**MATLAB**

**Flow control: for-do**

• Another way to use flow control is to tell Matlab how many times to execute a section of code.

• If you want to repeat certain lines of code multiple times, this is called a “loop”--somewhat like a racecar on a track loops around and around.

**Loops**

• In the case of a for-loop, sometimes called a for-do-loop, the loop or lines of code are repeated a specified number of times, given by an index or the loop variable.

**Matlab for-do loops**

Loop example:

```matlab
>> for i = [1, 2, 3]
    i
  end
i = 1
i = 2
i = 3
```

**Another way to specify the sequence**

Loop example:

```matlab
>> for i = [1:3]
    i
  end
```

where the notation 1:3 creates a vector from 1 to 3 inclusive (i.e. including 1 and 3), jumping by one.

**Changing the loop variable inside the loop**

What happens if you change the loop variable inside the loop?

```matlab
>> for i = [1:2]
    i
    i=17;
    i
  end
```

end will evaluate as

1
17
2
17

**Why use a loop?**

• Suppose you want to repeat a series of calculations on a dataset which has 10 sites.

• Rather than copying and pasting the code to repeat the calculations 10 times, you can set up a loop to do it automatically.

• Advanced tip: In Matlab—with its matrix-based approach—you can often avoid loops and instead process in parallel. We will not discuss efficiencies of programming here.

**Another way to specify the sequence**

Loop example:

```matlab
>> for i = [1:2:5]
    i
  end
```

here the notation 1:2:5 creates a vector from 2 to 5, jumping by 2: i.e. [1 3 5].

**Example for satellite data: Movies**

You have a stack of 6 maps of SST data, i.e. data with 3-dimensions [LAT x LON x TIME].

```
tdo=1
tdo=2
tdo=3
tdo=4
tdo=5
tdo=6
```
If the data are [LAT x LON x TIME] then the time index increments in the 3rd dimension:

Example for satellite data: Movies

To create a movie, cycling through all 6 maps, and plotting each, you can use the code:

```matlab
>> for tdo=[1:6]
    pcolor(lon,lat,sst(:,:,tdo))
    pause(1)
end
```

The effect of the `pause` is to pause for 1 second so you can see the map, then continue to the next.

Review

1. Loops can be used to repeat sections of code multiple times.
2. Matlab `for-do` loops use a loop variable to cycle through a specified range of values.
3. As the loop variable takes on each value, the code bracketed by the `for` and `end` reserved keywords is executed.