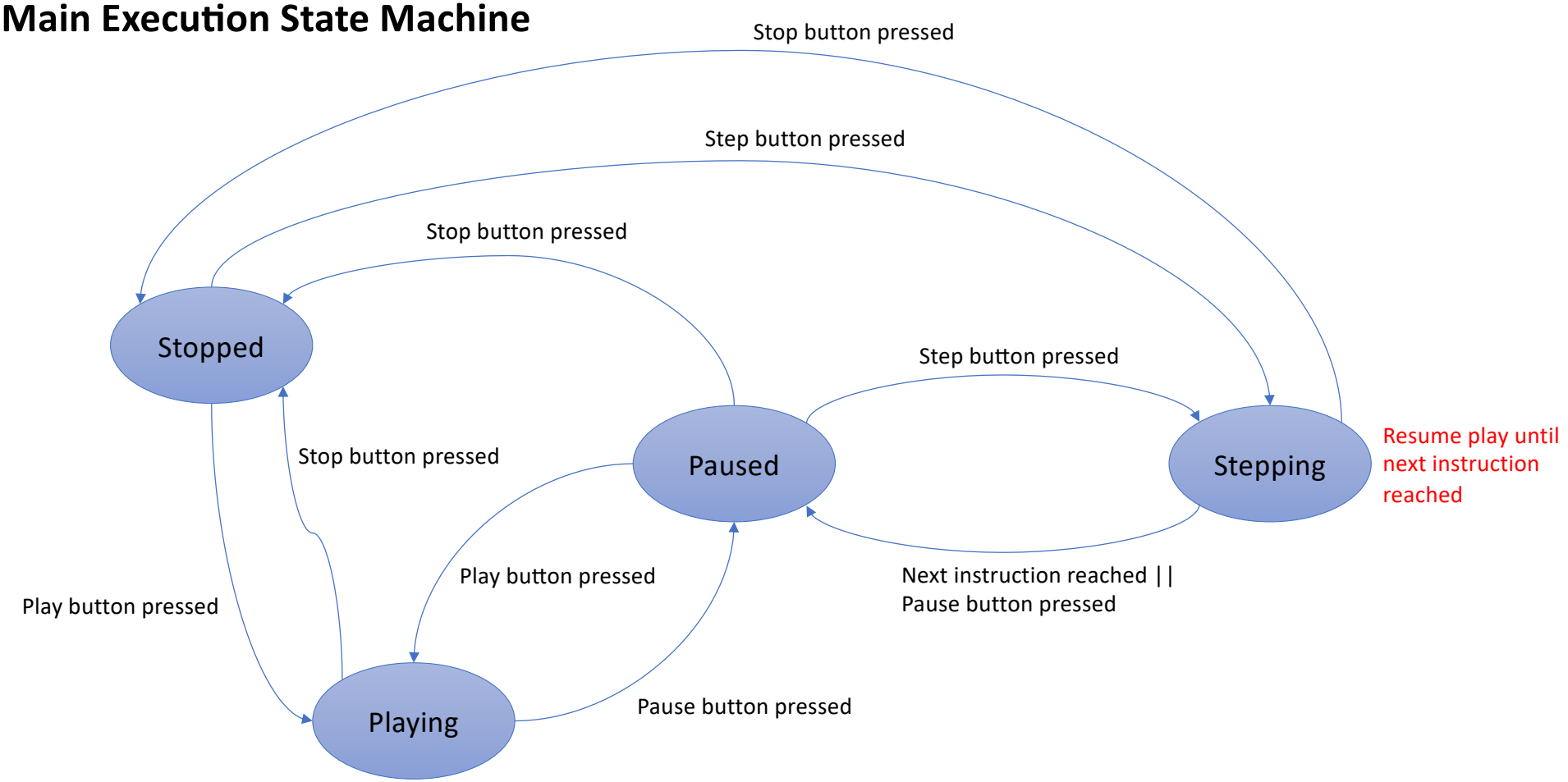
Main Execution State Machine

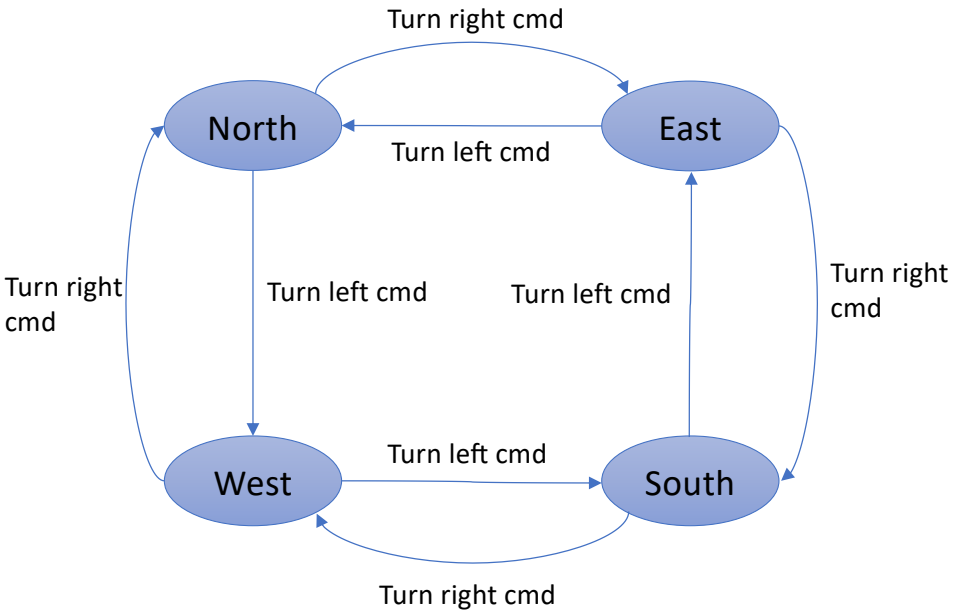


Main Execution State Machine

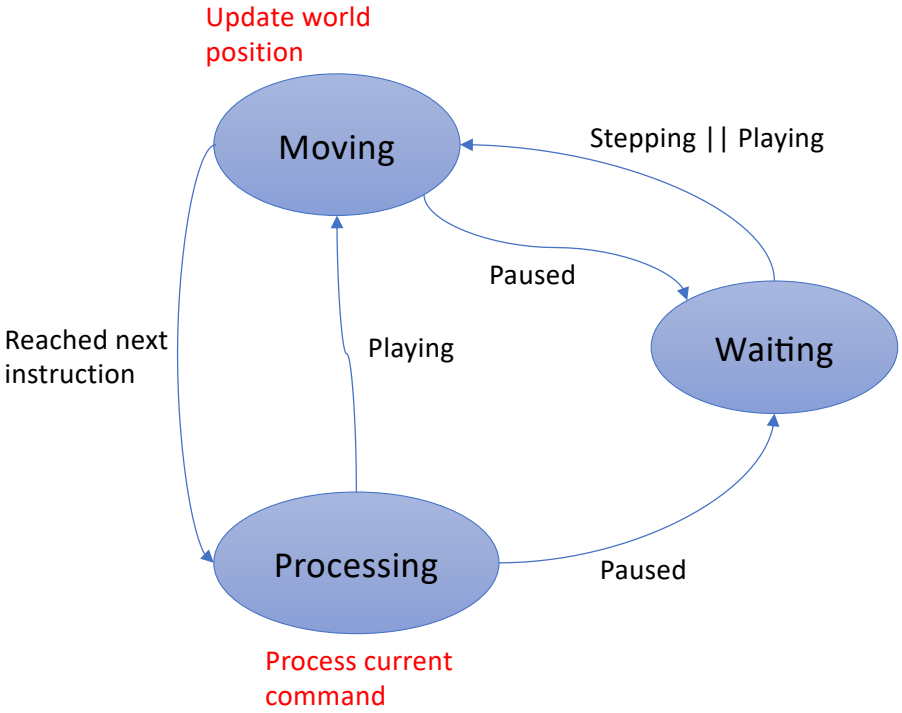
- Main execution state machine drives how the drone gets updated in the grid and how the commands are read
  - Stopped
    - The current program is stopped and can be edited by the user
  - Playing
    - The program is running without stopping in between each command
    - Drone should be moving consistently
  - Paused
    - The current program is paused but in the middle of execution, so no editing
    - Playing after this will continue execution from where it is
  - Stepping
    - The drone is moving to the next position on the grid, but will pause when reaching the next one
    - Process command -> move to next spot -> pause

Drone State Machines

Direction State Machine



Drone Execution State Machine

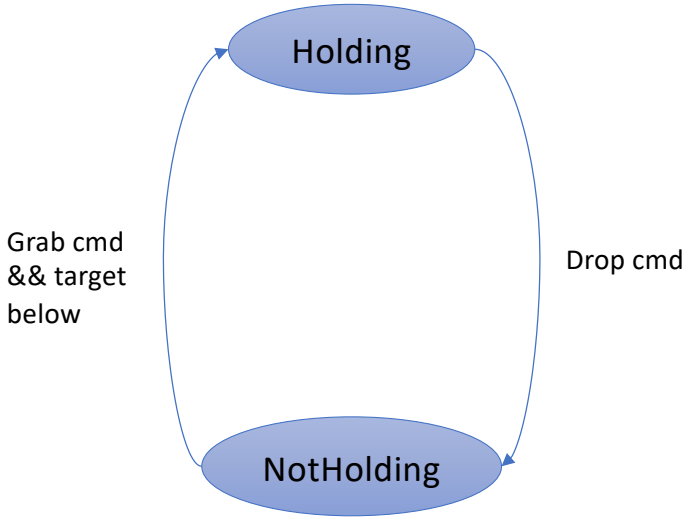


Drone State Machines

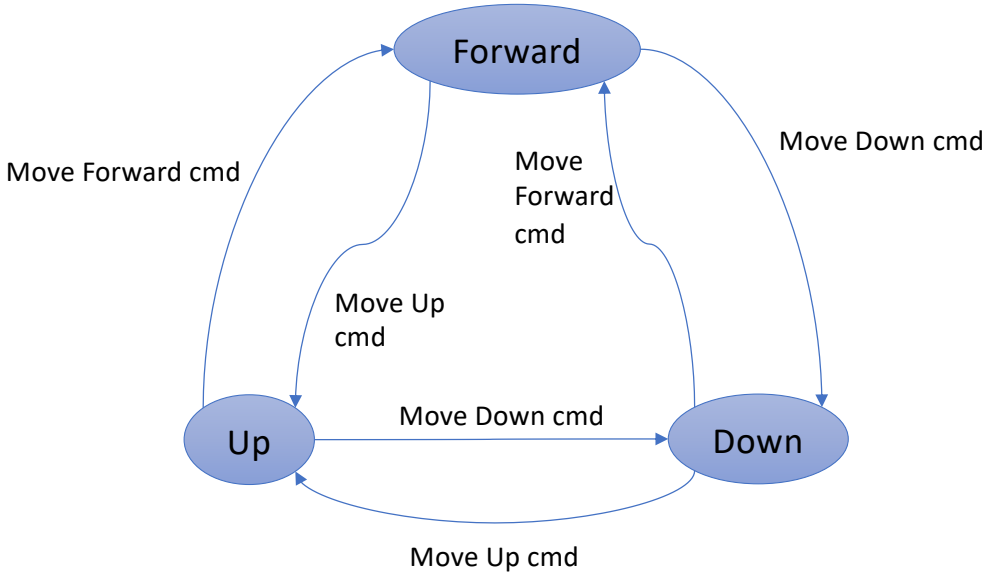
- Direction state machine determines which direction the drone will move if moving forward
  - North – drone facing north
  - East – drone facing east
  - South – drone facing south
  - West – drone facing west
- Drone execution state machine swaps between processing the command and moving to the next command
  - Moving – drone is moving in the grid toward the next command
  - Processing – drone reads the command and updates its state machine; moves to waiting or moving immediately after processing
  - Waiting – drone waiting for either the execution to resume with either stepping or playing

Drone State Machines

Hold State Machine



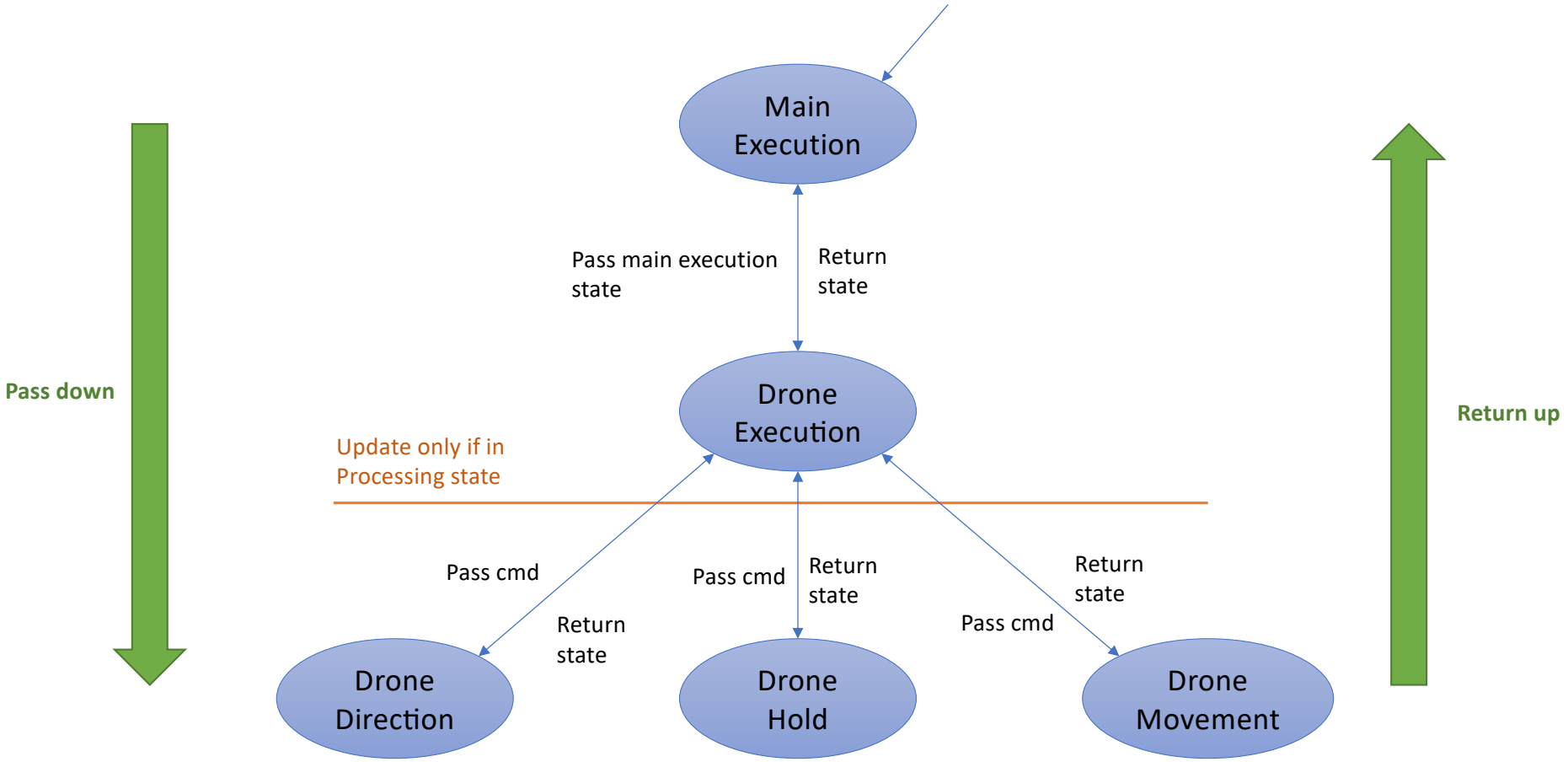
Movement State Machine



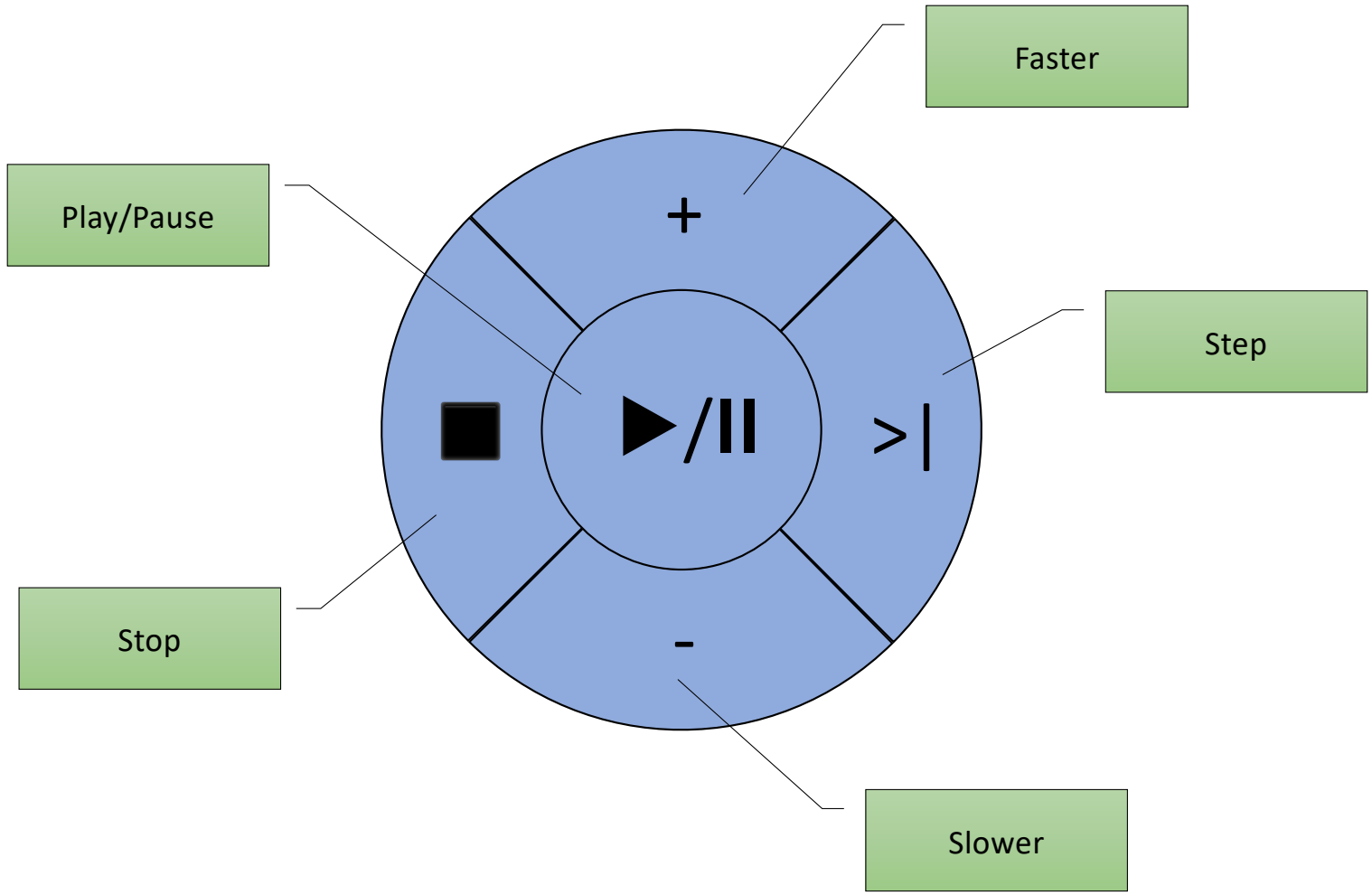
Drone State Machines

- Hold state machine determines if the drone is currently holding a target or not
  - Holding – drone is holding a target
  - Not Holding – drone is not holding a target
- Movement state machine determines how the drone is moving in the grid
  - Forward – drone is moving forward in direction supplied from the direction state machine
  - Up – drone is moving upward (+y coordinate)
  - Down – drone is moving downward (-y coordinate)

Flow of Control/Order of State Update



Touchpad for Playback Control



Touchpad for Playback Control

- User presses in certain sections on the touchpad in order to play, pause, stop, or step execution
- Up and down on the touchpad controls how fast the execution speed is when playing
  - Switch between slow (x0.5), normal (x1), and fast (x3)
- Depending on the main execution state, some buttons will not do anything
- Play/Pause button will show the correct label depending on the main execution state
  - Play icon shows when stopped or paused
  - Pause icon shows when playing or stepping
- In order to know when the button is pressed or released, events are invoked
  - When the button is first pressed, a “ButtonPressed” event in invoked
  - When the button is released, a “ButtonReleased” event is invoked
  - When the user slides their finger over a new button, a “ButtonReleased” event is invoked first for the released button, then a “ButtonPressed” event is invoked for the new button the finger is over