

# E77 Midterm Examination 1

October 1st, 2004

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			

(please circle your lab section where the exams will be returned)

Part	Points	Grade
A	10	
B	10	
C	4	
D	4	
E	7	
F	10	
<b>TOTAL</b>	<b>45</b>	

- 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)

A.1 (1 point) Let the array A be defined in MATLAB as

```
>> A =  
  
     6     1     5  
     0     6     4
```

Record the output of the MATLAB command

```
>> 2.*A(:,2:3)  
  
ans =
```

A.2 (0.5 point) Suppose that the arrays A and B are generated using the MATLAB commands:

```
>> A=1:3:5;  
>> B=[1,2,3,4,5];
```

Are A and B equal? Answer:

A.3 (0.5 point) Suppose that the arrays A and B are generated using the MATLAB commands:

```
>> A=1:10;  
>> B=linspace(1,10,10);
```

Are A and B equal? Answer:

A.4 (0.5+0.5+0.5+0.5+0.5+0.5 points) Let the two-dimensional arrays A, B, and C be defined in MATLAB as

```
A = [1 2 3 ; 4 5 6];  
B = [7 ; 8 ; 9];  
C = [10 11 12; 13 14 15];
```

For each the following commands, write ERROR next to the command if the command would cause an error to occur. Otherwise, leave blank.

```
>> D = [A,B]

>> D = [A;B]

>> D = A.^C

>> D = A.*B

>> C(1:2,3) = A(1,3)

>> A(1,3) = C(1:2,3)
```

A.5 (1+1+1+1+1 points) After the following MATLAB commands are executed,

```
>> a = 2;
>> b = -1;
>> c = [2 -1 20 0];
>> d = (c == [a b -20*b (a~=b)]);
>> e = (a <= b);
>> f = (a > c);
>> g = e | f;
>> h = (~e & f) ~= g;
```

indicate the outputs of the MATLAB statements:

```
>> d

    d =

>> e

    e =

>> f

    f =

>> g

    g =

>> h

    h =
```

**Part B** (10 points)

The following table includes the names of the three 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

B.1 (3 points) Write MATLAB commands to generate a  $3 \times 2$  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  $1 \times 2$  row vector with the number of stories and total height of the building.

```
>>
```

```
>>
```

```
>>
```

```
>>
```

```
>>
```

```
>>
```

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

```
>>
```

```
>>
```

```
>>
```

```
>>
```

```
>>
```

```
>>
```

B.3 (2+2 points) The 4 lines of code below add an extra field to the structure `tallB2`.

```
for i=1:3
    x = find(tallB2(i).location == ',');
    tallB2(i).NewField = tallB2(i).location(x+2:end);
end
```

Write the output of the following MATLAB statements:

```
>> tallB2(1).NewField
```

```
ans =
```

```
>> tallB2(3).NewField
```

```
ans =
```

**Part C** (2+2 points)

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

```
function a = myfun(b)
% Algebraic function evaluation
b = b^2 + 5;
a = (3*b + 9)/6;
```

Suppose you execute the MATLAB statements

```
>> clear all
>> a = 2;
>> b = myfun(a);
```

Record the output of the following MATLAB statements:

```
>> a
```

```
a =
```

```
>> b
```

```
b =
```

**Part D** (4 points)

Below are two 7-line blocks of code. Given a value of the variable  $x$ , each assigns a value to the variable  $y$ . Assume  $x$  is a scalar.

CODE BLOCK 1	CODE BLOCK 2
<pre>if x&lt;5     y = 2*x; elseif x&lt;10     y = x; else     y = 10; end</pre>	<pre>if x&lt;10     y = x; elseif x&lt;5     y = 2*x; else     y = 10; end</pre>

These two blocks of code do not lead to the same value of  $y$  for all given values of  $x$ .

D.1 (2 points) Determine a value of  $x$  for which the two blocks of code produce the same value of  $y$ .

Answer:  $x =$

D.2 (2 points) Determine a value of  $x$  for which the two blocks of code produce different values of  $y$ .

Answer:  $x =$

**Part E** (7 points)

Consider the following MATLAB statements:

```
>> clear
>> M(1).A = 3;
>> M(1).B = [1 3];
>> M(2).A = 2;
>> M(2).B = [2 3];
>> G = [10 20 30;40 50 60;70 80 90];
>> H = [5.1 4.1 3.1 2.1 1.1];
```

E.1 (2 points) What is the output of the command

```
>> H(M(2).B)
```

ans =

E.2 (2 points) What is the output of the command

```
>> H([M.A])
```

ans =

E.3 (3 points) What is the output of the command

```
>> G(M.B)
```

ans =

**Part F** (10 points)

For each of the following MATLAB codes, write the value of the output.

F.1 (3 points)

```
x = 0;
for k=1:10
    x = k^2;
end
x
```

x =

## F.2 (3 points)

```
y = 0;  
for k=1:2:10  
    y = y + k;  
end  
y  
  
y =
```

## F.3 (4 points)

```
z = 0;  
for k=1:100  
    for m=100:-10:10  
        if k==m  
            z = z+1;  
        end  
    end  
end  
z  
  
z =
```