darwinc

━━━━ Species Files ━━━━━━━━━━

Adding or removing lines from a species program often requires you to go back and change the target line numbers of lots of branch statements in the code. For example, here is the original `Rover.txt` file:

```
Rover
red
ifenemy 11        // 1
ifwall 7          // 2
ifsame 7          // 3
hop               // 4
go 1              // 5
ifrandom 9        // 6
left              // 7
go 1              // 8
right             // 9
go 1              // 10
infect            // 11
go 1              // 12
.
```

If I add a `hop` instruction before the `left` instruction on line 7, the target of the `ifenemy` jump on line 1 must change to 12, and the target of the `ifrandom` jump on line 6 must change to 10. To avoid having to make such changes every time a program changes, I've been working on a "Darwin Compiler" for a slightly extended species programming language. The language lets you write species programs using *labels* instead of line numbers. Here is the new `NewRover.darwin` file, written with labels:

```
Rover
red
start:
  ifenemy enemy
  ifwall turn
  ifsame turn
  hop
  go start
turn:
  ifrandom goright
  left
  go start
goright:
  right
  go start
enemy:
  infect
  go start
.
```

Notice that I can add labels like "`goright:`" and then jump to those labels. For example, the "`ifrandom goright`" instruction jumps to the `right` appearing immediately after the label "`goright:`".

Compiling and Running

To use labels in your creatures, simply create new species file in the "Creatures" directory. Name your file with the extension `.darwin`. I have provided a few examples on the handouts web page. To use those files in the darwin simulator, you must convert them to the original format that only uses line numbers. The `darwinc` command will do that for you: Specifically, the command

    darwinc NewRover

will compile the file "`Creatures/NewRover.darwin`" into the file "`Creatures/NewRover.txt`". You can look inside that file to see what the compiled program looks like. (It will be more or less identical to the original version of the Rover that used line numbers.) You can then run my simulator (or your own) as usual:

    darwin NewRover.txt Hop.txt FlyTrap.txt

(Note: I modified my `darwin` simulator to use the new files directly, so you can also simply run "`darwin NewRover.darwin Hop.txt FlyTrap.txt`". You don't need to support labels in your own version.)

This extension is still a work in progress— please let me know if you find any bugs or want to suggest improvements.