Coral-Algae Model V1

Part I

While the coral\_algaeV1.nlogo file is loaded into the NetLogo Web browser, the following code should be pasted into the ‘NetLogo Code’ Tab. I’ve made the comments a different font for readability, but you can also paste them into the code tab as well (the semi-colon means that NetLogo won’t read them as code).

;; choose initial-algae no. of random patches and make them green (set by slider)

to setup-algae

ask n-of 10 patches [set pcolor green]

end

;; choose initial-coral no. of random patches and make them pink (set by slider)

to setup-coral

ask n-of 10 patches [set pcolor pink]

end

;; grow coral by asking black patches next to pink patches to turn pink

to grow-coral

ask patches with [pcolor = pink] [

ask neighbors [if pcolor = black [set pcolor pink]]]

end

;; grow algae by asking black patches next to green patches to turn green

to grow-algae

ask patches with [pcolor = green] [

ask neighbors [if pcolor = black [set pcolor green]]]

end

Part II

In this section, we will start to add some realism to our model. First, lets set a ‘growth rate’ for algae that we represent as a probability. Here, we will let algae grow onto free space at a probability of 40/100 at every time step. Comments in red are for you to fill in!

;; grow algae by asking green patches if they are next to black patches, and if so, tell the black patches to turn green at a probability 40/100

to grow-algae

if random 100 < 40 [

ask patches with [pcolor = green] [

ask neighbors [if pcolor = black [set pcolor green]]]

]

end

;; grow coral by asking pink patches if they are next to black patches, and if so, tell the black patches to turn pink a probability 30/100

;; grow algae over coral by asking green patches if they are next to pink patches, and if so, tell the pink patches to turn green a probability 20/100

;; REMEMBER TO ADD THIS NEW PROCEDURE TO YOUR HEADER (TO GO)!

Part III

In this section, we will add a parrot fish to our model! This will be our first time adding a turtle class object. Our parrotfish will get energy from eating algae, will move around randomly and will die if they reach 0 energy. Don’t forget to change the header! Right now the relevant lines are commented, but we will uncomment them after we finish coding those parts.

**;;UPDATED HEADER**

breed [ parrots parrot ]

turtles-own [ energy ]

to setup

clear-all

setup-algae

setup-coral

;setup-parrots

reset-ticks

end

to go

if ticks >= time-steps [ stop ] ;; stop after 1000 ticks

grow-coral

grow-algae

grow-algae-coral

;ask parrots [

; move

; set energy energy - 1

; eat-algae

; death

; ]

tick ;; increment the tick counter and update the plot

end

**;;PARROT PROCEDURES**

to setup-parrots

create-parrots 10

[

set shape "fish"

set color violet

set size 1.5 ; easier to see

set energy random (2 \* 5)

setxy random-xcor random-ycor

]

end

to eat-algae ;; parrot procedure: parrots eat algae, turn the patch black

if pcolor = green [

set pcolor black

set energy energy + 5

]

end

to move ;; parrot procedure

rt random 50

lt random 50

fd 1

end

to death ;; parrot procedure: when energy dips below zero, die

if energy < 0 [ die ]

end