A blue and white logo

Description automatically generated

Two tape tuning machine simulator

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# Project Description

## This project is a graphical simulation of a Turing Machine using the PyQt5 framework. A Turing Machine is a theoretical computational model capable of simulating any computer algorithm. This simulation specifically checks a language acceptance condition by processing two tapes: the first tape (tape1) contains a sequence of characters, and the second tape (tape2) builds a sequence based on the characters in tape1. The simulation progresses in two phases: copying the characters from tape1 to tape2 up to a delimiter ('c'), and then comparing the sequences in both tapes to determine if the language is accepted or denied.

# Input Format

## tape1: Initialized with a sequence of characters ['B', 'a', 'a', 'b', 'c', 'a', 'a', 'b', 'B'].

## tape2: Initialized as ['B'].

## The head positions (head1 and head2) start at the first character of tape1 and tape2, respectively.

# Output Format

## Graphical representation of the tapes and head positions.

## Result label indicating whether the language is "Succeeded" or "Denied".

# Inside Mechanism

## Initialization: The GUI initializes with fixed-size settings and labels for displaying the tapes and head positions.

## Simulation Start: The "Start Simulation" button initiates the simulation, disabling itself until the simulation completes.

## Tape Processing: The simulation processes tape1 in two phases:

## Copy Phase: Characters 'a' and 'b' from tape1 are copied to tape2 until 'c' is encountered.

## Compare Phase: After encountering 'c', the simulation compares the remaining sequence of tape1 with tape2.

## Result Determination: Based on the comparison, the result label updates to "Language Succeeded" (green) or "Language Denied" (red), and the simulation stops.

# Programming Language, Tools & Libraries Used

## Programming Language: Python

## Tools & Libraries:

## PyQt5 for GUI development and event handling

## QTimer for timed simulation steps

## Image of output

A computer on a desk with a lamp

Description automatically generated