Computer Lab Assignment 1 Introduction to Matlab

Start Matlab and type the following in command window.

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(1) Define variables: try the following lines (Find two errors!)
>> a=6
>> a=6;
>> b=19
>> b=19.8
>> c = a*b
>> d = sin(c)
>> e = 'The quick brown fox' (must use the right type of single quotes in Matlab!)
>> f = [e ' jumps over the lazy dog.']
>> f = d+E
>> 2q = 2*f
(2) Define row and column vectors. What is the difference? (Find 2 errors!)
>> c = [2 4 6]
>> r = [3;5;7]
>> c(3)
>> c(2) = r(3)*2
>> size(c)
>> rank(c),rank(r)
>> norm(r)
>> c(3)
>> c*c
>> r*r
>> c*r
>> r*c
                             (What is the difference between r^*c and c^*r?)
                             (What is the difference between this and the following line?)
>> c=5
>> r(:) = 10
(3) The colon operator ":"
>> 1:10
>> 1 : 0.5 : 10
>> 100 : -7 : 50
>> r(1:2)
>> r(:)
(4) Make a 2D plot (copy and paste the following lines)
x = 0:0.01:1
y = sin(10 * x)
plot(x,y)
xlabel('X Axis')
ylabel('Plot Y Axis')
```

```
title('My first X-Y graph')

Make an improved XY plot:

x = 0:0.01:1

y1 = sin(10*x);

y2 = sin(5*x);

plot(x,y1,'r+',x,y2)

xlabel('X Axis')

ylabel('Y Axis')

title('My second X-Y graph')

plot(x,y1,'r+',x,y2,'r:')

plot(x,y1,'r+',x,y2,'r:')

plot(x,y1,'r+',x,y2,'-o') (What is the difference of the last two lines?)

\rightarrow Now save the graph as a PNG file (menu file\rightarrow save)
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```
(5) Define a matrix

>> v = [1 2 3]

>> v2 = [v v v]

>> v3 = [v,v,v]

>> M = [v;v;v]

>> A = [16 3 2 13; 5 10 11 8; 9 6 7 12; 4 15 14 1]
```

Before typing it guess the following two lines should print:

>> A(1,2)
>> A(1)
>> A'
>> A(1:4,1)
>> A(2,:)
>> size(A)

(6) Open the HELP window and search for the size. This window should look like:



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>> sum(A(1:4,end))
>> B = zeros(5,4)
>> size(B)
>> size(B,1)
>> B(:,:) = 10
>> B = 10
Delete the second column with
>> A
>> A(:,2) = []
```

```
(7) Make a 3D plot
[X,Y] = meshgrid(-8:.5:8);
% What does meshgrid do? Investigate X and Y!
R = sqrt(X.^2 + Y.^2) + eps;
Z = sin(R)./R;
mesh(X,Y,Z,'EdgeColor','black')
surf(X,Y,Z)
colormap hsv
colorbar
Now rotate the 3D graphics with the mouse. Now save the graphics as PNG file (file→save)
```

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(8) Make a contour plot (containing lines of constant altitude) of the predefined functions peaks;
[x,y,z] = peaks;
pcolor(x,y,z)
shading interp
% do not erase this -- add contour lines to existing graph
hold on
contour(x,y,z,20,'k')
hold off
```