Adaptation Strategies

EES 4760/5760
Agent-Based & Individual-Based Computational Modeling
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Class #13: Tues. February 21 2017

Getting Started

- I have put comments on your research projects in the Box folders.
- Sit with your team partners
- Download models:
  - https://ees4760.jonathangilligan.org/models/class_13/jg-tif.nls
  - https://ees4760.jonathangilligan.org/models/class_13/BusinessInvestor.nlogo

Subsetting

- Open the BusinessInvestor model in NetLogo

- Click `setup`

- Turn all the turtles red

- Turn turtle 5 green

- Ask turtle 5 to identify all the patches that are exactly 2 patches away from the turtle's patch (not a 2-patch radius from turtle-2)
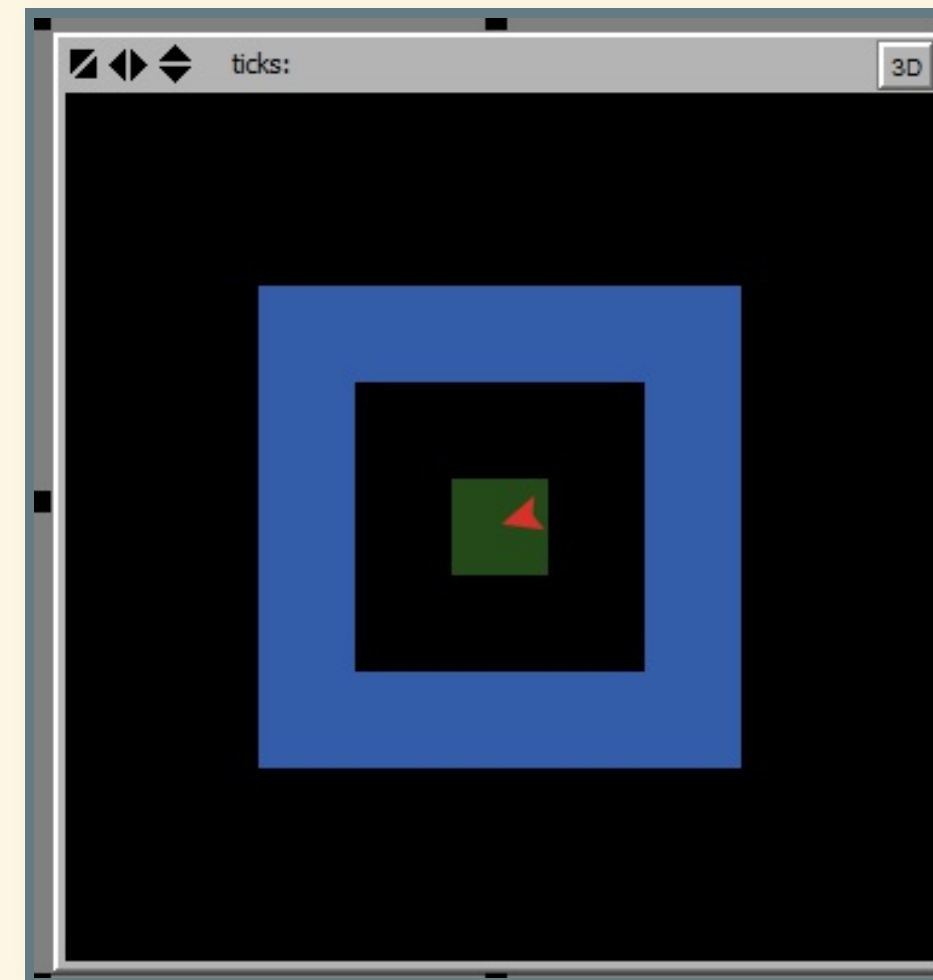
Hints:

- There are many ways to do this. Let's look at a way to do this with the `neighbors` primitive.

- Hints:
  - Use `member?` primitive (`member <agent> <agent-set>`)
  - Use `patch-set` primitive to turn an list of many patch-sets into a single patch-set

- Suggestion:
  1. Start by turning all neighbor patches (patches exactly 1 patch away) blue
  2. Next turn all patches within 2 patches blue
  3. Now turn all patches black again
  4. Now turn all patches within a 2-patch distance blue *except* the turtle's patch
  5. Now turn all patches black again
  6. Now turn all patches within a 2-patch distance blue *except* the turtle's patch and the patches 1 patch away.

A solution

```
ask turtle 5 [
  ask (patch-set [neighbors] of [neighbors] of self) with
    [not member? self [(patch-set neighbors patch-here)] of myself]
  [
  set pcolor blue
  ]
]
```

- What does `self` refer to in

  `patch-set [neighbors] of [neighbors] of self`?

- What does `self` refer to in

  `not member? self [(patch-set neighbors patch-here)] of myself`?

Links

- Put a slider on the interface and call it `number-of-links`

- Edit the chooser for `vision-mode` to add `links` as an option.

- Edit `to initialize-turtle`:

```
to initialize-turtle
  move-to one-of patches with [ not any? turtles-here ]
  set wealth 0
  set size 0.8
  color-turtle 1.0
  create-links-to n-of number-of-links other turtles
end
```

Links

- Edit `to-report find-best-patch`:

```
ifelse vision-mode = "radius"
[
  set candidates (patches in-radius sense-radius) with [ not any? turtles-here ]
  set candidates (patch-set candidates patch-here)
]
[
  ifelse vision-mode = "neighbors"
  [
    set candidates neighbors with [ not any? turtles-here ]
    set candidates (patch-set candidates patch-here)
  ]
  [
    ifelse vision-mode = "links"
    [
      set candidates neighbors with [ not any? turtles-here ]
      set candidates (patch-set candidates patch-here)
      set candidates (patch-set candidates ([neighbors with [not any? turtles-here]] of out-link-neighbors) )
    ]
    [
      error "Unknown vision-mode"
    ]
  ]
]
```

Expected Utility Function

- Function:

$$U = (W + PT) \times (1 - F)^T$$

  W = wealth, P = profit, F = risk of failure, T = time horizon

- How does this change as investors gain more wealth?

- Interactive app https://ees4760.jonathangilligan.org/contour