

Homework 6 Ziyuan Chen

Problem 0.

0.9. Construct: X_i represents the switches.
 X_i -domain = $[0, 1]$.
off on

$$f_i(x) = f_i(x_1 \dots x_m)$$

$$f_i(x \in [x_1 \dots x_m])$$

$$= \text{sum}(X_i) \text{ if } \exists i \in T_j \text{ for } j \in \text{range}(1, m+1)$$

\Rightarrow def $f(x_1, x_2 \dots x_m)$:

sum = 0

for j in range(1, m+1):

if i in T_j :

sum = sum + X_i

if sum % 2 == 1:

return True

else:

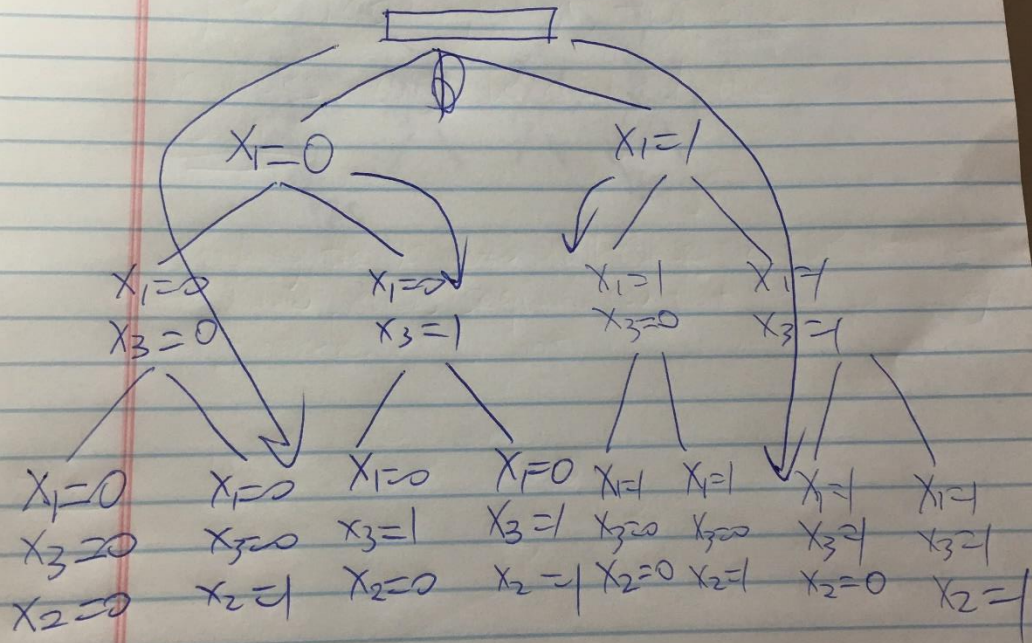
return False

Q.6.

(i) $[1, 0, 1], [0, 1, 0]$ Two possibilities.

(ii)

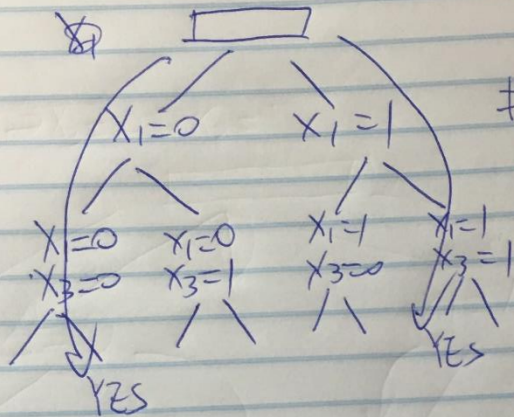
~~$X_1=0 \rightarrow X_3=0 \rightarrow X_2=$~~



Backtrack calls = $4 \times 2 + 1 = 9$ times.

Q. (iii)

With AC-3:



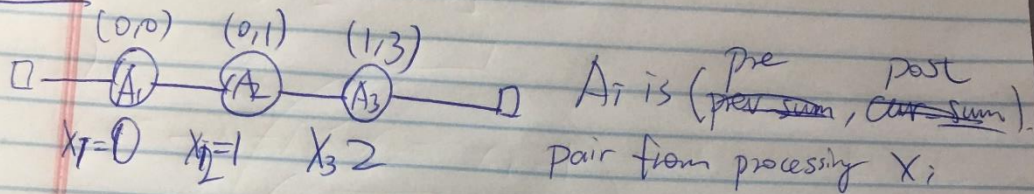
backtrack cells

$$= 2 \times 3 + 1$$

= 7 times.

Problem 2.

2a,



Processing: $A_i[2] = \min(K+1, A_i[1] + X_i)$

Initialization: $A_1[0] = 0$

Final output: $A_3[2] \leq K$

factor: $A_i[1] = A_{i-1}[2]$

3.c

My request:

minUnits 3

maxUnits 15

register Aut2016

register Win2017

register Aut2017

taken CS106B

taken CS107

taken CS109

taken CS140

taken CS221

taken MATH51

taken CS145

taken CS124

taken EE102A

taken EE102B

taken EE278B

taken CS103

taken CS161

request CS229

request CS148

request CS149

Output:

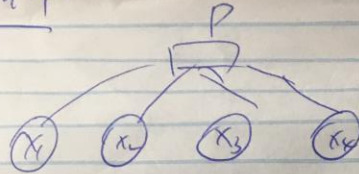
Quarter	Units	Course
Aut2016	4	CS148

Win2017	4	CS149
Aut2017	4	CS229

4.a.

Problem 4

4a.



If P has length n , then since the variables cannot be combined, the treewidth is n .

(Combining the variables will cause the CSP unable to know previous sequence(s) that form part of a pattern.)

4b.