

CSCI 190: HW5: *Suppliers and Consumers*

Due on **Wednesday, March 16 at 8:00am** (before the start of class.) Your solution must be submitted to the CSCI 190 drop box on midfiles. Your program must be named as follows: **YourName-HW5.nlogo**. Programs will be graded on:

1. correctness (70pts)
2. structure (10pts)
3. style (10pts)
4. interface (10pts).

Overview: You will write a NetLogo model in which producer agents move around the world producing resources, while consumer agents move around searching for and consuming resources. Some patches are obstacles (called walls) through which an agent cannot move. *The number of producers, consumers, and walls, should all be controlled by sliders.*

The consumer and producer both have movement problems that should be solved with the use of a `while` loop.

Further Instructions and Details:

Consumers: On any give turn, a consumer can move only 1 unit. It can sense resources up to a certain number of units away, where that *sensing radius is set by a slider*. (Let the default range be 5, but allow values from 1 to 10). If a consumer senses a resource, it should try to move toward the resource. However consumers must avoid walking into walls. *If a consumer's next step would be into a wall, that consumer should repeatedly face in a random direction until it is no longer facing a wall. (Try to make it so that consumers don't even cut across the corner of a wall.)*

Producers (Up to 65pt version): Producers produce resources. A producer can place up to one (1) resource in the world on each turn. However a producer will not place a resource within a certain number of units of another resource, where that number of units is also specified by a *density slider*. Producers also prefer to place their resources near walls.

Unlike a consumer, a producer is able to move a long distance in a single turn. At the beginning of a turn, a producer picks a random number from 50 to 200 that specifies its maximum travel distance that turn. It begins each turn facing a random direction. It will then travel in that direction until it comes up against a wall, or until it travels its maximum distance. At that point (whether it is near a wall or not) if there is no other resource within the given distance, it will produce a new resource and leave it there. If there is already a resource nearby, it's will not produce one that turn.

Producers (Up to the full 70pt version): Add the following to the movement of the producer: If a producer hits a wall before it has moved its full distance, and there is already another resource nearby (within the distance set by the density slider) it will face in another random heading and continue until it hits a wall or travels the maximum distance. It will continue to choose a new direction every time it hits a wall until either it travels its maximum distance or it is able to place a resource.

The World: Use a default sized world. Each patch is either a wall or an open space. Since producers do not produce new resources near other resources, each patch either contains a single resource or none at all. Periodically destroy a wall in one place and build it somewhere else—but not on top of an agent or resource. Maintain the number of walls specified by the slider, even if the slider is adjusted while the program is running.