MATLAB

Flow control: *for-do*

Loops

- 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.

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.

Loops: *for-do*

- 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:

loop variable

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

loop sequence

Another way to specify the sequence

Loop example:

loop variable

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

loop sequence

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

Another way to specify the sequence

Loop example:

loop variable

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

loop sequence

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

Changing the loop variable inside the loop

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

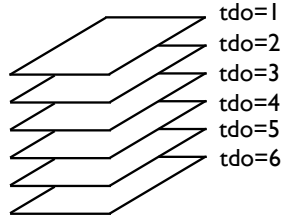
```
>> for i = [1:2]
         i
         i=17;
         i
end
```

will evaluate as

```
1
17
2
17
```


Example for satellite data: Movies

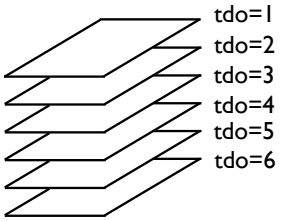
You have a stack of 6 maps of SST data, i.e. data with 3-dimensions [LAT x LON x TIME].



Example for satellite data: Movies

If the data are [LAT x LON x TIME] then the time *index* increments in the 3rd dimension:

`sst(:,:,1)` is the first map,
`sst(:,:,2)` is the second map.



Example for satellite data: Movies

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

```
>> 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 specifed range of values.

3. As the loop variable takes on each value, the code bracketed by the *for* and *end* reserved keywords is executed.