will behave, this project aims to create a simple model.

2. **User profile**. Who uses the system. what they know about the domain and computing (e.g., can browse the web, can program in Python)

The users should have a fundamental knowledge of Python, such as being able to open a package and change any variables that are different from the base model. As this project is specific to my lab, the primary users will be researchers in my lab, who range from undergraduates to post-doctoral fellows.

3. **Use cases**. Describe at least two use cases. For each, describe: (a) the objective of the user interaction (e.g., withdraw money from an ATM); and (b) the expected interactions between the user and your system.

(1a) The goal of the first use case is to customize the mathematical model for the user's specific experiment. The reagents can directly affect the enzymatic activity of the reaction, so the user needs to specify what they are using for the model.
(b) The user will input the specific components of their experiments, such as DNA sequence, nucleotide (dNTP) concentration, drug of interest analog (A, C, G, T). The user will input their information in a pop up that will come up and ask for all of the reagents and their concentrations, if needed.

(2a) This goal aims to show the specific real time curve for specific drug concentrations to see how the specific concentration behaves. By viewing individual curves, the user can learn how it is behaving.
(b) After preliminary graphs are shown with all of the drug conditions, a popup will show up and ask what concentration the user is interested in viewing. After the user chooses a specific concentration or declines, a secondary graph will show the individual curve or will exit the popup, respectively.