

MAE-10 : Winter Quarter 2011

Midterm Examination #1

Instructions: You have until the end of the class period to complete the exam. Notes on 1 side of a 8.5"x11" sheet of paper are allowed. Closed book. No calculators.

Section 1: Short Answer. (2 points each)

(1.1) What symbol is used for creating comments?

(1.2) What does the `numel ()` function do?

(1.3) What does the `size ()` function do?

(1.4) How many elements are in `ARRAY1`?

```
ARRAY1 = [ 0:3:9 ; -1:-2:-7 ]
```

(1.5) `A` is a 2x3 array. `B` is a 3x2 array. Is the command `A.*B` allowed? Why or why not? (credit given only if the correct explanation is provided)

Section 2: Find the error in the following segments of code, if any, and give an explanation of the error. If you believe that there are no errors write "No errors." You do not need to provide the output of the code. (2 points each)

(2.1)

```
x = [ 0:1:3 , 2 ; 0:2:10 ] ;  
y = x( 2 , 2 ) ;  
disp( y )
```

```
(2.2) x = [ 0 : 0.1 : 1 ];  
y = [ 0 : 0.2 : 2 ];  
w = x'  
a = ( ( y' )' )'  
t = [ w ; a ]
```

```
(2.3) hi = 'bye'  
bye = 'hi'  
disp( 'hi = ' , hi )
```

```
(2.4) t = [ 0:4 ; 3:3:12 ; 6:3:15 ];  
w = t( 1 , end )  
t = t( 2:3 , w )
```

```
(2.5) a = 4  
a(3) = 3  
a(2) = 2  
y = [ 0:2:4 ; a ]
```

```
(2.6) d = [ 3 , 6 , 8 , 8 3 2 ]  
f = [ 88 ; 99 ; 100 ; 33 ; 55 ; 22 ] ;  
g = (d .+ 2) .* (f ./ 2)'
```

```
(2.7) x = input( Enter a value for x: )  
y = 4 ;  
a = ( x > y ) & ( x < y ) | ( x > y )  
b = ~ a & a ;  
disp( x == y )
```

```
(2.8) if( 4 ~= 5 )
    disp( 'Four is Five' )
    if( 5 ~= 4 )
        disp( 'Five is Four' )
    end
    disp( 'Four is Four' )
else
    end
disp( 'I love Four' )
end
```

```
(2.9) class = 'MAE10' ;
switch class
case{ 'MAE12' , 'MAE13' }
if( 12 + 4 > 7 )
case{ 'MAE14' , 'MAE10' }
disp( 'hello' )
end
case{ 'MAE31' , 'MAE100' }
end
```

```
(2.10) a = 1001 ;
b = 5001 ;
w = -1 ;
if(a > 5)
disp( a )
if( b==a & a==b )
disp( a )
end
elseif( a > b + 1 )
w = b
if( w == 2 * b - 1 )
w = a ;
end
else
w = w + 1 ;
end
```

Section 3: Write the output from the following segments of code. Assume that there are no errors. (4 points each)

```
(3.1) x = [ 0:9 ; 1:10 ] ;  
      y = x( 1:2 , 6:8 ) ;  
      w = y( end , 1:2 ) ;  
      disp( y )
```

```
(3.2) a = 3 * 6 ^ 2 - 1 / 2 - 4 * 3 + 2 ;  
      b = 3 * 6 ^ ( 2 - 1 ) / 2 - 4 * ( 3 + 2 ) ;  
      c = 3*3^3/9+2^2*2+2 ;  
      d = 8 / 8+1 / 1+2 ^ 2+1 ;  
      f = [ a , b , c , d ] ;  
      disp( f )
```

```
(3.3) a = 'pizza' ;  
      b = 'monkey' ;  
      c = [ b( 3:5 ) ; a( 2:4 ) ] ;  
      d = [ c( 1,1:2 ) , b( 2:3 ) ] ;  
      disp( d )
```

```
(3.4) a = [ 0:2 ; 1:3 ; 2:4 ; 3:5 ] ;  
      b = 2.*a.^2.+2 ;  
      disp( b( : , end ) )
```

```

(3.5) x = [ 2 , 1 , 2 , 2 ] ;
        y = [ 3 , 6 , 3 , 2 ] ;
        if( x(4) <= y(3) )
            x(3) = y(2) ;
            x( 1:2 ) = y( 2:3 ) ;
        elseif(x(2) < x(1) )
            x = y ;
            disp( y( 1:2 ) )
        elseif(x(2) > 0)
            y = x ;
            disp( y( 1:2 ) )
        else
            x(1) = x(4) ;
        end
        disp( x( 1:2 ) )

```

```

(3.6) state = 'LA' ;
        switch state
            case { 'FL' , 'OH' }
                state(3) = 'M' ;
                LA = 'GA' ;
                if( state == 'LA' )
                    state(4) = 'A' ;
                end
            case { 'state' , 'MA' }
                if( state(2) == 'A' )
                    state(3) = 'T' ;
                    LA = state( 2:3 ) ;
                end
            otherwise
                LA = state ;
        end
        disp( [state , LA ]' )

```

```

(3.7) x = 3;
        y = 4;
        w = -1;
        c = 3;
        a = ~( ( x * y ) - w == ( w + x + y ) ) ;
        b = ( w - c - w ) < ( x - y ) ^ w ;
        if( a )
            w = 2;
        elseif( b )
            y = 4;
            c = 4;
        else
            x = x + y + w ;
            disp( [ x , y , w ] )
        end
        disp( [ x , y ; w , c ] )

```

Section 4: Write a program to complete the following tasks. You do not have to write the output of the code.

(4.1) (6 points) Someone provides you with a $M \times N$ array called \mathbf{A} , where M and N are integers. You do not need to know the values stored in \mathbf{A} for this problem.

- Switch the values stored in the 2nd row with the values stored in the last row.

- Switch the values stored in the 1st column with the values stored in the 3rd column.

- Check to see if the array is square (the number of rows and number of columns are the same). If \mathbf{A} is a square array, display the values stored in the 2nd row. If \mathbf{A} is not a square array, display the values stored in the 3rd column.

(4.2) (5 points) A scientist records the temperature and pressure many times during the day and stores this data in an array called **DATA**. The first row of **DATA** contains the time that the temperature and pressure measurements were obtained, the second row of **DATA** contains temperature measurements, and the third row of **DATA** contains pressure measurements. You do not need to know the values stored in **DATA** for this problem. Display the time, temperature, and pressure data on the screen in the following manner:

- The first column contains pressure data
- The second column contains the times when the pressure and temperature data were obtained
- The third column contains the temperature data

(4.3) (5 points) There are three functions,

$$x = t^2$$

$$y = t x^2 + t$$

$$w = \sin(y^3)$$

Calculate the values of x , y , and w from $t = -200$ to $t = 0$ seconds in increments of 5. Display the values of t , w , y , and x in a four column table.

(4.4) (5 points) Ask the user to input the following information:

- user's name
 - user's age
 - user's pet's name
 - user's pet's age
-
- If the number of characters in the pet's name is greater than the pet's age, and the number of characters in the pet's name is four or less, tell the user "Your short-named pet is young."
 - If the user's name contains more characters than the pet's name, display the pet's name. If the pet's name contains more characters than the user's name, display the user's name. If the user and pet have names that contain the same number of characters, tell the user that he should change his name.