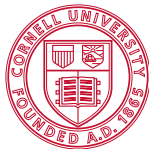


Lecture 04

Arrays, For Loop, Nested Loops

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July 3, 2013

Before we begin

HW1 Questions

OH Thursday, Friday

Arrays

Array

A variable to hold multiple values of the same type.

Example

```
x = [1, 2, 3, 4, 5, 6, 7];  
y = ['a', 'b', 'c'];  
z = 'abc';
```

Arrays - Indexing

Indexing

Specifying an element of an array by providing its location.

Example

```
a = [2, 3, 5, 7, 11, 13];  
a(1)    % 2  
a(2)    % 3  
a(3)    % 5  
a(6)    % 13  
  
s = 'Cornell'  
s(1)    % 'C'  
s(4)    % 'n'
```

Operations with Arrays

Array operators

- `.`[^] elementwise power raising
- `.`* elementwise multiplication
- `.`/ elementwise division

Example

```
a = [2 3 4 5];  
b = [1 2 4 3];  
c = a.*b; % c is [2 6 16 15]  
d = a.^b; % d is [2 9 256 125]  
e = a./b; % e is [2 1.5 1 1.6667]  
f = a + b; % f is [3 5 8 8]
```

Colon (:) Notation

Colon (:)

creates a sequence of numbers with constants steps

Example

```
1:6
% [1 2 3 4 5 6]
1:2:6
% [1 3 5]
6:-2:1
% [6 4 2]
'a':'e'
% 'abcde'
'e':2:'k'
% 'egik'
```

Indexing with Colon

Parts of an array can be extracted by indexing with colon notation.

Example

```
a = [2, 3, 5, 7, 11, 13];  
a(1:2)      % [2, 3]  
a(1:2:5)    % [2, 5, 11]  
a(6:-3:1)   % [13, 5]  
a(1:3:end)  % [2, 7]  
a(2:end-1)  % [3, 5, 7, 11]
```

New Loop

for

iterates over a range of values

Usage

```
for %<variable> = <range>
    %<loop body>
end
```


for - Examples

Example

```
% This will display values of x  
% at every iteration from 1 to 5  
for x = 1:5  
    x  
end
```

for - Examples

Example

```
% Sum integers from 1 to 100
s = 0;
for j = 1:100
    s = s + j;
end
fprintf('1+..+100=%d\n', s);
```

Nested Loops

Nested loops

are loops within loops

Example

```
for %<var1> = <range1>
    for %<var2> = <range2>
        % ....
    end
end
```

More Nested

Example

```
while %<condition1>  
    while %<condition2>  
    end  
end
```