

SMS 491, 2014: 2<sup>nd</sup> Scratch project (due Tue. Feb. 4<sup>th</sup>).

Choose one of the following *simulations* project to program:

1. Prey-predator interaction (some organisms may move randomly while other controlled by mouse and/or in response to organisms). You can have an organism multiply (e.g. cell division). For mathematics of such model see: [http://www.scholarpedia.org/article/Predator-prey\\_model](http://www.scholarpedia.org/article/Predator-prey_model), for an example game see: <http://ccl.northwestern.edu/netlogo/models/WolfSheepPredation>

2. Chemotactic behavior (randomly moving organisms stays longer in the direction where food concentration increase), eventually moving in direction of food. For more see: <http://en.wikipedia.org/wiki/Chemotaxis>, and for a model (game): <http://wormweb.org/bacteriachemo>

3. Schooling behavior with or without a leader (e.g. organisms respond primarily to a single organism). More at: [http://en.wikipedia.org/wiki/Shoaling\\_and\\_schooling](http://en.wikipedia.org/wiki/Shoaling_and_schooling), for a model (game): <http://www.humboldt.edu/ecomodel/clupeoids.htm>

Rules:

- Your project should include at least four sprites.
- Use at least 5 different control blocks, 3 different sensing blocks, 2 variables and 2 operators.
- Some objects detect when others are approaching and react to them. Side walls should be such that organisms leaving on the right re-enter to the left of the screen and vice-versa.
- Simulations should be realistic and should last at least a minute.
- Simulation should use a random number generator.
- Simulation should have a fun factor associated with it.

Bring the project to class (on a disk-on-key) on the day it is due and be ready to present it to the class.

Grading: late submissions, 1 full grade down.

Grading rubric:

- A: All the above details are present, clear to the user, and working (A- if minor details missing).
- B: Most of the above details are present, mostly clear to the user, and mostly working.
- C: About half of the above details are present, or are clear to the user, or are working.
- D: About a fourth of the above details are present, or are clear to the user, or are working.
- E: One or a few of the above details are present, or are clear to the user, or are working.
- F: No homework turned in.

An example of a game of fish eating fish: <http://scratch.mit.edu/projects/DarthPickley/230875>