

Test Cases

October 13, 2021

1 Test Cases with Expected Output

1. Input : $x1 \leq 2$ 1 10
Expected Output:

```
x1<=2
+-----+-----+
| State | 0 | 1 |
+-----+-----+
| 2IF   | 1 | 0 |
| 1F    | 0 | 0 |
| 0F    | 0 | -1 |
| -1    | -1 | -1 |
+-----+-----+
x1<=2 and x1=10 is FALSE
```

2. Input : $x1 \leq 2$ 1 1
Expected Output:

```
x1<=2
+-----+-----+
| State | 0 | 1 |
+-----+-----+
| 2IF   | 1 | 0 |
| 1F    | 0 | 0 |
| 0F    | 0 | -1 |
| -1    | -1 | -1 |
+-----+-----+
x1<=2 and x1=1 is TRUE
```

3. Input : $x1 + x2 \leq 5$ 2 2 1
Expected Output:

```
x1+x2 <= 5
```

State	0,0	0,1	1,0	1,1
5IF	2	2	2	1
2F	1	0	0	0
1F	0	0	0	-1
0F	0	-1	-1	-1
-1	-1	-1	-1	-2
-2	-1	-2	-2	-2

```
x1+x2 <= 5, x1=2 and x2=1 is TRUE
```

4. Input : $x1 + x2 \leq 5$ 2 4 3
Expected Output:

```
x1+x2 <= 5
```

State	0,0	0,1	1,0	1,1
5IF	2	2	2	1
2F	1	0	0	0
1F	0	0	0	-1
0F	0	-1	-1	-1
-1	-1	-1	-1	-2
-2	-1	-2	-2	-2

```
x1+x2 <= 5, x1=4 and x2=3 is FALSE
```

5. Input : $And(x1 \leq 2, x1 + x2 \leq 5)$ 2 1 3
Expected Output:

x1<=2					
+-----+-----+-----+					
State	0		1		
+-----+-----+-----+					
2IF	1		0		
1F	0		0		
0F	0		-1		
-1	-1		-1		
+-----+-----+-----+					
x1+x2 <= 5					
+-----+-----+-----+-----+					
State	0,0		0,1		1,0 1,1
+-----+-----+-----+-----+					
5IF	2		2		2 1
2F	1		0		0 0
1F	0		0		0 -1
0F	0		-1		-1 -1
-1	-1		-1		-2 -2
-2	-1		-2		-2 -2
+-----+-----+-----+-----+					
And(x1<=2,x1+x2 <= 5)					
+-----+-----+-----+-----+					
State	0,0		0,1		1,0 1,1
+-----+-----+-----+-----+					
<5,2>IF	<2,1>		<2,1>		<2,0> <1,0>
<2,1>F	<1,0>		<0,0>		<0,0> <0,0>
<2,0>F	<1,0>		<0,0>		<0,-1> <0,-1>
<1,0>F	<0,0>		<0,0>		<0,-1> <-1,-1>
<0,0>F	<0,0>		<-1,0>		<-1,-1> <-1,-1>
<0,-1>	<0,-1>		<-1,-1>		<-1,-1> <-1,-1>
<-1,-1>	<-1,-1>		<-1,-1>		<-1,-1> <-2,-1>
<-1,0>	<-1,0>		<-1,0>		<-1,-1> <-2,-1>
<-2,-1>	<-1,-1>		<-2,-1>		<-2,-1> <-2,-1>
+-----+-----+-----+-----+					
And(x1<=2,x1+x2 <= 5), x1=1 and x2=3 is TRUE					

6. Input : $And(x1 \leq 2, x1 + x2 \leq 5)$ 2 1 6
Expected Output:

x1<=2					
+-----+-----+					
State	0		1		
+-----+-----+					
2IF	1		0		
1F	0		0		
0F	0		-1		
-1	-1		-1		
+-----+-----+					
x1+x2 <= 5					
+-----+-----+-----+-----+					
State	0,0		0,1		1,0 1,1
+-----+-----+-----+-----+					
5IF	2		2		2 1
2F	1		0		0 0
1F	0		0		0 -1
0F	0		-1		-1 -1
-1	-1		-1		-2 -2
-2	-1		-2		-2 -2
+-----+-----+-----+-----+					
And(x1<=2,x1+x2 <= 5)					
+-----+-----+-----+-----+					
State	0,0		0,1		1,0 1,1
+-----+-----+-----+-----+					
<5,2>IF	<2,1>		<2,1>		<2,0> <1,0>
<2,1>F	<1,0>		<0,0>		<0,0> <0,0>
<2,0>F	<1,0>		<0,0>		<0,-1> <0,-1>
<1,0>F	<0,0>		<0,0>		<0,-1> <-1,-1>
<0,0>F	<0,0>		<-1,0>		<-1,-1> <-1,-1>
<0,-1>	<0,-1>		<-1,-1>		<-1,-1> <-1,-1>
<-1,-1>	<-1,-1>		<-1,-1>		<-1,-1> <-2,-1>
<-1,0>	<-1,0>		<-1,0>		<-1,-1> <-2,-1>
<-2,-1>	<-1,-1>		<-2,-1>		<-2,-1> <-2,-1>
+-----+-----+-----+-----+					
And(x1<=2,x1+x2 <= 5), x1=1 and x2=6 is FALSE					

7. formula $f = 2*x1 + x2 == 4$
Number of variables, $n = 2$
Input numbers in decimal: $x1 = 2, x2 = 0$
Expected Final Table:

State	(0,0)	(0,1)	(1,0)	(1,1)
4I	2	Err	1	Err
2	1	Err	0	Err
1	Err	0	Err	-1
0F	0	Err	-1	Err
-1	Err	-1	Err	-2
-2	-1	Err	-2	Err
Err	Err	Err	Err	Err

Expected Output on running input numbers on automaton: $x_1 = 2, x_2 = 0$ satisfies given formula.

8. formula $f = \text{Not}(x_1 + x_2 \leq 2)$
Number of variables, $n = 2$
Input numbers in decimal : $x_1 = 1, x_2 = 2$
Expected Final Table:

State	(0,0)	(0,1)	(1,0)	(1,1)
2I	1	0	0	0
1	0	0	0	-1
0	0	-1	-1	-1
-1F	-1	-1	-1	-2
-2F	-1	-2	-2	-2

Expected output on running input numbers on automaton: $x_1 = 1, x_2 = 2$ does satisfies given formula.

Note: You may name the states as (≤ 2) and so on if that is more convenient for you.

9. formula $f = \text{And}(\text{Not}(x_1 + x_2 \leq 2), x_2 \leq 1)$
Number of variables $n = 2$
Input numbers in decimal: $x_1 = 5, x_2 = 3$
Expected Final Table:

State	(0,0)	(0,1)	(1,0)	(1,1)
(2,1)I	(1,0)	(0,0)	(0,0)	(0,0)
(2,0)	(1,0)	(0,-1)	(0,0)	(0,-1)
(2,-1)	(1,-1)	(0,-1)	(0,-1)	(0,-1)
(1,1)	(0,0)	(0,0)	(0,0)	(-1,0)
(1,0)	(0,0)	(0,-1)	(0,0)	(-1,-1)
(1,-1)	(0,-1)	(0,-1)	(0,-1)	(-1,-1)
(0,1)	(0,0)	(-1,0)	(-1,0)	(-1,0)
(0,0)	(0,0)	(-1,-1)	(-1,0)	(-1,-1)
(0,-1)	(0,-1)	(-1,-1)	(-1,-1)	(-1,-1)
(-1,1)F	(-1,0)	(-1,0)	(-1,0)	(-2,0)
(-1,0)F	(-1,0)	(-1,-1)	(-1,0)	(-1,-1)
(-1,-1)	(-1,-1)	(-1,-1)	(-1,-1)	(-2,-1)
(-2,1)F	(-1,0)	(-2,0)	(-2,0)	(-2,0)
(-2,0)F	(-1,0)	(-2,-1)	(-2,0)	(-2,-1)
(-2,-1)	(-1,-1)	(-2,-1)	(-2,-1)	(-2,-1)

Expected Output on running input numbers on automaton: $x1 = 5$, $x2 = 3$ does not satisfy given formula.

Note: In the images above, all unreachable states have been removed from the table. Your algorithm can output a table much larger than the above. However, the states and transitions present in the above images must be in your table.