

E7 Midterm Examination 1

October 1st, 2010

NAME : _____

SID : _____

SECTION : **1** or **2** (please circle your lecture section)

LAB :

#11: TuTh 8-10	#12: TuTh 10-12	#13: TuTh 12-2	#14: TuTh 2-4
#15: TuTh 4-6	#16: MW 8-10	#17: MW 10-12	#18: MW 2-4
#19: MW 4-6	#21: TuTh 10-12	#24: MW 3-5	

(please circle your lab section)

Part	Points	Grade
A	10	
B	8	
C	8	
D	5	
E	4	
F	6	
G	4	
TOTAL	45	

- Notes:
1. Write your name on the top right corner of each page.
 2. Record your answers only in the spaces provided.
 3. You may not ask questions during the exam.
 4. You may not leave the exam room before the exam ends.

Part A (10 points)

Let two MATLAB arrays A and B be defined as

```
>> A = 1:5  
>> B = [1 2 3 2 1]
```

Record the output of the following MATLAB commands:

A.1 (1 point)

```
>> A
```

ans = _____

A.2 (1 point)

```
>> A+B
```

ans = _____

A.3 (1 point)

```
>> [A B]
```

ans = _____

A.4 (1 point)

```
>> B ./B
```

ans = _____

A.5 (1 point)

```
>> A+4
```

ans = _____

A.6 (1 point)

```
>> 1 ./B
```

ans = _____

A.7 (1 point)

```
>> B.^2
```

```
ans = _____
```

A.8 (1 point)

```
>> [A' B]
```

```
ans = _____
```

A.9 (1 point)

```
>> size([A;B])
```

```
ans = _____
```

A.10 (1 point)

```
>> A.*B
```

```
ans = _____
```

Part B (8 points)

The following code is entered in the command window:

```
>> A = {'Cal', 'Golden', 'Bears', [5 7], {[1 2 3 4]}};
```

In parts B.1-4, record the output of the following MATLAB commands:

B.1 (1 point)

```
>> A{1}
```

ans = _____

B.2 (1 point)

```
>> A{3}(1)
```

ans = _____

B.3 (1 point)

```
>> A{4}(2)
```

ans = _____

B.4 (1 point)

```
>> A{5}(2)
```

ans = _____

B.5 (2 point)

Enter a single-line command to extract the number 3 from A.

```
>> _____
```

B.6 (2 point)

Write a line of MATLAB code that uses the cell array A to generate the string 'Cal Golden Bears'.

```
>> _____
```

Part C (8 points)

The following table includes the names of three of the tallest buildings in the world, as well as the location of each building, the number of stories and the total height.

Name	Location	# of stories	height (ft)
Taipei 101	Taipei, Taiwan	101	1670
Petronas Tower	Kuala Lumpur, Malaysia	88	1483
Sears Tower	Chicago, USA	110	1450

C.1 (3 points) Write MATLAB commands to generate a 3×2 cell array called `tallB1`. The first cell of each row of `tallB1` should contain the name of the building and the second cell of each row should contain a 1×2 row vector with the number of stories and total height of the building.

>>

C.2 (3 points) Write the MATLAB commands to generate and fill a 1×3 structure array `tallB2` with fields `name` and `location` from the table above.

>>

C.3 (2 points) Write the output of the following MATLAB statements:

```
>> x = find(tallB2(1).location == ',');  
>> tallB2(1).location(x+2:end)
```

ans = _____

Part D (5 points)

Let the function M-file **myfun.m** be given by

```
function r = myfun(x)
% Calculate twice the reciprocal of a real
reciprocal = 1/x;
r = 2*reciprocal;
```

Suppose that `myfun` is visible to MATLAB and the workspace is clear. Write the output of the following MATLAB statements:

D.1 (1 point)

```
>> myfun(4)
```

ans = _____

D.2 (1 point)

```
>> myfun(0)
```

ans = _____

D.3 (1 point)

```
>> reciprocal
```

ans = _____

D.4 (1 point)

```
>> myfun(myfun(1)+1)
```

ans = _____

D.5 (1 point)

```
>> a = 2;
```

```
>> a = myfun(a)
```

ans = _____

Part E (2+2 points)

Write the outputs of the following MATLAB script:

```
>> A = [5 6];
>> B = [3;4];
>> C = 3;
>> B(2) = 2;
>> B(:,2) = A';
>> B = B - C
```

B = _____

```
>> t = A*B;
>> t = [t ; B(2,:)];
>> [i,j] = find(t>0);
>> i
```

i =

Part F (2+2+2 points)

The function `func` takes any real array `A` as input and outputs an array `B` of equal size, whose entries are equal to twice the corresponding entry of `A` for every non-negative entry of `A`, and equal to a given number `n`, for every negative entry of `A`. The function `func` accepts a subfunction `subf`. Complete the code in `func` and `subf`, as necessary.

```
function B=func(A,n)
% Replace A by B such that each entry of B equals:
% twice the entry of A if that entry of A is non-negative
% or n if the entry of A is negative
```

```
B = 2*subf(_____ % COMPLETE THE ARGUMENT LIST
```

```
function C = subf(_____ % COMPLETE THE
% ARGUMENT LIST
% subfunction of func
```

```
C_____ % COMPLETE THE LINE
```

Part G (4 points)

Complete the MATLAB command below to create an anonymous function for $f(x) = 10 \times e^{-2x}$:

>> f = _____

Subsequently, complete the following two MATLAB commands that would plot the function f over the range $0 \leq x \leq 2$:

>> x = _____

>> plot _____