Module 2
Overview

- Variables
- Procedures
- Looping and iteration
Variables

- Variable: a container that holds a value
- Variables have properties
  - name
  - type
  - physical location in memory
- Value can be used and changed
Using Variables

- Declare: allocates space and sets the name
- Initialize: sets the initial value

```swift
let sideLength = 4
```
Using Variables

- Call: use the value stored in the variable
  \[ \text{forward sideLength} \]

- Modify: change the value
  \[ \text{set sideLength 6} \]
  \[ \text{forward sideLength} \]
Procedures in NetLogo

- Procedures are named blocks of code
- Programs are decomposed into procedures
- Names are used to invoke (or call) the procedures
- Procedures can call other procedures
Procedures Example

to setup
clear-all
create-turtles 1
makeSquare
end

to makeSquare
ask turtle 0
[
  set heading 0
  pen-down
  forward 4
  left 90
  forward 4
  left 90
  forward 4
  left 90
  forward 4
] end
Reasons to Use Procedures

- Decomposes the problem into simple steps
- Code is easier to understand
- Code can be reused
- Makes it easier to debug your code
Local Variables

- Can be used in its procedure or command block
- Cannot be accessed elsewhere
Local Variables

- Need to be defined where they are used

```plaintext
to setup
  clear-all
  create-turtles 1
end
to drawLine
  let sideLength 4
  ask turtle 0
  [pen-down
    forward sideLength
  ]
end
```
Loops and Iteration

- Loops: code that is repeated more than once
- Powerful and efficient concept
- Avoid duplicate code
- Make programming more efficient
- Iterations: how many times code is repeated
Types of Loops

- There are three types of loops:
  - Infinite loops
  - Conditional loops
  - Counted loops
Infinite Loops

- Run until one of the following occurs:
  - External stop command
  - Manually turned off
  - Runtime error
Counted Loops

- Repeated a certain number of times
- Establish a loop counter

def makeSquare:
    clear-all
    create-turtles 1
    let sideLength = 5
    ask turtle 0
        [pen-down
            set heading 0
            repeat 4
                [forward sideLength
                    right 90
                ]
        ]
end
Thank you for watching!
Video created by Bianca Bologa

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