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% HW01 Instructions…
%
% Create a file called “HW01_<your last name w/o spaces>_<your first
name…>.m
% In it put the commands from the following, and add your answers.
% You can add your answer using the display command:
disp(‘Answer 0:  Put your answers to the questions here, so that when
the’);
disp(‘Command is run, they will print out.’);

% Compare element-wise versus array-wise operations on matrices:
m4 = magic( 4 );

% Q1: What does this operation do?
%    Does it work on the entire matrix or on each element?
m4.^2
disp(‘Ans 1: <your answer here….>’);

% Q2: What does this operation do?
%    Does it work on the entire matrix or on each element?
m4^2

%
%  Notice when there are, or are-not, semicolons on the end of the
lines.
%
% Q3: Can you generate a 7x7 magic square?
%    (This defines the variable m7?)
%
m7 = magic( 7 )

% Q4: Print out one element:
ltuae = m7( 5, 5 )


% Q5:  Extract a sub-matrix from rows 1 to 4, and columns 1 to 2:
submat = m7( 1:4, 1:2 )


% Q6: Treat the entire matrix as one long vector, and print the 34th
element:
m7(34)


% Q7:  If we wanted to print element #34 using (row,col) notation,
what notation would we use?
%  Demonstrate that here:
m7( 1, 1 )   % This is wrong, fix it…
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% Q8: Extract the last row:
%
%  Remember that you can use “end” as the last element of a dimension.
%  This will be on a quiz later.
%
m7( end, : )


% Q9: What command would I use to get this row of the matrix, m7:
%   38    47     7     9    18    27    29
% ANS:  write the command and execute it.



% Q10: Extract the 4th column, and transpose it using the .' operator:
%
% REM:
% The .' works on the values.
% The ' operator alone converts imaginary values.
%
% Does it print as a row or a column?
m7( :, 4 ).'


% Q11: Read in the cameraman image, from the Matlab image example
repository:
im_cam = imread( 'cameraman.tif' );
imshow( im_cam );

% Q12: Get a sub-section of the cameraman, and show just the heads of
the man and the tripod:
im_cam_head = im_cam( 35:83  , 97:176  );
imshow( im_cam_head );

% Q13: What command would you use to isolate the part of the image
that is the
% faint building in the back right side?
im_subset = your command to get that image here ...
imagesc( im_subset );
pause( 3 );                               % This waits 3 seconds.

% Q14:  Read in the peppers.png image:
im_peppers = imread( 'peppers.png' );
imshow( im_peppers );


% Q15:
% Get a sub-section of the peppers image, and display it:
%
% WHY DO I NEED THE THIRD PARAMETER HERE??
% I DIDN'T USE THAT FOR THE CAMERA MAN?
%
% ANS:
sub_im = im_peppers(  164:255   ,  200:312  , :  );
imshow( sub_im );


% Q16:
% Go back to the camera man:
%
% Let's multiply the values, to see the dark regions better.
% Does this help us see the dark regions?
% Does it hide any regions?
%
% ANS ALL QUESTIONS:
im_cam_mult = im_cam * 4 ;
imagesc( im_cam_mult );

% Q17:   Try this version, what is different?
% ANS:
im_cam_mult = im2double( im_cam ) * 4;
imagesc( im_cam_mult );








% Q18: When we do this what does it do? Does it help us see his
pockets?
%      Why or why not?  What did we do to the image?  What can you not
see?
%
%  Now I am going to clip the current im_cam_mult image to a maximum
%  value of 1, and re-display it.
im_cam_mult( im_cam_mult > 1.0 ) = 1.0;
imagesc( im_cam_mult );


% That operation selects only the values of the image that are over
1.0,
% and those are set to 1.0
% It does this by creating a temporary boolean variable "im_cam_mult >
1.0",
% and using it to impact only those pixels.

% Lets get a clean copy of the cameraman, and mess up the values:
im_uint8  = imread('cameraman.tif');
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im_double = im2double( im_uint8 );

% Q19: What do the following commands emphasize about the image?
%  How do they differ?
%
% ANS:
im_new = im_double.^3 ;
imagesc( im_new );

im_new = im_double.^(1/2.8);
imagesc( im_new );


% Q20:
% Read in the image, RED_GREEN_BLUE_YELLOW_MEMORY_COLORS.jpg
% Convert the image to a double format.
% im = im2double( imread(‘RED_GREEN_BLUE_YELLOW_MEMORY_COLORS.jpg’) );
% And display the following versions of the image


% 20a: The image itself.
%  Then pause for two seconds.  pause(2).
%
% 20b: Just the red   channel (the red   color plane).
%      Then pause for two seconds.
%
% 20c: Just the green channel (the green color plane).
%      Then pause for two seconds.
%
% 20d: Just the blue  channel (the blue  color plane).
%      Then pause for three seconds.
%
%
% 20e: The inverse of the image.
%      Then pause for two seconds.
%
% 20f: Just the first  channel.  What color is this?
%      Then pause for two seconds.
%      What color is this?  ANS:
%
% 20g: Just the second channel.  What color is this?
%      Then pause for two seconds.
%      What color is this?  ANS:

% 20h: Just the third channel.
%      Then pause for three seconds.
%      What color is this?  ANS:
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