Event Driven State Machine Lab

BME554L - Fall 2025 - Palmeri

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> 💡 Tip
>
> I would recommend doing this with pencil and paper first, not immediately jumping into
> a tool. Err on the side of more detail than not.

Digital Kitchen Timer

Generate a state diagram for a simple digital kitchen timer that has the following buttons:

- `Start/Stop` Button
- `Reset` Button
- `Pause` Button
- `Up/Down/Left/Right` Arrow Buttons (4)

The timer outputs time intervals in the format: `HH:MM:SS`

Functional States

- The kitchen timer has an "Idle" state when it isn't actively counting down time. In this
  state:

  - The `Up/Down` buttons increment the time for the `HH`, `MM` or `SS` values.

- The `Left`/`Right` buttons let you move between `HH`, `MM` and `SS`.
- Time intervals will wrap around to `00` when a reasonable max value is exceeded.
- The `Reset` button sets all of the time values to `00`.
- The `Pause` button is inactive.

- `Start/Stop` will start the timer countdown when in `Idle`.
- In the `Countdown` state:

  - The `Start/Stop` button will stop and reset the countdown interval.
  - The `Pause` button will pause, but not reset, the countdown time.

- When the countdown is done, the timer enters an `Alarm` state, where:

  - The `Up`/`Down`/`Right`/`Left` arrow buttons, `Reset` and `Pause` buttons are inactive.
  - `Start/Stop` will stop the alarm and return the timer to `Idle` with the previously set countdown time.

> 💡 Tip
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> If any functional state expectation isn't explicitly described above, please implement something reasonable.

Make sure that your state diagram:

- Has initialization (i.e., batteries put in) and termination (i.e., completely powered off) dots.
- Includes all functional states, including (but not limited to):

  - `Idle`
  - `Countdown`
  - `Paused`
  - `Alarm`

- Consider if states should have entry and exit actions.
- Make sure all transitions between states are annotated with associated triggering events.

Generate the State Diagram

Formally render your state diagram using one of the tools outlined on the State Diagram Tools page.

Gradescope

Upload your rendered state diagram to the associated Gradescope assignment.