

Name: _____

GTID (ex: 903XXXXXX): _____

CS 1371

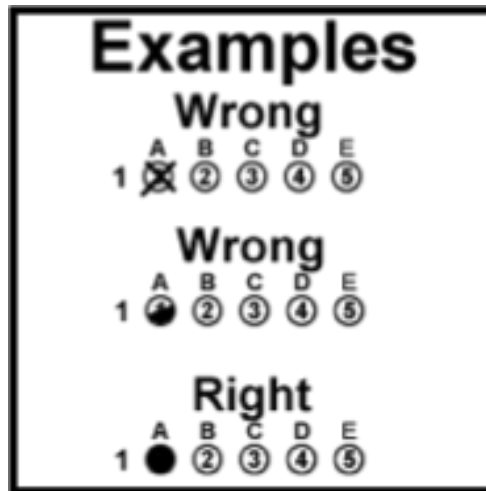
Exam 1

September 26th, 2018

Form A

- Write your name and GTID on every page or **you could lose 5 points on the exam.**
- Check the board at the front of the room for any updates/clarifications during the exam.
- You may not use the MATLAB string class
- All logical values should be denoted `true` or `false` NOT 0 or 1
- An appendix containing useful information is provided separately.
- No credit will be given for comments, but if they are useful for you, feel free to use them.
- If there is a problem that you cannot figure out, skip it and move on. Be mindful of how much each question is worth.
- If you run out of room, use the back page. Be sure to mark that you are continuing your answer on the back page!
- You have fifty minutes. Good luck!

Please fill in the entirety of the circle for multiple choice questions!!



I pledge that I have neither given nor received help on this exam:

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Signature

Date

Problem 1. Answer the following conceptual questions. (25 Points)

- a. Determine whether the following function headers are valid. For EACH header fill one bubble for *valid* or *invalid*. If the function header is *invalid*, rewrite the CORRECTED function header using the same function and variable names. (2 points each)

Function avocado (in, in2)

☐ Valid ☐ Invalid _____

function [] = fluffers()

☐ Valid ☐ Invalid _____

function [out1, out2] = doggos(dog1 dog2)

☐ Valid ☐ Invalid _____

- b. Consider the following function that takes in a 1XN vector of doubles and answer the question below.

```
1 function average = findAverage(vec)
2 sumOfVec = sum(vec);
3 average = sumOfVec./5;
4 end
```

Will the function above find the average of the vector correctly for every vector input? Explain your answer in one sentence (4 points).

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- c. The following function is defined in the current directory. Consider the function and answer the questions below.

```
1    function [cost, time] = phonePlan(calls, texts)
2    temp = calls + texts;
3    a = temp .* 2;
4    time = calculate(calls);
5    cost = a + time;
6    end
7
8    function [out] = calculate(calls)
9    time = calls .* 3;
10   out = time + 1;
11   end
```

The following code is run in the Command Window:

```
>> textsSent = 2;
>> [wasted, cost] = phonePlan(3, textsSent);
```

- i. Complete the table below with the values of each variable in the listed workspaces. If the variable does not exist in the workspace, write DNE. (2 points each)

	Command Window	phonePlan	calculate
cost			
time			

- ii. If line 5 in the code above is changed to `a + time = cost`, will the code still run as expected? (3 points)

- ☐ Yes, the code will run as expected.
☐ No, the code will error.
☐ No, the value of `time` will be different.
☐ No, the value of `cost` will be different.

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Problem 2. Answer the following tracing questions. (20 Points)

```
1  function [fixedStr] = iAmBetter(str, word1, word2)
2  pos = strfind(str, word1);
3  select = pos + length(word1) - 1;
4  str(pos:select) = word2;
5  mask = str==','|str=='.'|str=='?'|str=='!';
6  str(mask) = [];
7  letters = str == 'a' | str == 'e' | str == 'u';
8  str(letters) = upper(str(letters));
9  fixedStr = str;
10 end
```

- a. Assuming the function above is defined in the current directory and the following code is run in the Command Window, what are the class and value of `betterStr`? (5 points)

```
>> str = 'Whos the best!?! Buzz'
>> betterStr = iAmBetter(str, 'best', 'Goat')
```

Class:

Value:

- b. Suppose the following code is run in the command window:

```
>> str = 'Im a helluva engineer'
>> betterStr = iAmBetter(str, 'engineer', 'yacket')
```

Would the function error? If so, identify the line on which it errors and briefly (1-2 sentences) explain the error. If not, write the output. (5 points)

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c. If the `|` operators on line 7 were changed to `&` operators, how would the output change with the code run from part (a)? (5 points)

☐ 'WHOS THE GOAT BUZZ '

☐ 'WHOS THe GOaT BuZZ '

☐ 'Whos thE goAt BUzz '

☐ 'Whos the Goat Buzz '

d. Suppose that lines 6 and 7 are switched, and the code from part (a) is run. Would the function error? If so, identify the line on which it errors and briefly explain the error. If not, write the output. (5 points)

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Problem 3: Answer the following short coding questions. Do NOT write functions and do NOT hardcode! (25 points)

- a. Given three $1 \times N$ vectors named `vec1`, `vec2`, and `vec3`, create a larger vector named `totalVec` where the values in the `vec1` are inserted in every third index starting at index 1, the values in `vec2` are inserted in every third index starting at index 2, and the values in `vec3` are inserted in every third index starting at index 3. Find the smallest number in `totalVec`, and store the **index** of this number in the variable `smallest`. The smallest number is guaranteed to occur only once. (10 points)

```
vec1 = [7 8 9]
```

```
vec2 = [4 5 6]
```

```
vec3 = [1 2 3]
```

```
totalVec => [7 4 1 8 5 2 9 6 3]
```

```
smallest => 3
```

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- b. You are given a $1 \times N$ vector named `vec` where N is guaranteed to be an even number. First, determine the number of even values in `vec` and store the answer in the variable `evenCount`. Update `vec` by subtracting `evenCount` from every element in the first half of `vec`. Update `vec` again by reversing the second half of `vec`, and store the answer in `newVec`. (10 points)

```
vec = [2 5 6 81 13 8 3 10]
```

```
evenCount => 4
```

```
newVec => [-2 1 2 77 10 3 8 13]
```

- c. The following lines are run in the command window.

```
>> vec = [3 1 6 4];
```

```
>> vec(1) = [];
```

```
>> num = vec(3);
```

Will the code above error? If so explain why, if not state the value of `num`. (5 points)

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Problem 4. Write the following function. Your function should work for all possible inputs as specified by the problem. Do NOT hard code using any of the examples. (30 points)

Function Name: partyMonster

Inputs(2) : (double) Nx4 array of information about different party guests
(char) Character vector of the form 'Sam wants # dollars per guest'

Outputs(2): (double) Updated Nx4 array
(logical) Whether all of the guests brought the dollar amount Sam requested

Function Description:

It's Sam's Birthday, and you've decided to throw a surprise birthday party for him. You are given an array where each row represents a separate person and what they are bringing. The first column will be the amount of money they are giving as a **gift**, the second column will be the number of **cookies**, the third column will be the number of **cupcakes**, and the last column will be the number of **brownies**.

1. Find the negative values in the array and make them positive.
2. Rearrange the rows according to the number of **brownies** in descending order. The row with the highest number of brownies should be on top, and the lowest on the bottom.
3. Find the maximum of each column and append these values to the bottom of the array.
4. If every guest brings more money than Sam asked for as a gift, output a logical true for the second output. Otherwise, output a logical false.

Test Case:

```
>> arr = [30, 10, -10, 5;
          -16, -20, 30, 0;
           50, 5, 5, 10;
           20, -20, -25, 20]
>> str = 'Sam wants 25 dollars per guest'

>> [newArr, check] = surpriseParty(arr, str)

newArr => [20, 20, 25, 20
          50, 5, 5, 10
          30, 10, 10, 5
          16, 20, 30, 0
          50, 20, 30, 20]
```

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check => false

Write your code in the space below.

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EXTRA SPACE: if you use this space, be sure to label which question you are answering. In the original question space, CLEARLY leave a note that you've continued the answer here.