Octave basics part 3

December 4, 2018

No Binder links because Binder does not work with Octave. You are recommended to only use this as a reference while programming in the Octave or Matlab application.

These correspond to Professor Wassil's slides

In [1]:
```
A = [1 0 1; 5 0 10; 1 0 0]

% By default, find() returns the indices of non-zero elements of the matrix
find(A)

```

```
A =

    1    0    1
    5    0   10
    1    0    0

ans =

   1
   2
   3
   7
   8
```

In [2]:
```
find(A==0)

```

```
ans =

   4
   5
   6
   9
```

In [3]:
```
A = [1; 4; 2; 8; 4]

% if A is a vector – returns a vector one element shorter than A of the differ

diff(A)

```

```
A =

   1
   4
   2
   8
   4

ans =

   3
  -2
   6
  -4
```

In [4]:
```
B = [1 4 2 8 4]
diff(B)

```

```
B =

   1   4   2   8   4

ans =

   3  -2   6  -4
```

In [5]:
```
A = [1 2 3; 4 8 5; 24 18 1]

%  if matA is a matrix – matrix of row differences

diff(A)

```

```
A =

    1    2    3
    4    8    5
   24   18    1

ans =

    3    6    2
   20   10   -4
```

In [6]:
```
matA = [1 2 3; -4 -5 -6; 7 -8 9]
```

```
matA =

   1   2   3
  -4  -5  -6
   7  -8   9
```

In [7]:
```
logical_negative = matA < 0
```

```
logical_negative =

  0  0  0
  1  1  1
  0  1  0
```

In [8]:
```
idx_negative = find(logical_negative)
```

```
idx_negative =

   2
   5
   6
   8
```

In [9]:
```
matA(idx_negative) = 0
```

```
matA =

   1   2   3
   0   0   0
   7   0   9
```

In [10]:
```
matA = [1 2 3; -4 -5 -6; 7 -8 9]
```

```
matA =

   1   2   3
  -4  -5  -6
   7  -8   9
```

In [11]:
```
matA(find(matA < 0 )) = 0
```

```
matA =

   1   2   3
   0   0   0
   7   0   9
```

In [12]:
```
matA = [1 2 3; 4 5 6; 7 8 9]
matB = [1 2 3; 4 5 6; 7 8 9]

C = matA./matB
```

```
matA =

   1   2   3
   4   5   6
   7   8   9

matB =

   1   2   3
   4   5   6
   7   8   9

C =

   1   1   1
   1   1   1
   1   1   1
```

In [13]:
```
name = 'Professor Williams'
```

```
name = Professor Williams
```

In [14]:
```
name(5)
```

```
ans = e
```

In [15]:
```
name(11:18)
```

```
ans = Williams
```

In [16]:
```
size(name)
```

```
ans =

    1   18
```

In [17]:
```
length(name)
```

```
ans =  18
```

Slides from Chapter 3

In [18]:
```
D =  [72 134 3.2; 81 201 3.5; 69 156 7.1; 82 148 2.4; 75 170 1.2 ]
```

```
D =

   72.0000  134.0000    3.2000
   81.0000  201.0000    3.5000
   69.0000  156.0000    7.1000
   82.0000  148.0000    2.4000
   75.0000  170.0000    1.2000
```

In [19]:
```
A = [1 2 3; 4 5 6]
```

```
A =

   1   2   3
   4   5   6
```

In [20]:
```
% mean of the columns
mean(A, 1)
```

```
ans =

   2.5000   3.5000   4.5000
```

In [21]:
```
mean(D, 1)
```

```
ans =

   75.8000  161.8000    3.4800
```

In [22]:
```
% mean of the rows
mean(A, 2)
```

```
ans =

   2
   5
```

In [23]:
```
mean(D, 2)
```

```
ans =

   69.733
   95.167
   77.367
   77.467
   82.067
```

In [24]:
```
mean(A)
```

```
ans =

   2.5000   3.5000   4.5000
```

In [25]:
```
mean(mean(A))
```

```
ans =  3.5000
```

In [26]:
```
mean(A(:))
```

```
ans =  3.5000
```

In [27]:
```
% Preprocessing -- Identifying outliers

x=[1; 50 ;1.6; 1.3; 1.8; 1.9; 1.5; 1.2; 1.5]

mu = mean(x)
sigma = std(x)
```

```
x =

    1.0000
   50.0000
    1.6000
    1.3000
    1.8000
    1.9000
    1.5000
    1.2000
    1.5000

mu =  6.8667
sigma =  16.177
```

In [28]:
```
outliers = abs(x - mu) > 2* sigma
```

```
outliers =

  0
  1
  0
  0
  0
  0
  0
  0
  0
```

In [29]:
```
1 x(outliers) = NaN
2
```

```
x =

   1.0000
      NaN
   1.6000
   1.3000
   1.8000
   1.9000
   1.5000
   1.2000
   1.5000
```

In [30]:
```
1 mode(x)
2
```

```
ans =  1.5000
```

In [31]:
```
1 % Be careful when using a matrix with a NaN value in a function
2 mean(x)
3
```

```
ans = NaN
```

In [32]:
```
1 median(x)
2
```

```
ans = NaN
```

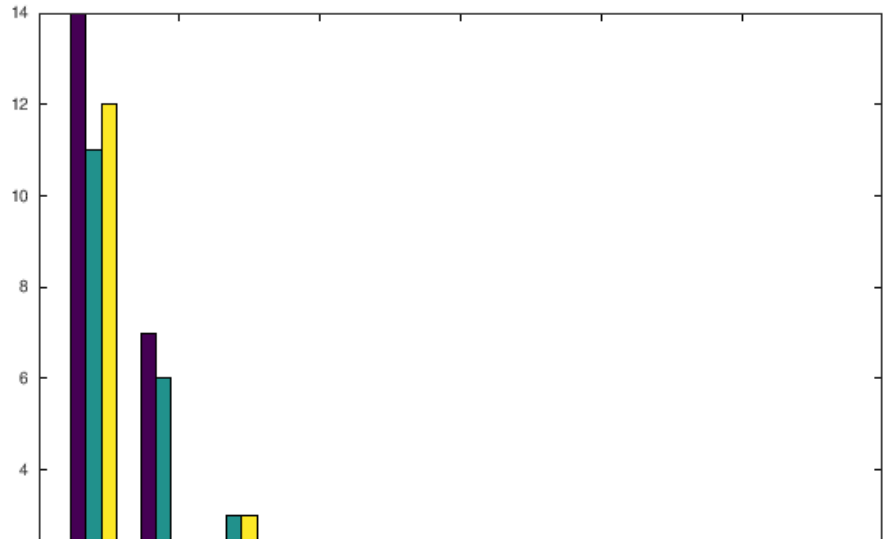
In [33]:

```
count =  [
11 11 9;
7 13 11;
14 17 20;
11 13 9;
43 51 69;
38 46 76;
61 132 186;
75 135 180;
38 88 115;
28 36 55;
12 12 14;
18 27 30;
18 19 29;
17 15 18;
19 36 48;
32 47 10;
42 65 92;
57 66 151;
44 55 90;
114 145 257;
35 58 68;
11 12 15;
13 9 15;
10 9 7]
```

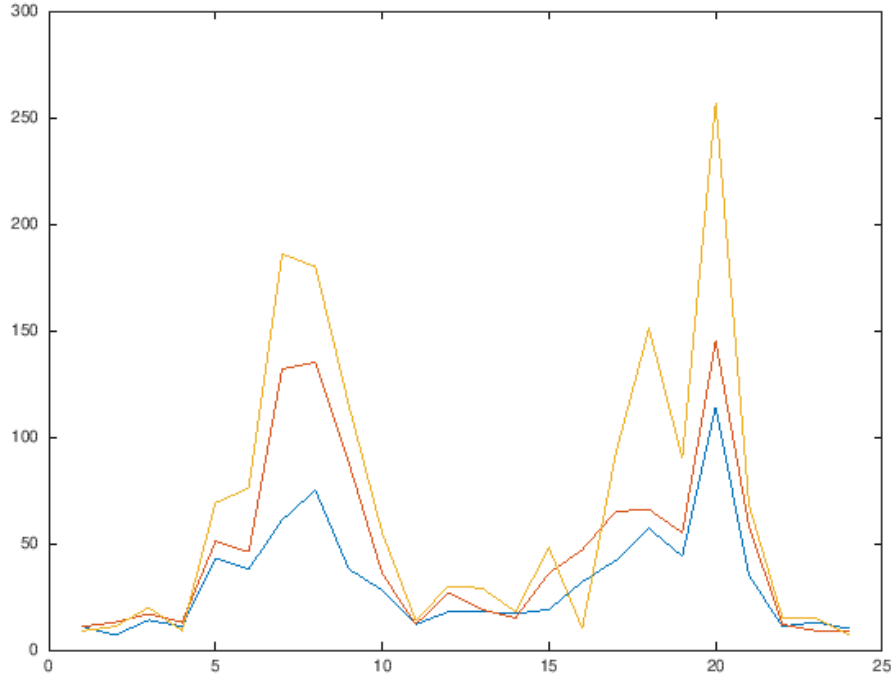
```
count =

    11    11     9
     7    13    11
    14    17    20
    11    13     9
    43    51    69
    38    46    76
    61   132   186
    75   135   180
    38    88   115
    28    36    55
    12    12    14
    18    27    30
    18    19    29
    17    15    18
    19    36    48
    32    47    10
    42    65    92
    57    66   151
    44    55    90
   114   145   257
    35    58    68
    11    12    15
    13     9    15
    10     9     7
```

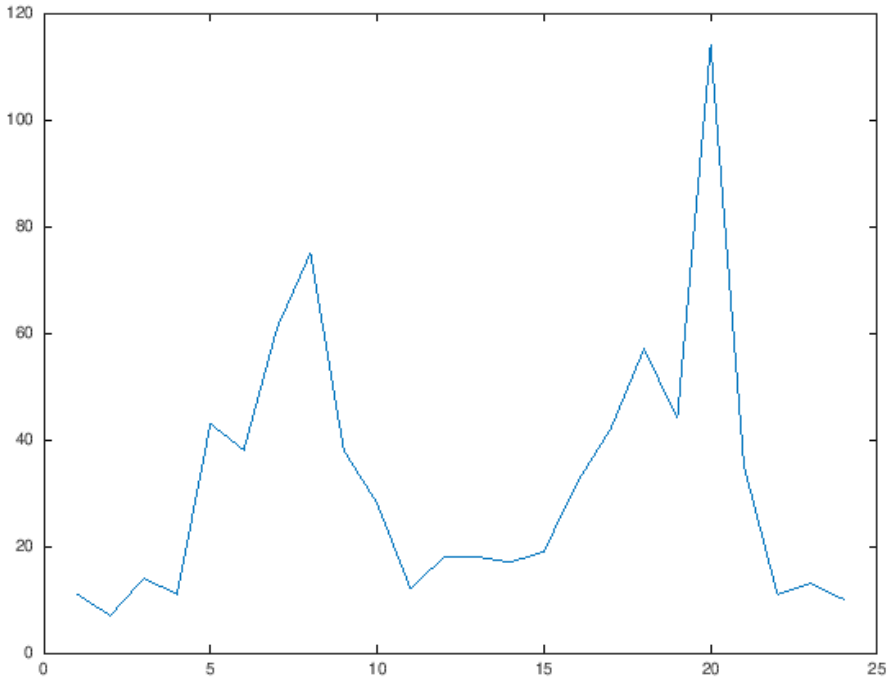
In [34]:
```
1
2
hist(count)
```



In [35]:
```
1
2
plot(count)
```



In [36]:
```
plot(count(:,1))
```



In [37]:
```
scatter(x)
```

```
error: Invalid call to scatter.  Correct usage is:

 -- scatter (X, Y)
 -- scatter (X, Y, S)
 -- scatter (X, Y, S, C)
 -- scatter (..., STYLE)
 -- scatter (..., "filled")
 -- scatter (..., PROP, VAL, ...)
 -- scatter (HAX, ...)
 -- H = scatter (...)

Additional help for built-in functions and operators is
available in the online version of the manual.  Use the command
'doc <topic>' to search the manual index.

Help and information about Octave is also available on the WWW
at http://www.octave.org (http://www.octave.org) and via the help@octave.org
mailing list.
```

In [38]:
```
A = [10 20 30; 40 50 60; 70 80 90];
B = [1 10 1];
C = A./B
```

```
C =

   10    2   30
   40    5   60
   70    8   90
```