CS1371 Fall 13 Test 3 – Nov 20, 2013 **VERSION A**

Name: _____

GT Username(gburdell3): KEY

Section: _____

**-You will have 50 min for this exam**
**-This is a closed note/closed computer exam**
**-You are allowed one piece of paper for a crib sheet, front side only**
**-You are allowed to print off Appendix A to use as a reference during the exam**
**- Please bubble in the section below with your GT Username (gburdell3)**

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| A | A | A | A | A | A | A | A | A | A | A | A | A | A | A | A | A | A | A |
| B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B |
| C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C |
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| V | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V |
| W | W | W | W | W | W | W | W | W | W | W | W | W | W | W | W | W | W | W |
| X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| Z | Z | Z | Z | Z | Z | Z | Z | Z | Z | Z | Z | Z | Z | Z | Z | Z | Z | Z |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 |
| 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 |
| 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 |
| 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 |
| 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 |
| 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 |

B

**Question 1**:
Which of the following lines of code will index the top right corner of an image array, assuming an even number of rows and columns?

a.) `arr(end./2+1:end, 1:end./2, :)`

b.) `arr(1:end./2, end./2+1:end, :)`

c.) `arr(end./2+1:end, end./2+1:end, :)`

d.) `arr(1:end./2, 1:end./2, :)`

e.) `arr(1:end./2, :,:)`

E

**Question 2**:
What is the value of the variable "`out`" after the following code is run?

```
critique = struct('Class',{'ME 3340', 'NRE 3316'},'GPA',[2.46, 3.05]);
field = 'GPA';
out = critique(1).field;
```

a.) `out = 3.05`

b.) `out = 2.46`

c.) `out = [2.46, 3.05]`

d.) `out = {'ME 3340', 'NRE 3316'}`

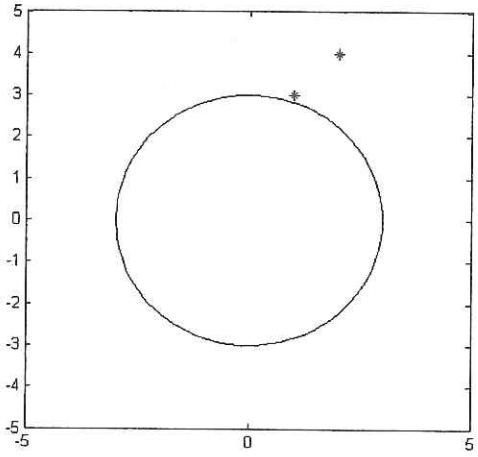
e.) The code produces an error

**Question 3:**
Given the following:

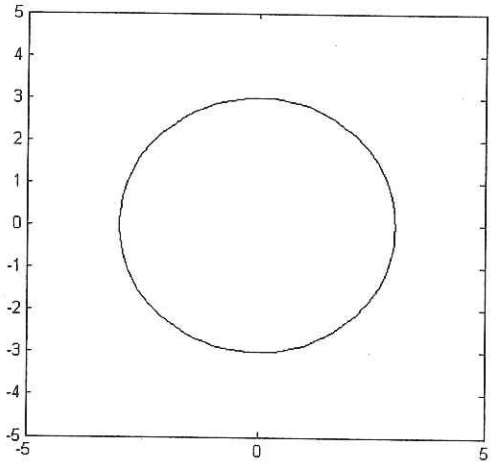
```
plot([1,2],[3,4], 'k*');
r = 3;
th = linspace(0,2*pi);
x = r*cos(th);
y = r*sin(th);
plot(x,y,'k')
axis([-5 5 -5 5]);
```

Which plot below best represents what the code above will produce?

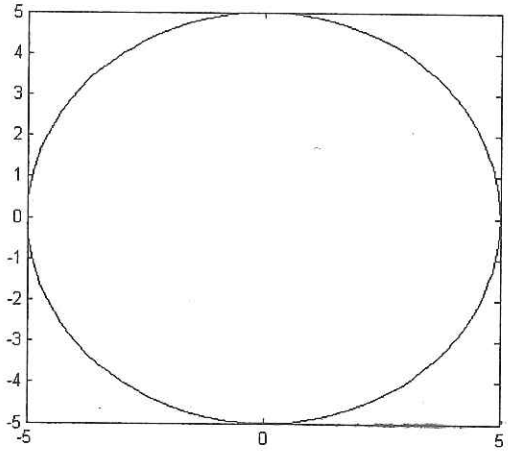
A.)



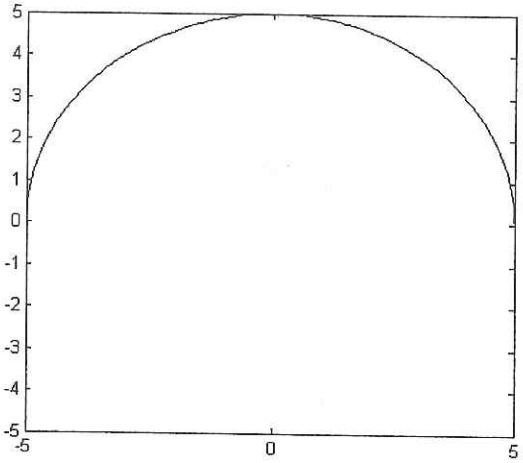

B.)




C.)




D.)



**Question 4:**

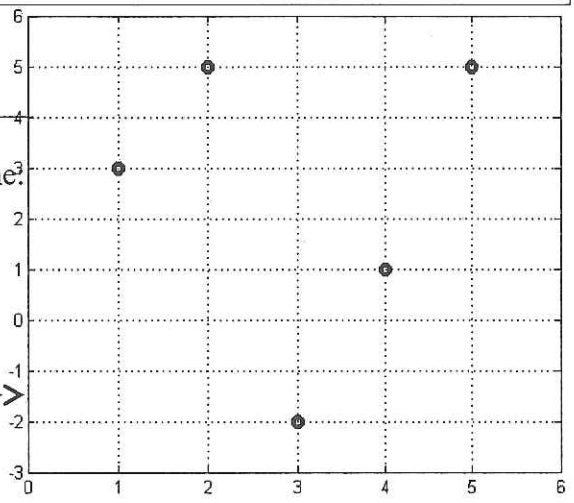
The following code is written in the MATLAB file, `myCode.m`:

```
function word = myCode(word, count)
if count > length(word)
    word = char(word + 1);
elseif word(count) == 'z'
    word(count) = 'a';
else
    count = count + 1;
    word = myCode(word, count);
end
end
```

The following code is written on the MATLAB command line:

```
A = myCode('TEST', -1)
B = myCode('quiz', 3)
x = 1:5;
y = [3 5 -2 1 5];
plot(x,y,'ko','LineWidth',3)-------->>>>>
grid on
axis([0 6 -3 6]);
coeff = polyfit(x, y, 2);
C = length(coeff);
D = interp1(x, y, 4.5, 'linear');
```

`plot(x,y,'ko','LineWidth',3)`




After the above script is run, what are the values of the following variables? If a line produces an error, answer ERROR for that variable and assume the rest of the code is still run.
Enter the values as they would be entered into MATLAB :
- vectors and arrays in [square brackets]
- strings in 'single quotes'
- logicals as true or false
- cell arrays in {curly braces}
- if the answer is error write ERROR

A ==> ERROR

C ==> 3

B ==> 'quia'

D ==> 3

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**Question 5:**

Function Name: mysteryMeat
Inputs (2): (char) The filename of an image
(uint8) A 1*3 vector representing a new color's [R,G,B] values

Outputs (1): (uint8) A 100*100*3 array representing the edited image

Function Description:
In order to make a few dollars here and there, you decide to take a job with Georgia Tech's Dining Services. Little did you know that it would involve MATLAB! You snapped a picture of Woodies' scrumptious-looking Mystery Meat Surprise and posted it to the Dining Services website, before realizing that there's, um, green stuff in it.

Write the function mysteryMeat which takes in the filename of an image and a "new color". Change all of the green pixels in the original image to the replacement "color". Then, so that nobody notices, shrink the picture down to a 100*100 picture, which is too small for anyone to see your crude "editing". Do not write the image to a file or display it, just output the resulting array

Notes:
-A "green" pixel is defined as one in which the value of the "green" element is greater than both the "red" and "blue" elements of each color. That is to say, if a color is described as an R, G, and B value, the G value is the biggest.
-Output the edited image; do not write it to a new filename, and do not show it in the command window.

**Solution to Question 5:**

```
function out = mysteryMeat(filename, newcolor)
  img = imread(filename);      % Read in image
  r = img(:,:,1)
  g = img(:,:,2)               % Extract layers
  b = img(:,:,3)
  mask = g>r & g>b             % Determine which pixels to replace
  r(mask) = newcolor(1);
  g(mask) = newcolor(2);       % Replace pixels
  b(mask) = newcolor(3);
newImg = cat(3, r, g, b);      % Put layers together
[r c] = size(g);
newR = round(linspace(1, r, 100));
newC = round(linspace(1, c, 100));   % Rescale
out = newImg(newR, newC, :);
end
```

**Question 6:**
Function Name: chopper
Inputs: -(struct) A structure array with the details about the season

Outputs: -(cell) A cell array with the team names that have a chance to beat the Braves

Function Description:
You're really impressed by the Braves this 2013 season, and you want to go ahead and make some predictions about the Braves during the 2014 season. Take a structure array containing records of baseball teams during the 2013 season. The structure array will always contain a 'Team' field. Use the following method to determine which teams have a chance to beat the braves. Output a cell array with the team names that have a chance to beat the Braves.

If a team has more than a certain percentage of wins, they have a chance to beat the Braves. You have the following built-in functions to help you:

Function Name: `seasonInfo`
Inputs (2): -(struct) A structure array with season info
-(cell) A cell array of the fieldnames of the structure
Outputs (1): -(double) The minimum win percentage to beat the Braves

%Takes in the original structure and a cell array of the field names of the structure and outputs the minimum win percentage that a team must have to beat the Braves

Function Name: `sportsAnalysis`
Inputs (2): -(struct) A structure array with team info
-(double) The minimum win percentage to beat the Braves
Outputs (1): -(logical) A logical vector where the teams have a chance to beat the Braves

%Takes in the input structure array and the minimum win percentage to beat the Braves, and outputs a logical vector that is true for each team that has a high enough win percentage to beat the Braves and false for each team does not have a chance to beat the Braves.

Notes:
- Do not attempt to calculate the win percentage by hand. Use the functions provided.

**Solution to Question 6:**

```
function out = chopper(str)
names = fieldnames(str)          % Get Field names
percentage = seasonInfo(str, names);   % Gets percentage chance
logs = sportsAnalysis(str, percentage);   % determines if they can beat the Braves
out = {str(logs).Name}           % Extracts appropriate team names
```