globals [

initial-trees ;; how many trees (green patches) we started with

burned-trees ;; how many have burned so far

oppo-zone

oppo-xstart

oppo-xend

oppo-ystart

oppo-yend

]

breed [fires fire] ;; bright red turtles -- the leading edge of the fire

breed [embers ember] ;; turtles gradually fading from red to near black

to setup

clear-all

set-default-shape turtles "square"

;; make some green trees

ask patches with [(random-float 100) < density]

[ set pcolor green ]

;; make a column of burning trees

ask patches with [pxcor = min-pxcor]

[ ignite ]

;; set tree counts

set initial-trees count patches with [pcolor = green]

set burned-trees 0

reset-ticks

; Rain Area:

set oppo-xstart ( - max-pxcor / 2)

set oppo-xend (max-pxcor / 2)

set oppo-ystart ( - max-pxcor / 2)

set oppo-yend ( max-pxcor / 2)

end

to go

if not any? turtles ;; either fires or embers

[ stop ]

ask fires

[

ask neighbors4 with [pcolor = green]

[

ifelse oppo and (pxcor < oppo-xend) and (pxcor > oppo-xstart) and (pycor > oppo-ystart) and (pycor < oppo-yend)

[ set oppo-zone TRUE ]

[ set oppo-zone FALSE ]

ifelse oppo-zone and ((random-float 100) < oppo-chance)

[ ]

[ ignite ]

]

set breed embers

if supp and (pxcor < max-pxcor - 2) and (pxcor > min-pxcor + 2) and (pycor < max-pycor - 2) and (pycor > min-pycor + 2)

[

ask patch-at-heading-and-distance supp-angle 3

[

ifelse oppo and (pxcor < oppo-xend) and (pxcor > oppo-xstart) and (pycor > oppo-ystart) and (pycor < oppo-yend)

[ set oppo-zone TRUE ]

[ set oppo-zone FALSE ]

ifelse oppo-zone and ((random-float 100) < oppo-chance)

[ ]

[

if pcolor = green

[ ignite ]

]

]

set breed embers

]

]

fade-embers

tick

end

;; creates the fire turtles

to ignite ;; patch procedure

sprout-fires 1

[ set color red ]

set pcolor black

set burned-trees burned-trees + 1

end

;; achieve fading color effect for the fire as it burns

to fade-embers

ask embers

[

ifelse oppo and (pxcor < oppo-xend) and (pxcor > oppo-xstart) and (pycor > oppo-ystart) and (pycor < oppo-yend)

[ set oppo-zone TRUE ]

[ set oppo-zone FALSE ]

ifelse oppo-zone

[

set color color - 0.05 ;; make red darker but slower than when no rain.

if color < red - 3.5 ;; are we almost at black?

[

set pcolor color

die

]

]

[

set color color - 0.3 ;; make red darker

if color < red - 3.5 ;; are we almost at black?

[

set pcolor color

die

]

]

]

end