Nile University

Two tape tuning machine simulator

CSCI 419

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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