Quiz 11/12/2015 Name: _____

CDS130 quiz # 2

- Write your name at the top of each page.
- This is an open-book quiz.
- All computational commands and statements appearing in this exam are specifically referring to the Matlab programming language taught in class.
- You may not use Matlab on the computer for the first 3 questions. (Matlab is allowed for the Q4 and Q5).
- Absolutely no interaction between students is allowed.
- Each question is worth 2 points. Partial credit may be awarded ONLY if work is shown.
- The exam will take place in IN 223.
- Duration for this quiz: 75 minutes

Q1. What is the output of executing the following Matlab code (without using matlab):

```
clear all; clc;
for i=1:4
   for j=i:4
    M(i, j) = i+j;
   end
end
M(:, 4)
```

Answer:

5
6
7
8

Q2. Write some lines of code that use nested for loops to produce a 5 by 5 (square) matrix A with 0's down the main diagonal, 1's in the entries just above and below the main diagonal, 2's above and below that, etc. The matrix should look like this:

```
     0     1     2     3     4
     1     0     1     2     3
     2     1     0     1     2
     3     2     1     0     1
     4     3     2     1     0
```

Answer:

```
clear all; clc;

for i=1:5
 for j= 1:5
    M(i,j) = abs(j-i);
 end
end
```

Q3. What is the result of running the following Matlab code:

```
clear all; clc;
M = [ 1  2  -3  0  4  5  0  -7 ;
      -3  4  -1  7  3  2  9   5 ;
       0  0   0 -1  1 -2  2  -3 ];
counter = 0
for i = 1:3
 for j = 1:8
       M(i,j) = mod(M(i,j), 2);
       counter = counter + 1;
    end
 end
counter
M
```

```
counter =
          24
M =
    1  0  1  0   0  1  0  1
    1  0  0  1   1  0  1  1
    0  0  0  0   1  1  0  1
```

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Q4. Write a Matlab code to calculate the following summation.
(1) provide the matlab code
(2) calculate the final result.

$$\frac{3\times4}{1\times2}+\frac{5\times6}{3\times4}+\frac{7\times8}{5\times6}+\ldots+\frac{1003\times1005}{999\times1000}$$

```
clear all; clc;

result = 0;

for i=3:2:1003
    result = result + i*(i+1) /((i-2) * ( i-1))
end

result
```

Answer:

518.7455

Q5. In Matlab, if you execute the following matlab code

```
clear all; clc;
load mandrill
image(X)
colormap(map)
axis equal off
print -dpng mandrill.png
```

the following image will be produced.

Now, you are asked to modify the above code, such that a cropped image (see below) is produced after the modified code is executed (the height and width are 75% and 50% of the original picture, respectively).

Provide your matlab code.

```
clear all; clc;
  load mandrill
  image(X)
  colormap(map)
 axis equal off
print -dpng mandrill.png

 [m,n]= sizeof (X)
M = X(1:round(m*0.75), round(0.25*n):round(0.75*n));
image(M)
```