#### General Computer Science for Engineers CISC 106 Lecture 11

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#### Lecture Overview

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- Lab (due Monday, tonight, at 11:55pm)
   / Midterm Review (3/17)
- Vectors, looping through
- Matrices, looping through

#### Vectors

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- Vector = one dimensional array
- Since it is one dimensional, either m or n is equal to one
- I x n (one row). This is also called a "row vector"
- m x I (one column). This is called a "column vector"
- Can get length of the vector with the length(x) function
- length(vector) returns the length of the vector

## Looping through a vector

The following function loops through the inputVector and returns the number of 8s in it.

(Note: this code can be found at

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http://www.udel.edu/CIS/106/cavazos/09S/examples/

function output = count8sVector( inputVector) %count number of 8s in a one dimensional array (i.e. a vector) numberOfEights = 0; %set number of observed 8s to zero lengthOfInputVector = length(inputVector); %get length of the vector for k = 1:lengthOfInputVector %for k equals 1 to length of vector if (inputVector(k) == 8) %if the kth position of the vector equals 8... numberOfEights = numberOfEights + 1; %increment the number of observed 8s

fprintf('k is %d ', k); %print out the position of this observed 8 end %end the IF end %end of FOR loop

output = numberOfEights; %return the number of observed 8s end

# Matrices

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- Matrix = two dimensional array
- m x n , where m is number of rows and n is number of columns
- Can get size of the matrix with the size(x) function
- size(inputMatrix) returns a 1x2 matrix that contains the number of rows and number of columns of the inputMatrix

# Looping through a matrix

(Note: this code can be found, much more nicely formatted, at http://www.udel.edu/CIS/106/cavazos/09S/examples/)

This function loops through both dimensions of the inputMatrix and counts the number of 8s in it.

```
function output = count8sMatrix( inputMatrix)
%count number of 8s in a two dimensional array (i.e. a matrix)
   numberOfEights = 0: %set number of observed 8s to zero
   lengths = size(inputMatrix); %get m by n size of the matrix (m rows, n columns). And it these two
dimensions are stored
                      %in a 1 by 2 array called lengths
   fprintf('size of the matrix m by n is ') %print out...
```

disp(lengths) %the dimensions of the matrix

for m = 1:lengths(1) % for m equals 1 to "whatever is in the first index of lengths"

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for n = 1:lengths(2)
```

% for n equals 1 to "whatever is in the second index of lengths"

```
% if the mth row and the nth column in the matrix is an eight, then...
if (inputMatrix(m,n) == 8)
  numberOfEights = numberOfEights + 1; % ...increment the number of observed eights
end
```

end %end of FOR loop for the columns

```
end %end of FOR loop for the rows
```

output = numberOfEights; %output the number of observed eights

end