E77 Midterm Examination I

Monday September 26, 2005

Name :	
SID :	

Section: **1**   **2**   (Please circle your lecture section)

Please circle your Laboratory section: (where your exam will be returned)

#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

Part	Points	Grade
1	10	
2	14	
3	12	
4	14	
5	8	
6	4	
7	10	
8	8	
TOTAL	80	

1. Write your name on each page.

2. Record your answers ONLY on the spaces provided.

3. You may not ask questions during the examination.

4. You may not leave the room before the exam ends.

5. Close book exam. One 8.5" × 11" sheet of handwritten notes allowed.

6. No calculators or cell phones allowed. (Please turn cell phones off)

1 Part

What is the output when the following commands are typed in sequence from the MATLAB command window? Do not worry about the exact format of the output.

(2)   1.

```
>> clear all
>> x = 4*2/4+(-2)^2;
>> x

=
```

(2)   2.

```
>> y = 4*(2\4)-2^(2);
>> y

=
```

(2)   3.

```
>> y = floor(3.2)+log(exp(2));
>> y

=
```

(2)   4.

```
>> z =5*sin(pi/2)+sqrt(9);
>> z

=
```

(2)   5.

```
>> who
```

---

2   Part

Assume that the following commands have been entered into the MATLAB command window:

```
>> clear all
>> a = 2;
>> b = [1;4];
>> c= [1 2];
```

Write the output that the following commands will produce. Do not worry about the exact format of the output. If the result produces a Matlab error then write ERROR.

(2)   1.

```
>> a + b
```

ans = _____

(2)   2.

```
>> a .* c
```

ans = _____

(2)   3.

```
>> a * c
```

ans = _____

(2)   4.

```
>> c .^ a
```

ans = _____

(2)   5.

```
>> b + c
```

ans = _____

(2)   6.

```
>> b' + c
```

ans = _____

(2)   7.

```
>> c .^ (b')
```

ans = _____

Numbers between parenthesis are the points allocated to each question.

3   Part

1. What is the output when the following commands are sequentially typed from the MATLAB command window? Do not worry about the exact format of the output.

(1)   (a)

```
>> s = 'Are you asleep yet?';
>> length(s)
```

= _____

(2)   (b)

```
>>  s([5 7 14])
```

= _____

(3)   (c)

```
>>  s(16 : -3 : 9)
```

= _____

2. Fill in the blanks, exactly as you would in Matlab, to create two vectors, V and W, each having 101 elements and ranging from $-\pi/2$ to $\pi/2$.

(3)   >> V = linspace(   );

(3)   >> W = [:   :   ];

_____

4 Part

Assume that the matrix $A = \begin{bmatrix} 1 & 6 & 5 \\ 4 & 2 & 9 \\ 8 & 0 & 7 \end{bmatrix}$ has been defined,

i.e. `>>A = [1 6  5; 4   2   9; 8  0  7];`.

Write the output that the following commands will produce. Do not worry about the exact format of the output. If the result produces a Matlab error then write ERROR.

(2)   1.

```
>>A(1,2)
```

ans = _____

(2)   2.

```
>>A(6)
```

ans = _____

(2)   3.

```
>>A(:,3)'
```

ans = _____

(2)   4.

```
>>A(2,:)
```

ans = _____

(2)   5.

```
A(1:2,2:3)
```

ans = _____

(2)   6.

```
>>sum(A)
```

ans = _____

(2)   7.

```
>>size(A)
```

ans = _____

5   Part

Suppose that the following 2×2 cell array, which is named `Info`, has been created in Matlab:

$$
\begin{bmatrix}
\text{My name is} & 1 \\[2mm]
\begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix} & \begin{bmatrix} 5 & 6 \\ 7 & 8 \end{bmatrix}
\end{bmatrix}
$$

(2)   1.   Write down the Matlab command that will insert the string `'Roberto'` into the (1,2) cell of the array `Info`:

>> _____

(2)   2.   Write down the Matlab command that will generate a new variable `x`, which is the sum of the array in the cell (2,1) and the array in the cell (2,2) of `Info`:

>> _____

(2)   3.   Write down the Matlab command that will generate a new variable `y`, which is the sum of the (1,1) element of the array in cell (2,1) and the (1,2) element of the array in cell (2,2) of `Info`:

>> _____

(2)   4.   What would the value of `y` in the previous question be?

>> _____

Numbers between parenthesis are the points allocated to each question.

6 Part

(2)   1. Will the following two sets of commands produce the same dimension cell arrays? (Explain why)

```
>> U1 =  { 's' ; 'min' ; 'h'  };
```

```
>> U(1,1)= {'s' } , U(1,2)= { 'min'  } ,  U(1,3)= { 'h'  };
```

---

(2)   2. If the following commands are entered sequentially into MATLAB, circle the first command that will cause an error

```
>> A = {{{[5 7]}}};
```

```
>> B = A{1};
```

```
>> C = B{1};
```

```
>> D = C{1};
```

```
>> E = D{1};
```

```
>> F = E{1};
```

```
>> G = F{1};
```

7   Part

(2)   1.   Suppose `A` is a 2 ×2 structure array with three fields. How many different pieces of data can be stored in the structure?

ANS: _____

(2)   2.   Write a command that puts the number `5` in the field `ratings` of the element at row `2` and column `3` of the structure array called `Mystructure`.

>> _____

(2)   3.   Consider the structure array `A` created by the following commands

```
>>clear all

>>A(1).cats=[1 2 3 4];

>>A(2).dogs=[5 6 7 8];
```

At this point, how many empty double arrays exist in the structure `A`?

ANS: _____

(questions continue on the next page)

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4. Assume that the following MATLAB statements have been sequentially typed in the command window:

```
>> clear all

>> record.name = 'studentA';

>> record.id = 1;

>> record.score = 100;

>> record(2).name = 'studentB';

>> record(2).id = 3;

>> record(2).score = 90;

>> record(3).name = 'studentC';
```

Write the output that the following commands will produce. Do not worry about the exact format of the output. If the result produces a Matlab error then write ERROR.

(2)   (a)
```
>> record(record(2).id).name
```

ans =

(2)   (b)
```
>> record(3).score
```

ans =

8   Part

Let the Matlab function `myFun` be given by:

```
function a = myFun(b,c)
d = 3;
b = b^c;
a = d*b;
```

Suppose you execute the following Matlab statements:

```
>> clear all;

>> a = 2; b = 2; c = 3;

>> d = myFun(b,c);
```

Provide the outputs of the following commands:

(2)   1.

```
>> a
a =
```

(2)   2.

```
>> b
b =
```

(2)   3.

```
>> c
c =
```

(2)   4.

```
>> d
d =
```

Numbers between parenthesis are the points allocated to each question.