

**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 statments

[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:**