Topics: Logical arrays, more on matrices, random number generator

Reading (ML): review Sec 4.3

Logical arrays and operations

elev = rand(4,3)  % example, elevations on a map
elev = 8*elev
elev = elev + 10
elev > 16  % returns a logical array

% 1-d examples
vec = elev(1,:)
% 1st row of matrix elev

L = vec>16
% logical array indicating result from vec>16
vecHigh = vec(L)
% extract just the cells with values > 16

vecHigh = vec(vec>16)
% combine last two statements in one

I = find(vec>16)
% get the indices where vec>16
vecHigh = vec(I)
% extract just the cells with values > 16

% Create a vector same as vec above except that all the values below 16
% are "zeroed out"

I = find(vec>16)
vecHigh = zeros(1,length(vec))
vecHigh(I) = vec(I)
% assign only to the cells with indices in I

% the 3 statements above can be replaced by one statement:

vecHigh(vec>16) = vec(vec>16)

% 2-d examples

L = elev>16
% logical array (matrix)
elevHigh = elev(elev>16)
% a VECTOR!!!

% How to create a matrix same as elev above except that all the values
% below 16 are "zeroed out"? Use function FIND and do not use IF statements

[ri,ci] = find(elev>16)
% ri stores row index
% ci stores col index

:
Random number generator `rand`

MATLAB’s pre-defined function `rand` generates a number in the range of 0 to 1 randomly. In other words, function `rand` generates a number from the standard *uniform* distribution: any number in the range of 0 to 1 is *equally likely to occur*. Note that the range is the open interval (0,1).

Generate the result from one throw of a fair, 6-sided die:

Pick a letter randomly from the alphabet: