

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

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- 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

Interface Info Code			
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draw_house			
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Decomposition in Programming

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



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



- 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

- heading

- location
- pen color

- pen size
- pen up/down



Statements

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

```
to move_turtles
   clear-all
   create-turtles 3
   ask turtles
   [
      pen-down
      set pen-size random 8
      forward 4
   ]
   create-turtles 1
   ask turtle 3
   [
      forward 4
   ]
end
```

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Thank you for watching!



Video created by Bianca Bologa

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