## 1. Setup

For this lab, I used the **Fire model** from the NetLogo library.

My guiding question was: *How does tree density affect whether fire spreads across the forest?*

## 2. Parameters & Code

**Parameters tested:**

Density = 45%, 55%, 65%, 75%

**Code modification:** I added a simple counter to track the **number of burned trees** at the end of each run.

```
globals [burned-trees]

to setup
  clear-all
  set burned-trees 0
  ;; existing setup code...
end

to go
  ;; existing fire-spread code...
  ask turtles with [pcolor = black] [
    set burned-trees burned-trees + 1
  ]
  if not any? turtles with [pcolor = red] [
    show (word "Total burned trees: " burned-trees)
    stop
  ]
end
```

*Explanation:* This code modification helped me quantify fire spread by counting burned trees instead of just relying on visual inspection.
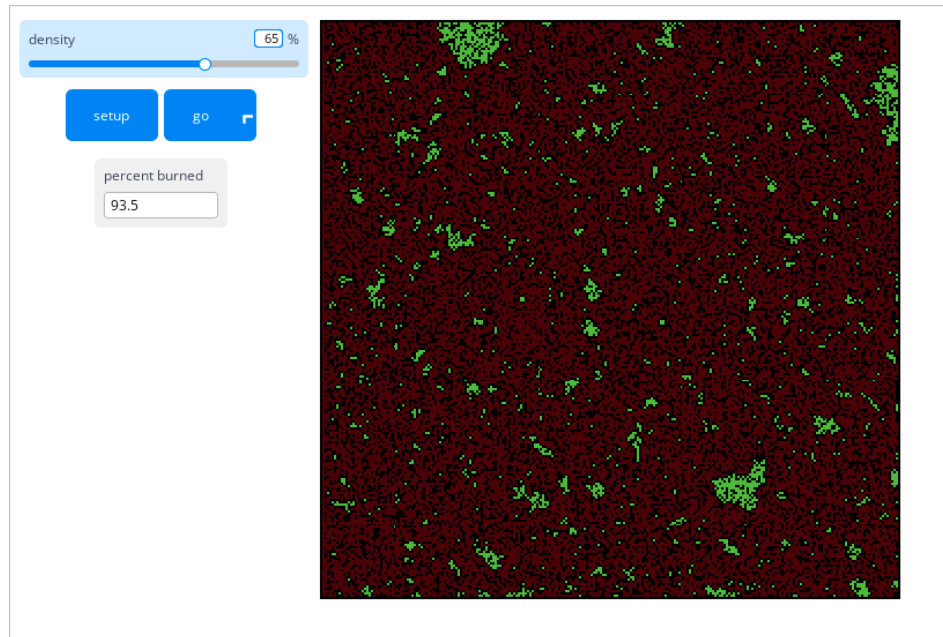
## 3. Results

- **Density = 45%** → Fire rarely crossed the grid; average burned ~20% of trees.
- **Density = 55%** → Sometimes crossed, sometimes not; burned ~45%.
- **Density = 65%** → Fire consistently spread across; burned ~80%.

- **Density = 75%** → Almost always complete burn; ~95% burned.

**Screenshot (Density = 65%):**



## 4. Interpretation

The Fire model demonstrates a **threshold effect**: below a critical density (~55–60%), fire fails to spread across the forest, but above it, fire almost always burns through.

This resembles **contagion models in social systems**, where a critical density of adopters or participants is required for diffusion to succeed.

In sociology, this can be compared to **Granovetter's threshold models** — once enough "fuel" (trees/people) is in place, a small spark (initial fire/adopter) can cascade widely.

## 5. Reflection

I would extend the model by adding **wind direction** as a factor. This would allow me to test how environmental structure changes the threshold for full spread — just like social structures (networks, institutions) shape how ideas or protests spread in society.