**Julio Pochet Edmead**

**Module 5.2 Assignment:**

**Forest Fire Simulation: Flowchart**

**A screenshot of a computer screen

AI-generated content may be incorrect.**

**Forest Fire Simulation: Pixel Assignment Rules**

**1. Initial Pixel Assignment (Forest Creation)**

Each pixel in the grid is assigned one of three states:

|  |  |  |
| --- | --- | --- |
| **Symbol** | **Meaning** | **Assignment Rule** |
| A | Tree | Randomly placed based on INITIAL\_TREE\_DENSITY. |
| @ | Fire | Randomly ignited based on FIRE\_CHANCE. |
|  | Empty | Default state if no tree is assigned. |

**Example Code:**

if (random.random() \* 100) <= INITIAL\_TREE\_DENSITY:

forest[(x, y)] = TREE # Place tree

else:

forest[(x, y)] = EMPTY # Keep empty

**2. Pixel State Changes During Simulation**

Each pixel updates dynamically based on the following conditions:

**Tree Growth (Empty → Tree)**

* A tree grows in an empty space based on GROW\_CHANCE.

if ((forest[(x, y)] == EMPTY) and (random.random() <= GROW\_CHANCE)):

nextForest[(x, y)] = TREE

**Lightning Strike (Tree → Fire)**

* A tree catches fire randomly due to a lightning strike.

elif ((forest[(x, y)] == TREE) and (random.random() <= FIRE\_CHANCE)):

nextForest[(x, y)] = FIRE

**Fire Spreading (Tree → Fire)**

* If a tree is next to a burning tree, it catches fire.

elif forest[(x, y)] == FIRE:

for ix in range(-1, 2):

for iy in range(-1, 2):

if forest.get((x + ix, y + iy)) == TREE:

nextForest[(x + ix, y + iy)] = FIRE

**Burned Trees (Fire → Empty)**

* Burning trees turn into empty spaces.

elif forest[(x, y)] == FIRE:

nextForest[(x, y)] = EMPTY

**3. Emergent Patterns Due to Randomness**

* **Each run produces unique results** due to random tree placement, fire spread, and regrowth.
* Adjusting **GROW\_CHANCE** and **FIRE\_CHANCE** affects whether the forest **recovers or burns completely**.

**Running the code in a command line interface:**

