

CN208 Introductory Computer Programming

Week 7:- Execution Control (For, While)

By

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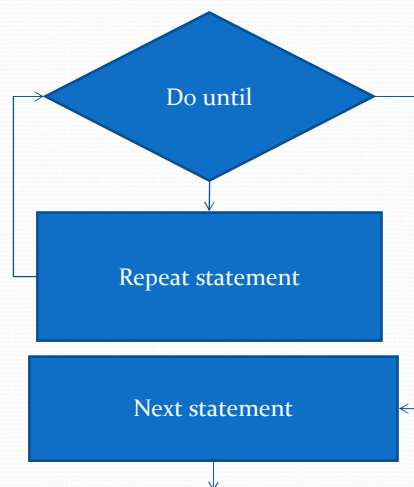
Execution Control (For, While)

- **Overview of Iteration**
- For Loops
- While Loops

Overview of Iteration

- To repeat do the same operation for the specific rounds.
- E.g. I want to add 1 for 5 times minus 4 for 3 times.
- How to translate this to program ?

Overview of Iteration



Execution Control (For, While)

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For Loops

```
>> for j=1:4,  
    j  
end  
  
j =  
    1  
  
j =  
    2  
  
j =  
    3  
  
j =  
    4  
  
>>
```

For Loops

```
>> A = [ [1 2 3]' [3 2 1]' [2 1 3]']
A =
     1     3     2
     2     2     1
     3     1     3

>> B = A;
>> for j=2:3,
>>     A(j,:) = A(j,:) - A(j-1,:)
>> end
A =
     1     3     2
     1    -1    -1
     3     1     3

A =
     1     3     2
     1    -1    -1
     2     2     4
```

For Loops

```
>> for j=2:3,
>>     for i=j:3,
>>         B(i,:) = B(i,:) - B(j-1,:)*B(i,j-1)/B(j-1,j-1)
>>     end
>> end
B =
     1     3     2
     0    -4    -3
     3     1     3

B =
     1     3     2
     0    -4    -3
     0    -8    -3

B =
     1     3     2
     0    -4    -3
     0     0     3
```

Execution Control (For, While)

- Overview of Iteration
- For Loops
- **While Loops**

While Loops

```
>> h = 0.001;
>> x = [0:h:2];
>> y = 0*x;
>> y(1) = 1;
>> i = 1;
>> size(x)

ans =

     1     2001

>> max(size(x))

ans =

     2001

>> while(i<max(size(x)))
    y(i+1) = y(i) + h*(x(i)-abs(y(i)));
    i = i + 1;
end
>> plot(x,y,'go')
>> plot(x,y)
```

While Loops

```
for i=1:2:7           % Loop from 1 to 7 in steps of 2
    i                 % Print i
end

for i=[5 13 -1]      % Loop over given vector
    if (i > 10)       % Sample if statement
        disp('Larger than 10') % Print given string
    elseif i < 0      % Parentheses are optional
        disp('Negative value')
    else
        disp('Something else')
    end
end
end
```

While Loops

```
% Here is another example: given an mxn matrix A and a 1xn
% vector v, we want to subtract v from every row of A.

m = 50; n = 10; A = ones(m, n); v = 2 * rand(1, n);
%
% Implementation using loops:
for i=1:m
    A(i,:) = A(i,:) - v;
end

% We can compute the same thing using only matrix operations
A = ones(m, n) - repmat(v, m, 1); % This version of the code runs
% much faster!!!

% We can vectorize the computation even when loops contain
% conditional statements.
%
% Example: given an mxn matrix A, create a matrix B of the same size
% containing all zeros, and then copy into B the elements of A that
% are greater than zero.

% Implementation using loops:
B = zeros(m,n);
for i=1:m
    for j=1:n
        if A(i,j)>0
            B(i,j) = A(i,j);
        end
    end
end
end
```

Reference

- <http://www.cs.brown.edu/courses/cs143/MatlabTutorialCode.html>

Q & A