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

```
let sideLength 4
```

Using Variables

- Call: use the value stored in the variable

```
forward sideLength
```

- Modify: change the value

```
set sideLength 6
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
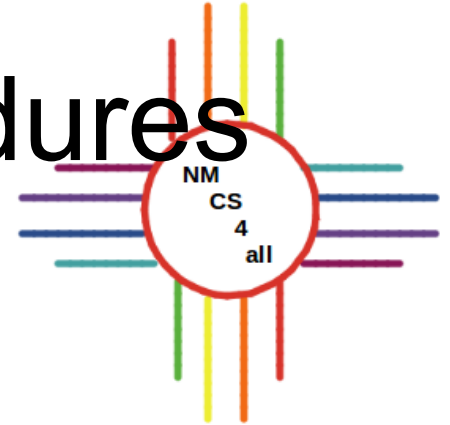
- Procedures can call other procedures

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


```
Nothing named SIDELENGTH has been defined.

to setup
    clear-all
    create-turtles 1
    let sideLength 4
end

to drawLine
    ask turtle 0
    [
        pen-down
        forward sideLength
    ]
end
```
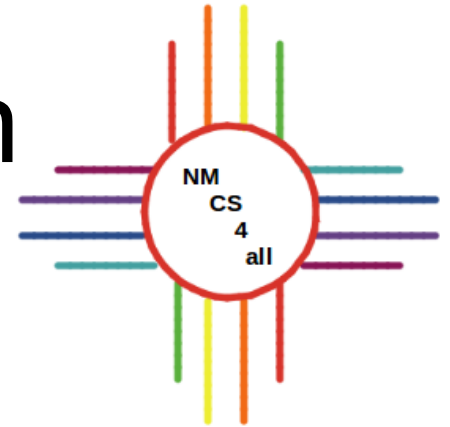
Local Variables

- Need to be defined where they are used

```
to setup
    clear-all
    create-turtles 1
end


to drawLine
    let sideLength 4
    ask turtle 0
    [
        pen-down
        forward sideLength
    ]
end
```
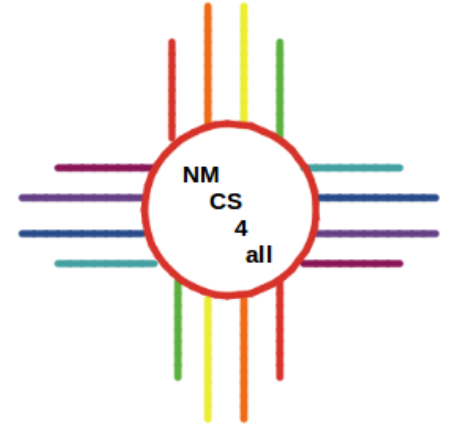
Loops and Iteration

- Loops: code that is repeated more than once

- Powerful and efficient concept

- Avoid duplicate code

- Make programming more efficient

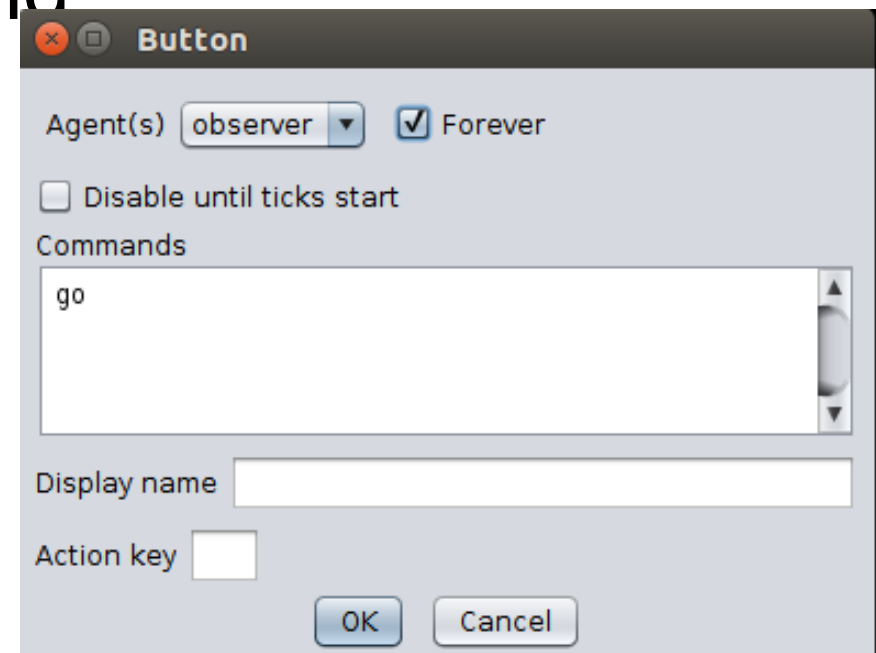- Iterations: how many times code is repeated
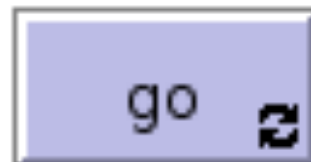
Types of Loops

- 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
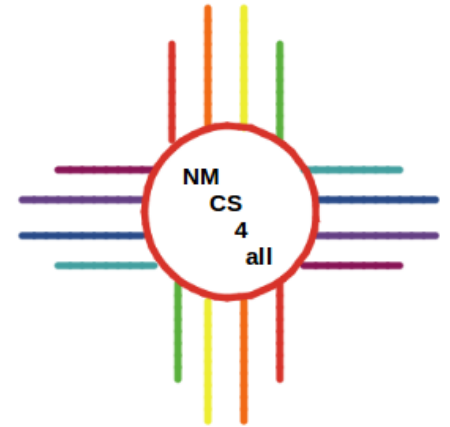
    - Runtime error
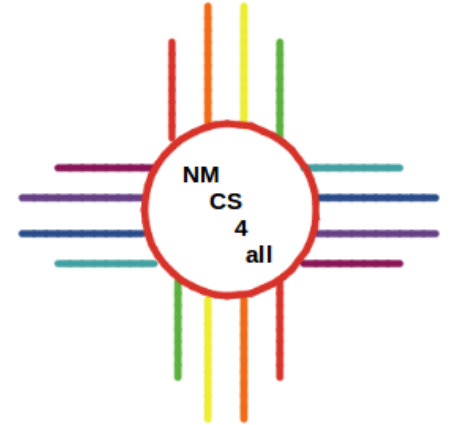
Counted Loops

- Repeated a certain number of times

- Establish a loop counter

```
to 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