OAK RIDGE National Laboratory

Sequencer Lab

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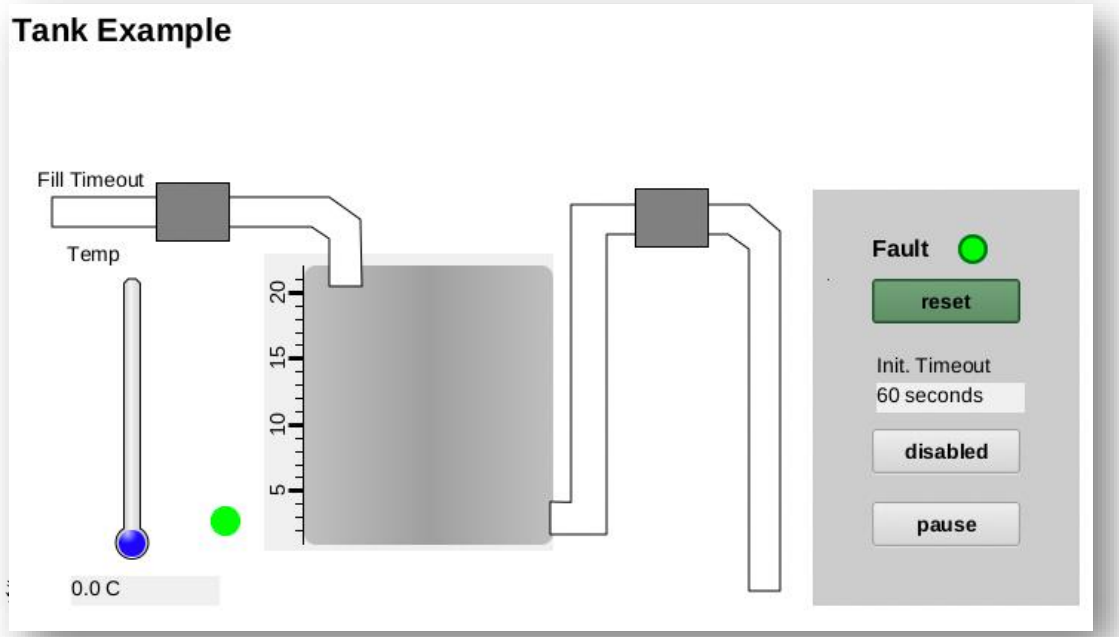
Tank Example

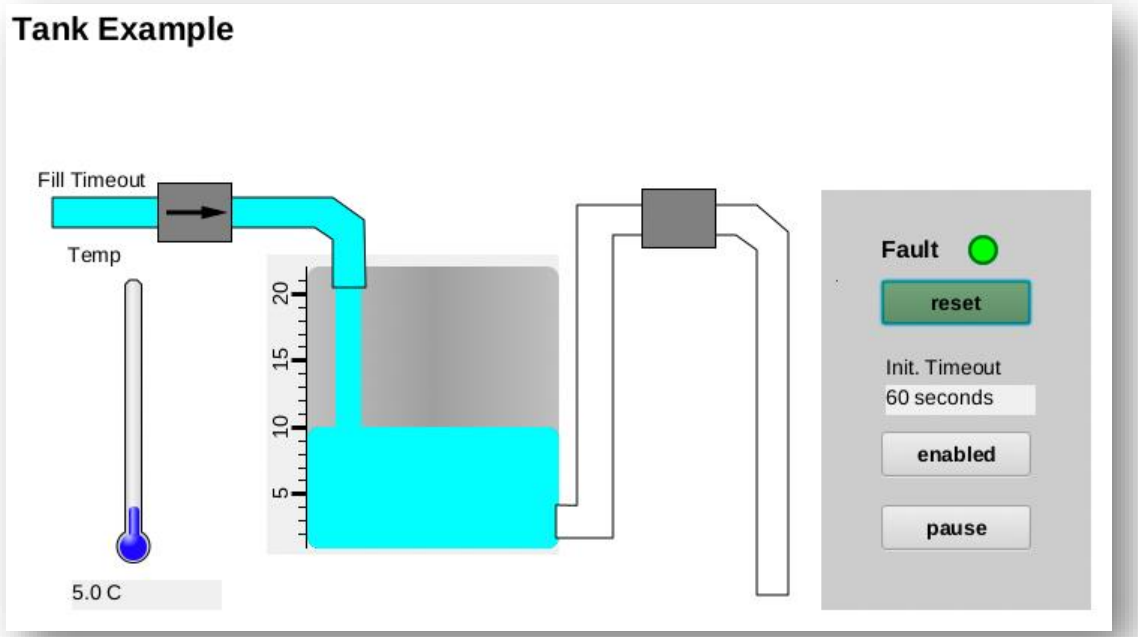
- In CSS, open /ics/examples/17_sequencer/tank.bob
- In terminal, run IOC

```
cd /ics/examples/17_sequencer/iocBoot/iocseq
./st.cmd
```

- Click “disabled” so it turns “enabled”. Tank should fill.

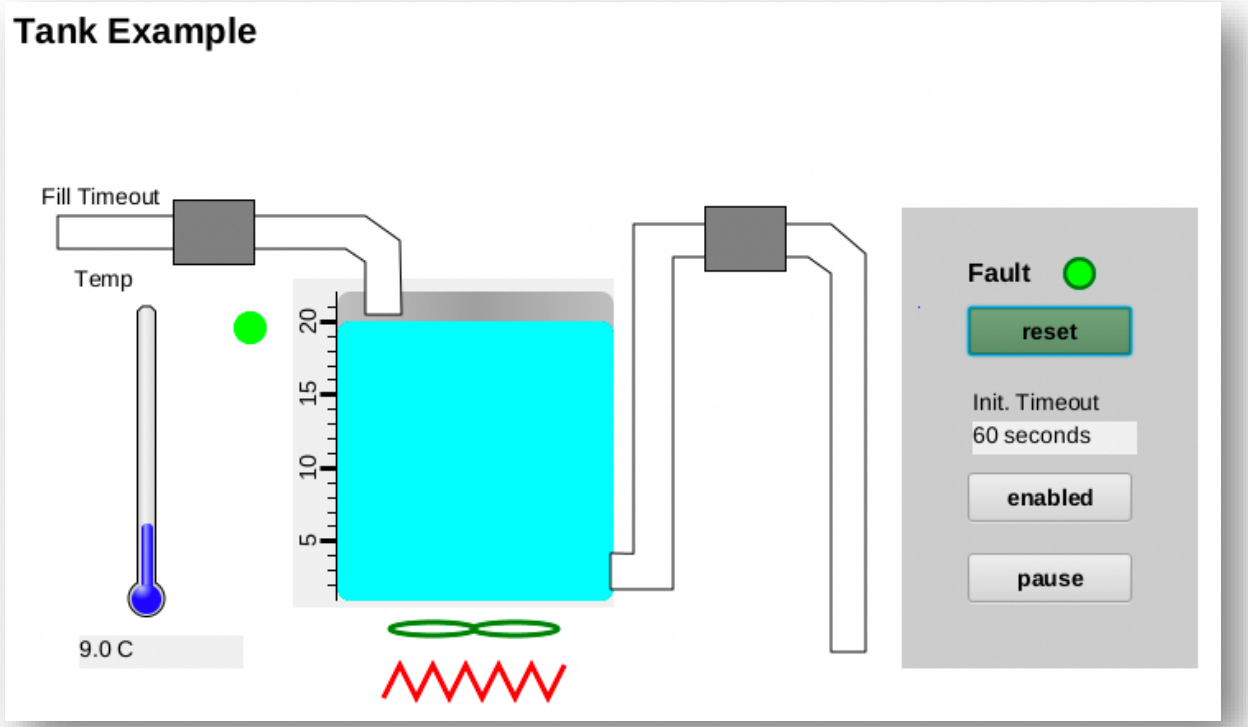
  If you waited too long and there’s a fault, “reset”

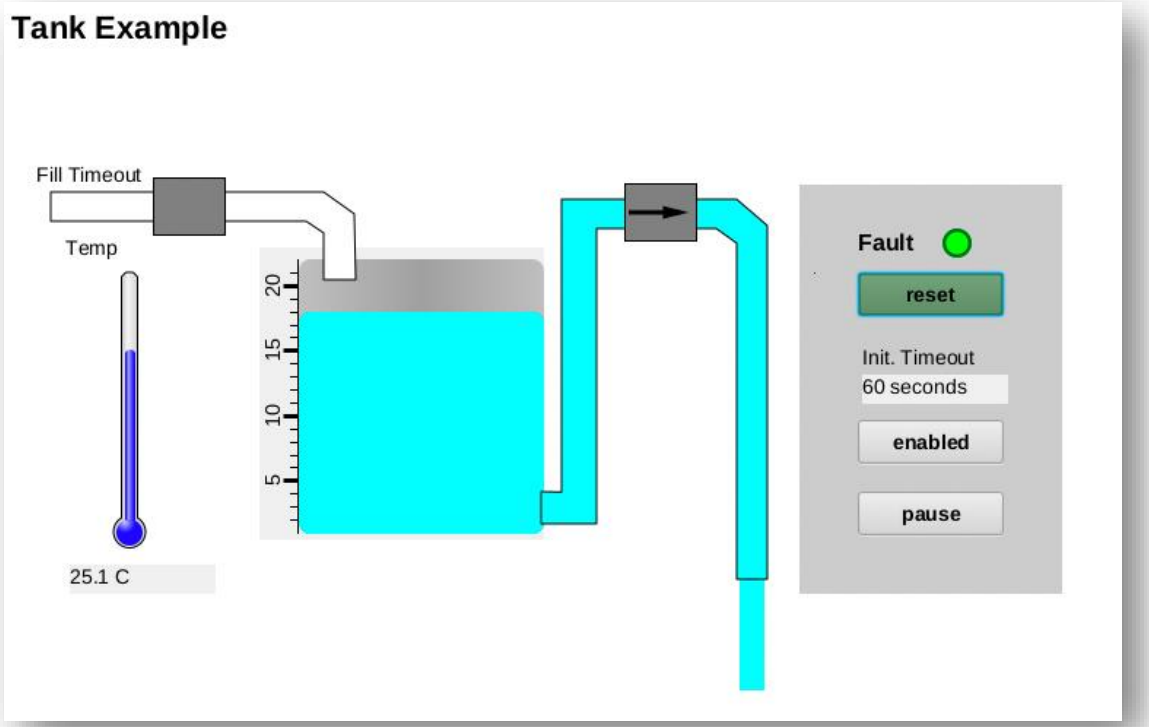




Tank Example…

- When full, the tank should heat and stir
- When temperature reaches 25C, tank is emptied





Study Database, 17_sequencer/seqApp/Db/tank.db

- Under what conditions will the "..:level" record simulate a "fill"?
- .. up to what level?
- What does "..:highLevel" detect?

- How could you simulate a faster tank fill/drain?
- .. a faster heatup?

- Will anything in the database start/stop the pumps, turn the heater on/off?

Study SNL, 17_sequencer/seqApp/src/tank.st

- Why are some variables using “monitor”, others not?

- Restart the IOC. What is the initial state?
- What needs to happen to reach the “filling” state?
- How to then get to the “heating” and “transferring” states?

- Re-start the IOC. How do you get into the “faulted” state?
- How do you then get out of the “faulted” state?

- While ”filling” or “heating”, what happens when you push “pause”?
- When no longer “paused”, how does the sequence know if it should return to “filling” or “heating” or …?

Study SNL, 17_sequencer/seqApp/src/tank.st …

- Are the pumps, heater, impeller/stirrer turned on/off
  a) In the code that transitions into some state?
  b) In the `entry {..}` section of the target state?
- What's the advantage of each approach?

Update the "transferring" state to turn everything on/off as needed within its `entry {..}` section

Update the SNL code

The original code transitions
"heating" ➔ "transferring"
when the temperature reaches 25

Add two states:

"heating" ➔"holding"➔"reheating"➔"transferring

Best do this one at a time!

- State "holding" – hold temperature for 10 seconds
  - Transition to this state from "heating"
  - Transition to "reheating" when complete
- State "reheating" – heat until temp >= 30
  - Transition to "transferring" when complete

Example End Result

Temperature pauses at 25 C, then re-heats to 30