### **Simulation**

### **Duration: 1 Week**

### **Summary**

This unit presents basic concepts in modeling complex systems through computer programming of agent-based simulations using NetLogo. It uses NetLogo Web, which is a free web-based programming environment for simulation. The site comes with hundreds of pre-defined models of things like the spread of disease, the effect of clouds on global warming, etc. NetLogo is its own text-based language that is similar to the Javascript they just learned in the Programming unit. The students will look at the existing simulations, test hypothesis by experimenting with parameters (e.g. the number of clouds), and optionally by modifying the NetLogo code to understand that simulations are programmed.

### **Learning Objectives**

* Use modeling and simulation to represent phenomenon. [AP CSP P3, LO 2.3.1]
* Use models to formulate, refine, and test hypothesis. [AP CSP P3, LO 2.3.2]

### **Course Material**

* Read: [Computing Modeling and Simulation](http://intro-computing.cs.uri.edu/index.php/Simulation)
* Watch: [Agent-Based Computer Models](https://www.youtube.com/watch?v=W7_kU2IWuXU) [5:04]
* Watch: [Intro To Net Logo](https://www.youtube.com/watch?v=AJXFiO-ULv0) [1:59]
* Read: [What Is Net Logo?](https://ccl.northwestern.edu/netlogo/docs/)

### **Assessments**

* Conceptual Quiz:
  + [Modeling and Simulation](https://docs.google.com/document/d/1WmgzX91Zqp3XbHmMw5-2RtcArl6-7Bd85JfL5mXy4oc/edit?usp=sharing) (requires access)
* Practical Assignment:
  + [Modeling and Simulation](https://drive.google.com/open?id=1Sl5zieIe3enVg6s8DOP-uFEXo8RTvaA_IXAUfC_lsHI) | [Rubric](https://drive.google.com/open?id=1WOIl4k7Oo-FeslZexzXt5PBi1yWXyZbXPWwufvEOCF0) | [Answer Key](https://docs.google.com/document/d/1oNYwv2k5gpcSoKNOBpCBSpuroi1j_MYX9GFrBLvH_-8/edit?usp=sharing)