Appendix: User Manual

The application is hosted on the school servers for access on the school network by following this link: https://jeh27.teaching.cs.st-andrews.ac.uk/. If you would like to instead install and execute the application locally, follow the Installing and Executing section.

Installing and Executing

The application requires Node [52] to be installed and was created using version 16.20.2. Once installed, start by running *npm install* to install all React libraries and dependencies for the application. Once installed, this does not have to be run again. To run the application, first build the application by running *npm run build,* and once completed, run *npm run start* to run the application as a server attached to localhost:3000. Next.js will provide a hyperlink to this in the terminal. Locating to localhost:3000 in your browser will display the application.

Using the Application

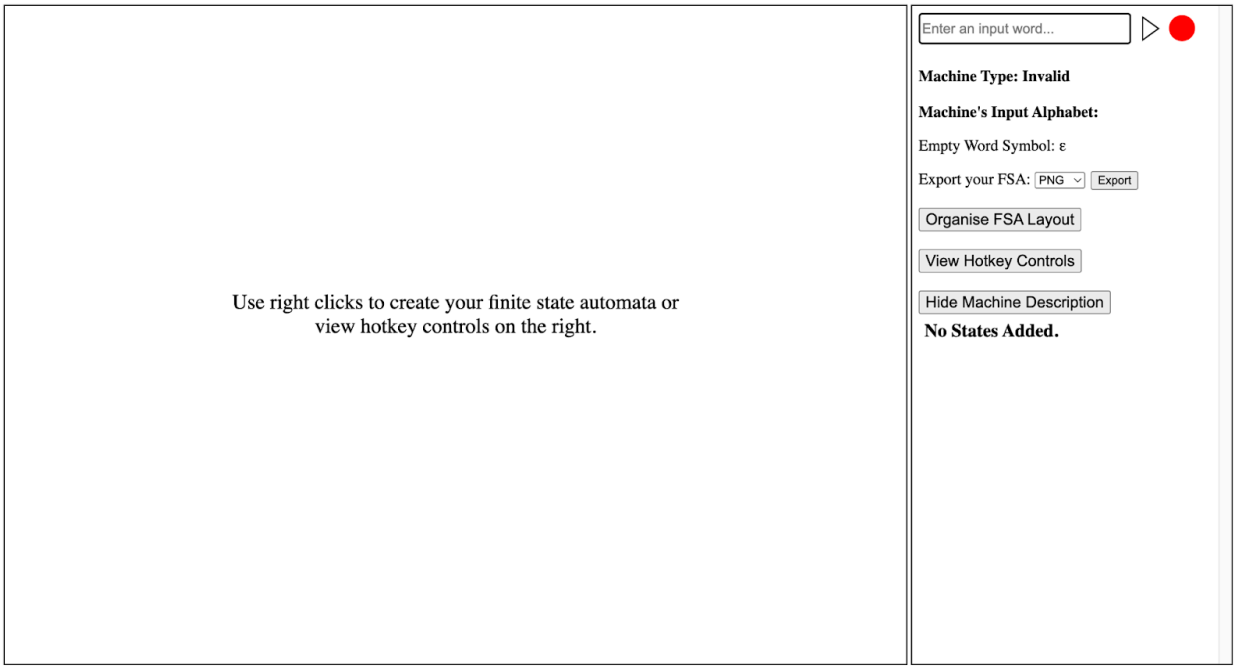

Figure 20: Screenshot of Application

On the left side is the Viewport, which may be used to graphically create a finite state automaton and on the right side is the Interaction Window, which allows you to run an input on your automaton, view information about it, or export it as an image or JSON file.

There are two main control schemes that allow you to create and edit your automaton. The first is through right-clicks and selecting an option from a menu shown. Right-click on the background to either create a new state or clear the Viewport of all states and transitions. Right clicking on a state allows you to either: create a transition by selecting that state as the origin state and then right click on another to finish creating the transition by selecting the destination state, toggle the accept status of a state, make that state the start state of the automaton or delete it and all connected transitions. Right-clicking on a transition allows you to delete it.

The second is hotkey controls that are listed by clicking ‘View Hotkey Controls’, these are combinations of keys and mouse clicks.

The controls are the following:

- Double Click (Blank Space) — Creates a new state at the mouse’s position.
- Click (State) — Allows the user to change the state’s name.
- Drag (State) — Updates the state’s position.
- Shift + Click (Two States) — Creates a transition between the two states.
- Shift + Click (One State x2) — Creates a self-pointing transition.
- Alt + Click (State) — Deletes the state and all connected transitions.
- Alt + Click (Transition) — Deletes the transition.
- Double Click (State) — Toggles whether the state is an accept state or not.
- Control + Click (State) — Turns the selected state into the start state.

Note: Alt is equivalent to the ‘option’ key on macOS.

To export the automaton, select an option from the dropdown and click export to either download a PNG or SVG file of the diagram or a JSON file detailing the machine built.