

Midterm Exam 1

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10/18/2019

22 questions, 50 minutes, 11 pages

Version B

Name: _____**Student ID:** _____**Statement of Academic Integrity**

UC Berkeley Honor Code: "As a member of the UC Berkeley community, I act with honesty, integrity, and respect for others."

On my honor, I will neither give nor receive any assistance in taking this exam. I will not use any electronic devices during the exam.

Signed: _____

Instructions

1. The exam is closed book. No electronic device is permitted (no calculator, no cellphone, no laptop, no MATLAB).
2. Bring your Cal ID to the exam room.
3. You may bring one 8.5" × 11" sheet of paper of handwritten notes.
4. Please do not get up to leave until the exam is over.
5. Read and sign the above statement of academic integrity.
6. Write your full name and SID in the blanks above and on the top of the bubble sheet.
7. Mark the version of your exam on the bubble sheet. Incorrectly marked exam version may result in 0 point in your exam grade.
8. Mark your answers on the bubble sheet with pen or pencil. There is one and only one correct choice for each question. Multiple bubbles, incomplete bubbles, or stray marks will be marked incorrect.
9. At the end of the exam, hand in the completed bubble sheet AND the exam.

Do not open the exam book until instructed to do so.

1. Let two arrays A and B be defined as:

```
>> A = 2:6  
>> B = [1 2 3 2 1]
```

What is the output of the following command?

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

- (a) 2 5
 - (b) 10 1
 - (c) 5 2
 - (d) 1 10
 - (e) MATLAB returns an error
2. Consider the code:

```
A=[1:3; 2:2:6; 3:-1:1];
```

What is the output when the following command is implemented?

```
B = A'
```

- (a) B =
1 2 3
2 4 2
3 6 1
- (b) B =
Inf Inf Inf
Inf Inf Inf
Inf Inf Inf
- (c) B =
3 2 1
2 4 6
3 2 1
- (d) B =
1 2 3
2 4 6
3 2 1
- (e) B =
3 2 1
6 4 2
1 2 3

3. Consider the code:

```
A=[1:3; 2:2:6; 3:-1:1];
```

What is the output when the following command is implemented?

```
C=[A(:,1) [4 5 7]' A(:,2)]
```

(a) C =
 2 7 3
 4 5 6
 2 4 1

(b) C =
 1 2 3
 4 5 7
 2 4 6

(c) C =
 1 4 2
 2 5 4
 3 7 2

(d) Matlab returns an error.

(e) C =
 1 7 2
 2 7 4
 3 4 6

4. Which of following is the value of B after executing the Matlab code?

```
A = [1, 2, 3, 4; 5, 6, 7, 8; 9, 10, 11, 12];  

B = A([1,3], [2:3]);
```

- (a) MATLAB returns an error
- (b) [2,3;6,7;10,11]
- (c) [5,7;9,11]
- (d) [2,3;10,11]
- (e) None of the above

5. What would be the value of `output` when the following code is executed?

```
A=[1; 2; 3; 4];  
B=[1; 1; 1; 1];  
C=A.*B;  
output=size(C)
```

- (a) [1,1]
 - (b) [1,4]
 - (c) [4,4]
 - (d) MATLAB returns an error
 - (e) None of the above
6. Running the following Matlab code, what is the result?

```
A = ['E'];  
B = ['7'];  
C = A + B;  
class(C)
```

- (a) logical
 - (b) double
 - (c) character
 - (d) string
 - (e) MATLAB returns an error
7. Run the following code in MATLAB command window

```
a = [1 2 3 4 2];  
b = a>=3;  
c = a(b);
```

What are the sizes of variable `b` and `c`

- (a) `b` is 1-by-2 and `c` is 1-by-5
- (b) `b` is 1-by-5 and `c` is 1-by-5
- (c) `b` is 1-by-2 and `c` is 1-by-2
- (d) `b` is 1-by-5 and `c` is 1-by-2
- (e) None of the above

8. What will be the value of `hold`, once we run the following code?

```
MyStr = 'Programming in MATLAB is fun!';  
hold = strfind(MyStr, 'in');
```

- (a) MATLAB returns an error
- (b) 9
- (c) [9,10,13,14]
- (d) [9,10]
- (e) [9,13]

9. Consider the string below

```
str='E7 is a FuN CoURsE';
```

We want all upper case letters turn to lowercase. That is, we want a one line code that returns
'e7 is a fun course'

Which of the following codes can successfully achieve this. Note that the ASCII codes for 'A','Z','a','z' and '7' are respectively 65,90,97,122 and 55.

- (a) `>> dum=find(str<=90 & str>=65); str(dum)=str(dum)+32`
- (b) `>> dum=find(str<=122 & str>=97); str(dum)=str(dum)+32`
- (c) `>> dum=find(str<=90); str(dum)=str(dum)-32`
- (d) `>> dum=find(str<=90); str(dum)=str(dum)+32`
- (e) None of the above

10. Let three variables `x`, `y` and `z` be defined as:

```
>> x = 1;  
>> y = 2;  
>> z = 3;
```

What is the output of the following command?

```
>> x>y && z<w
```

- (a) 1
- (b) 0
- (c) logical 1
- (d) logical 0
- (e) MATLAB returns an error

11. What will be the value of `hold`, once we run the following code?

```
A = [3, -2, 6; 5, 8, 1; -7, 11, 4];
S1 = sum(A,1);
S2 = sum(A,2);
hold = find( S2>S1' )
```

- (a) MATLAB returns an error
- (b) A column vector with elements 2 and 3
- (c) A logical column vector: [0;1;1]
- (d) A logical column vector: [1;0;0]
- (e) A single number 1

12. Which one of the following Matlab codes result in an error

(a)

```
a=2;
if a>2
    b=3;
else
    b=4
elseif a<-2
    b=4;
end
```

(b)

```
a=2;
if a>2
    b=3;
else
    b=4
else
    b=4;
end
```

(c)

```
a=2;
if a>2
    b=3;
else a<-2
    b=4
```

- (d) All three codes above are correct.
- (e) All three codes above result in errors.

13. What is the result of executing following code?

```
n = 0;
count = 0;
while n<=10
    if n < 5
        n = n + 1;
    else
        n = n + 2;
    end
    count = count +1;
end
disp(count);
```

- (a) 11
- (b) 10
- (c) 8
- (d) 7
- (e) None of above.

14.

```
function out = operator(a,b)
out = 1
if a==b
    out = a*b
else
    if a > 2 & b < 3
        out = a+b
    elseif a <= 0 & b >=3
        out = a-b
    elseif a>=0 & a <=2 & b > 0
        out = a/b
    end
end
end
```

Execute the code `out = operator(0, 3)`, what will be the value of `out`?

- (a) 0
- (b) 1
- (c) 3
- (d) -3
- (e) MATLAB returns an error

15. What are the final values of i , j , and m for the following code?

```
v = [3 1 5];  
i = 1;  
for j = v  
    i = i + 1;  
    if i == 3  
        i = i+2;  
        m = i+j;  
    end  
end
```

(a) $i = 6$
 $j = 5$
 $m = 7$

(b) $i = 7$
 $j = 3$
 $m = 8$

(c) $i = 7$
 $j = 3$
 $m = 7$

(d) $i = 6$
 $j = 5$
 $m = 6$

(e) $i = 5$
 $m = 10$
 $j = 5$

16. Let the function choice.m be defined as follows:

```
function y = choice(x)

if x <= 0
    y = abs(x) + 5;
elseif x > 100
    y = "Huge";
else
    switch x
        case {1 , 4 , 9 , 16 , 25 , 36 , 49 , 64 , 81 , 100}
            y = sqrt(x);
        otherwise
            y = num2str(x/2) ;
    end
end
```

What is the output of the following command?

```
>> y = choice(10);
>> y
```

- (a) "Huge"
- (b) '5'
- (c) 5
- (d) "5"
- (e) 15

17. The code

```
d = eps
```

returns the distance from 1.0 to the next largest -----

- (a) The code would return an error
- (b) Integer
- (c) Single precision number
- (d) Double precision number
- (e) Multiple of 10

18. Consider a MATLAB function f that $f(a) > f(b)$ for all $a > b \geq 0$ and returns an error when calling $f(a)$ for $a < 0$. What of the following MATLAB command returns a logical value **true**?
- (a) `f(2) > f(1) || f(-1) > f(2)`
 - (b) `f(3) > f(2) && f(3) > f(4)`
 - (c) `xor(f(2) > f(1), f(3) > f(2))`
 - (d) `f(4) > f(1) & f(2) > f(-1)`
 - (e) `f(3) > f(1) | f(1) > f(-1)`
19. Consider the following variables. Which of the following expression will give you an error if you try to execute them:

```
a=[5, 43, 22];
b=[2, 3];
c=1;
```

- (a) `b>a(2:end) | b(1)<=c`
 - (b) `c>a | b(2)<=a`
 - (c) `b>a(2:end) & a(1:2)<=c`
 - (d) `c<=a && c>=b`
 - (e) `a(end)==c && b(1)>=c`
20. The function `SimpCal` is shown below and it is accessible from the MATLAB command window.

```
function [ D , Y ] = SimpCal(X, D)
D = D^2 + 9;
Y = sqrt(D) - X;
```

Assume that the following commands have been executed in the command window:

```
>> X = 5;
>> dum = 4;
>> Y = X^2 - dum;
>> [dum, Y] = SimpCal(X, dum);
```

What are the values of `Y` and `dum`, respectively?

- (a) MATLAB returns an error
- (b) -3, 25
- (c) -3, 4
- (d) 0, 25
- (e) 0, 4

21. Let the function Conv.m be defined as follows:

```
function TOut = Conv(UnitIn,UnitOut,TIn)
switch UnitIn
    case 'F'
        switch UnitOut
            case 'C'
                TOut = (TIn-32)*5/9;
            otherwise
                disp('Error in Output Units')
        end
    case 'C'
        switch UnitOut
            case 'F'
                TOut = (TIn*9/5)+32;
            otherwise
                disp('Error in Output Units')
        end
    otherwise
        disp('Error in Input Units')
end
```

What is the output of the following command?

```
Ti = 37;
To = Conv('C','F',Ti)
```

- (a) Error in Output Units
- (b) To = 37.7778
- (c) Error in Input Units
- (d) To = 98.6
- (e) MATLAB returns an error

22. What will be the outcome of the following code?

```
clear all; clc;
a = 5; b = 7; c = 1;
f = @(x) a*x^2 - b*x +c;
b = 3;
disp( f(3) )
```

- (a) 25
- (b) 37
- (c) 205
- (d) 217
- (e) MATLAB returns an error