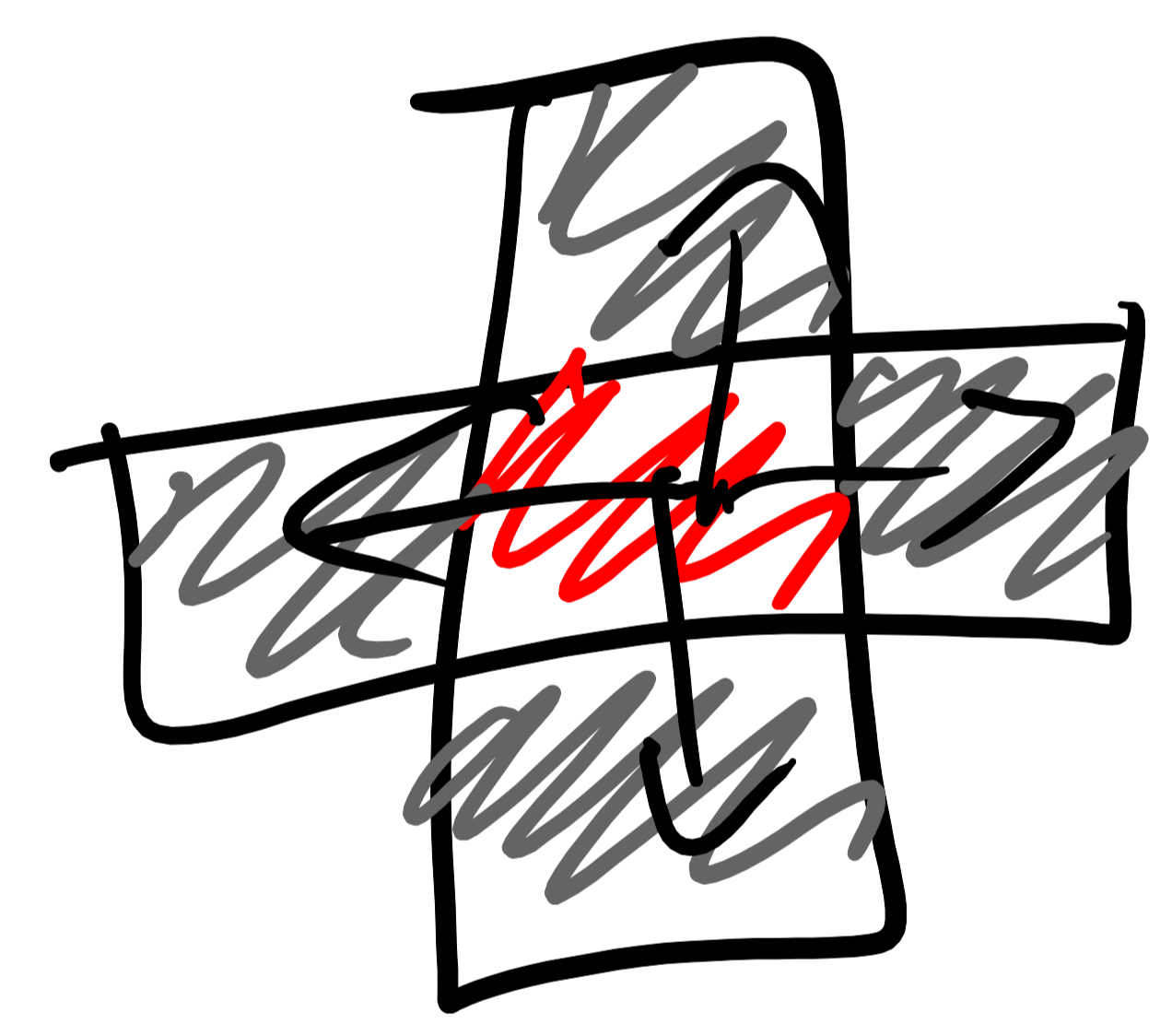
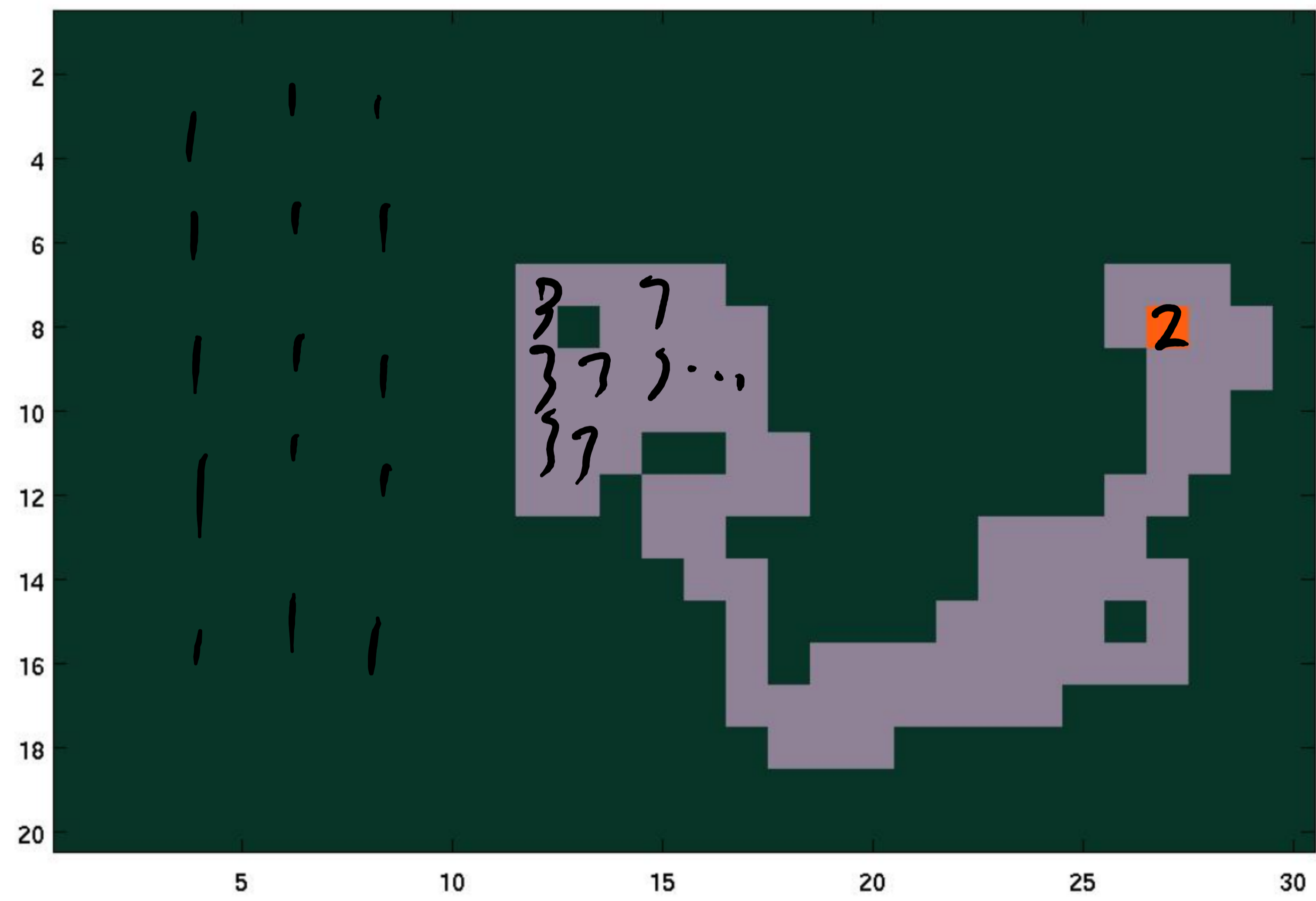
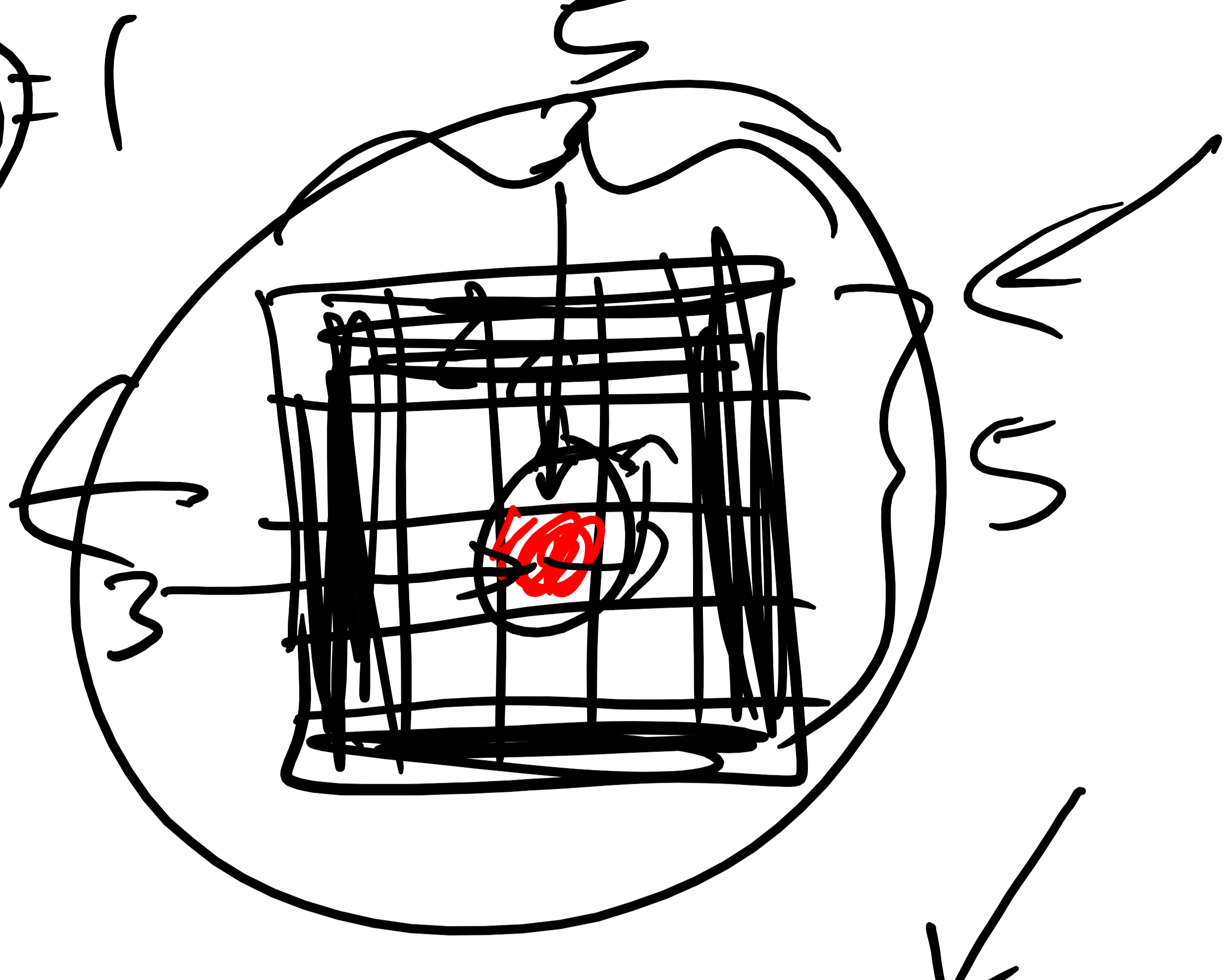


Create a file fire.m implementing a function with the following specifications:

```
function outcomes = fire(numRows, numCols, startRow, startCol, trials)
% Simulate the spread of a fire.
% USAGE: outcomes = fire(numRows, numCols, startRow, startCol, trials)
% The simulation will be performed on a grid with
% specified number of rows and columns, assumed to be numbered
% starting at (1,1) at the top-left. The fire begins at location
% (startRow, startCol) within that grid.
%
% An individual trial will have one of five outcomes:
% 1) it reaches the right edge of the grid
% 2) it reaches the bottom edge of the grid
% 3) it reaches the left edge of the grid
% 4) it reaches the top edge of the grid
% 5) it burns out within the grid.
% The returned outcome will be a row-vector of length five
% designating the percentage of trials that resulted in
% such outcomes. For example, the value outcomes(5) is the
% percentage of trials that burned out.
%
% input argument trials specifies the number of independent
% trials. If not specified, one trial will be performed.
%
% When only one trial is to be performed, the function animates
% the spread of the fire.
```



Creating Images in Matlab

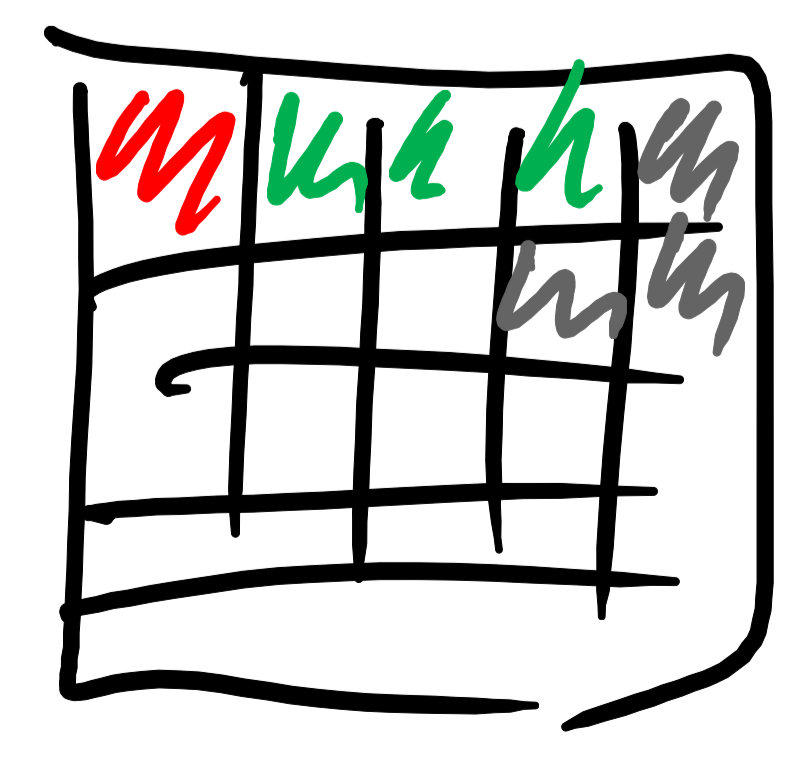
Given a matrix of integers, you can plot an image based on the use of those integers as indices into a prescribed colormap. The syntax is `image(A)` where `A` is the matrix of numbers.

For our images, we simply use three colors, with color 1 being the forest green, color 2 being the fiery orange, and color 3 being the burnt-out gray. We set that colormap with the following command.

```
colormap([.035 .200 .153; 1.00 .367 .063; .561 .510 .592]) % rgb values for green, orange, gray
```

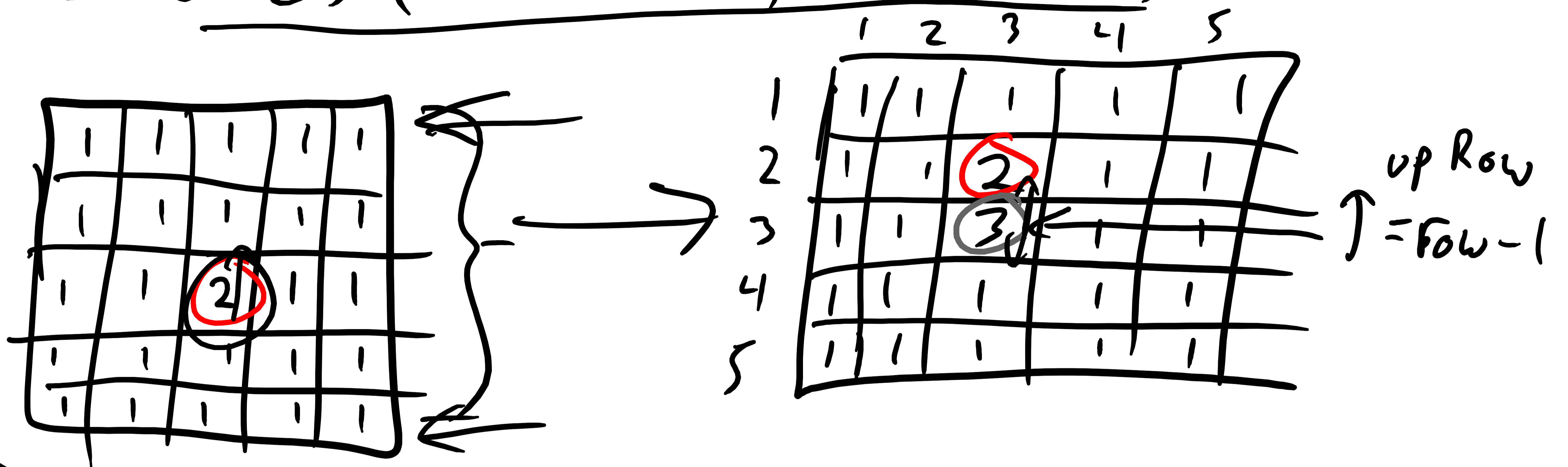
For example, try copy-pasting these three lines into a script. Then, change the map matrix to modify the image.

```
colormap([.035 .200 .153; 1.00 .367 .063; .561 .510 .592]) % rgb values for green, orange, gray
map = [ 1 1 1 1; 2 3 3 1; 2 3 3 1];
image(map);
```



$trials = 100$
 $North = 25$
 $outcomes [\sim \sim \sim .25 \sim]$
 $\uparrow \uparrow \uparrow \uparrow \uparrow$
 $R \quad B \quad L \quad \sim \quad C$

forest = ones(numRows, numCols)

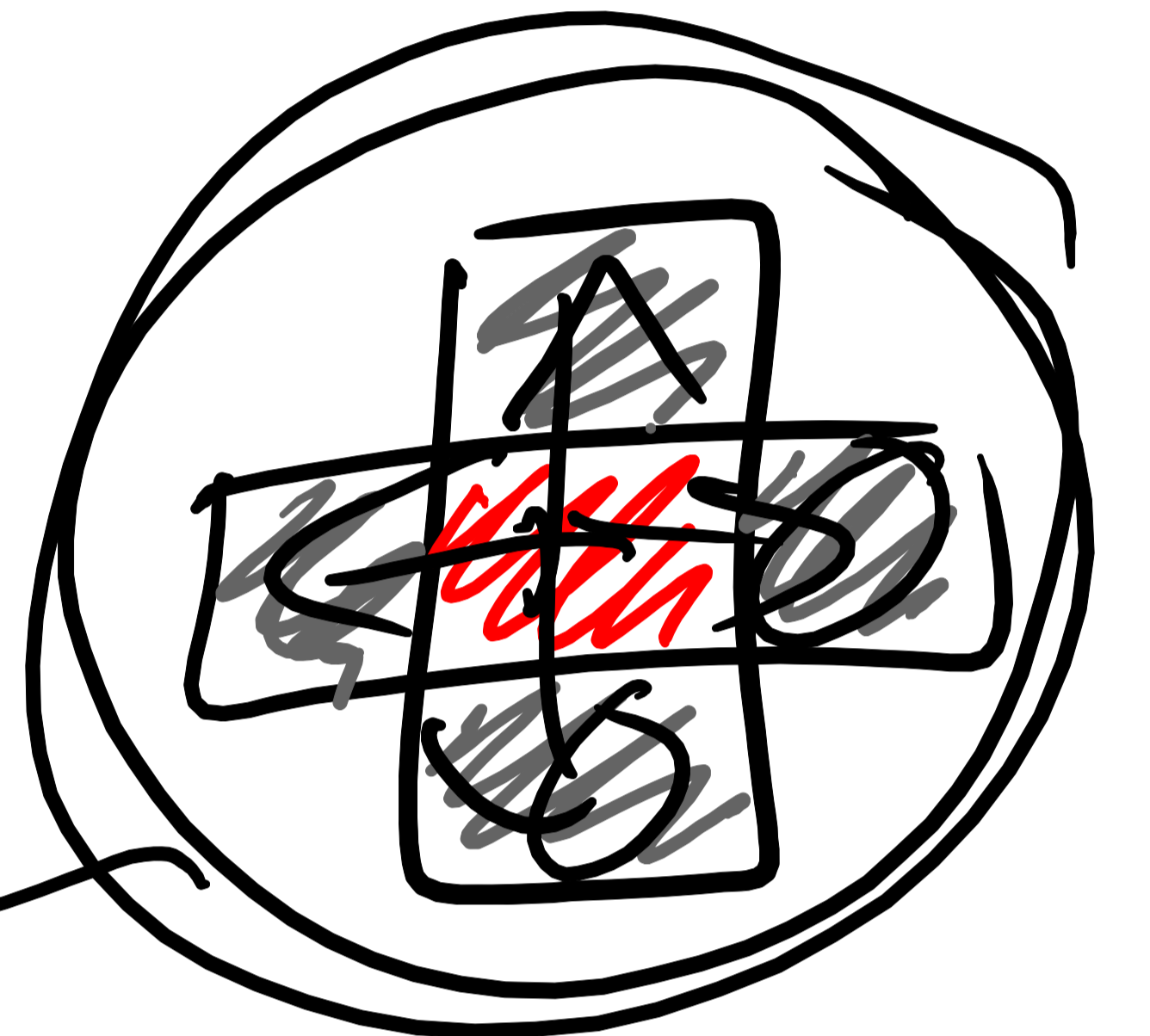


fireRow = start + Row

fireCol = start + Col

forest(start + Row, start + Col) = 2;

→ while (fire_burns == true)



valid = directions;

valid = ['N', 'W'];

← pick one of these at random

① What if valid is empty?

Pick a
Random
Direction

Random if length(valid) == 0

break; ← out core
end

② How do we pick a random element of valid?

randomPick = randi(length(valid));

randDir = valid(randomPick);
= 'N'

→ forest(fireRow, fireCol) = 3; % burnt

```
randDir = 'N'
```

```
if randDir == 'N'  
    fireRow = fireRow - 1;
```

```
else if RD == 'E'  
    fireCol = fireCol + 1;
```

```
    ~~~~~ 'S'
```

```
    ~~~~~ 'W'
```

```
end
```

```
→ forest(fireRow, fireCol) = 2 % fire
```

```
if trials == 1
```

```
    colormap(...)
```

```
    image(forest
```

```
        pause(0.5);
```

```
end
```

```
end % while
```