Module 1

Introduction to NetLogo
Overview

- Computational thinking: 3 A’s
- Decomposition in programming
- Turtle graphics basic ideas
- Statements in NetLogo
3 A’s of Computational Thinking

- Abstraction
  - Capturing essential characteristics only
  - Generalizing from specific instances

- Automation
  - Computers execute repetitive tasks quickly and efficiently

- Analysis
  - Verification and validation of the abstractions
3 A’s Example
Decomposition in Programming

- Step 1: Identify the parts
- Step 2: Solve each part
- Step 3: Combine the parts to solve the problem
Decomposition Example

www.clipartxtras.com
Decomposition Advantages

- Smaller parts are easier to think about
- Can speed up programming
- Can speed up execution
Decomposition Disadvantages

- Computers are stupid
- Some problems are hard to decompose
- Sometimes the pieces do not work together
Turtle Graphics

- Simple set of graphics commands
  - Executed by turtles

- Frequently used for introduction to programming

- Illustrates two key concepts:
  - A computer program is a sequence of instructions
  - A running program has a state, which is a function of time
Turtle State

- A turtle always has a state that includes:

  - shape
  - location
  - pen color

  - heading
  - pen size
  - pen up/down
Turtle State
Statements

- Computer programs contain statements
  
  - Statements
    
    - Smallest independent units of code
    
    - Produce an action
  
  - Examples

```plaintext
to move_turtles
  clear-all
  create-turtles 3
  ask turtles
  [
    pen-down
    set pen-size random 8
    forward 4
  ]
  forward 4
create-turtles 1
ask turtle 3
[
  forward 4
]
end
```
Thank you for watching!
Video created by Bianca Bologa

https://moseslab.cs.unm.edu/lab-page/bianca-bologa.html