ENGR 132 Exam Practice
Relational & Logical Operators

Problems

Practice 1.

Given the following matrices:

```
A =  5   7   9        B =  1   0
    -1   4   9             -1   4
    -3  -5   6
```

What is displayed in the MATLAB command window after the following command is executed?

```
C = A <= 4
```

Solution

Practice 2.

Determine the results of the logical expression in the truth table provided below.

xor((A|B),~B) & (~A & B)

	A = 1	**A = 0**
B = 1		
B = 0		

Solution

Practice 3.

The following variables have been assigned in the MATLAB command window:

```
>> P = 4;
>> Q = 10;
>> R = [2, 3, 4, 5];
>> S = [7, 0, 1, 5];
>> T = [4, 8; 0, 6];
>> U = [1, 5, 7; 4, 0, 1];
>> V = [6, 2; 0, 4];
```

Each command below results in an error. **In each case, explain the reason for the error.**

A. `>> V+T = Q / P >= R - 1`
B. `>> W_x = any(U > 4) & all(V)`
C. `>> 2 = xor(all(~any(V > 1)) & find(T < V) , any(~all(V >1)))`
D. `>> [row, col] = find((T > P) | (P + R < Q))`
E. `>> Q = R./U`

Solution

Practice 4.

Complete the following Truth Table. Please show all the steps in each cell to get credit on the problem. Skipping steps will result in points being lost.

E & ~D | xor(~C,D)

	C=0		**C=1**	
	D = 0	**D = 1**	**D = 0**	**D = 1**
E=0		**Skip**		**Skip**
E=1	**Skip**		**Skip**	

Solution

Practice 5.

A. Which expression **WILL NOT** result in R1 = 0 if run in MATLAB?

   a. `R1 = xor(0,0)`
   b. `R1 = 1 & 0`
   c. `R1 = 0 | 0`
   d. `R1 = 1 & -1`
   e. `R1 = ~(-1) & ~0`

B. You have executed the following commands in MATLAB:

```
>> Z = -1;
>> Y = 1;
>> R1 = xor( (Y & Y & (~Z | ~Y) ), (Z & Y) )
```

   What is the value of R1?

   a. 0

b. 1

c. An Error Occurs

Solution

Practice 6.

You have executed the following commands in MATLAB:

```
>> Z = [0 1 -1];
>> R1 = [5 5 5] <= Z <= 0
```

What is the value of R1?

A. `R1 = [1 1 1]`
B. `R1 = [0 0 1]`
C. `R1 = [0 1 1]`
D. `R1 = [0 0 0]`
E. An Error Occurs

Solution

Solutions

Practice Solution 1

```
C = 0 0 0
    1 1 0
    1 1 0
```

Practice Solution 2

	A = 1	**A = 0**
B = 1	xor(1,0)&(0&1)=(1&0)= 0	xor(1,0)&(1&1)=(1&1)=1
B = 0	xor(1,1)&(0&0)=(0&0) = 0	xor(0,1)&(1&0)=(1&0)=0

Practice Solution 3

A. `Error: The expression to the left of the equals sign is not a valid target for an assignment.`

B. `Error using &`
`Matrix dimensions must agree.`

C. `Error: The expression to the left of the equals sign is not a valid target for an assignment`

D. `Error using |`
`Matrix dimensions must agree`

E. `Error using .*`
`Matrix dimensions must agree`

Practice Solution 4

E&~D|xor(~C,D)

	C = 0		C = 1	
	D = 0	D = 1	D = 0	D = 1

E = 0	**CELL A**
	`E&~D|xor(~C,D)`
	`0&~0|xor(~0,0)`
			CELL B
			`E&~D|xor(~C,D)`
			`0&~0|xor(~1,0)`	

	`0&1|xor(1,0)`
	`0|1`
	`1`
			`0&1|xor(0,0)`
			`0|0`
			`0`	

E = 1		**CELL C**
		`E&~D|xor(~C,D)`
		`1&~1|xor(~0,1)`
		`1&0|xor(1,1)`
		`0|0`
		`0`
				CELL D
				`E&~D|xor(~C,D)`
				`1&~1|xor(~1,1)`
				`1&0|xor(0,1)`
				`1|1`
				`1`

Practice Solution 5

A. d

B. b

Practice Solution 6

A