

Lecture SAT Example

Beam Search

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State Space

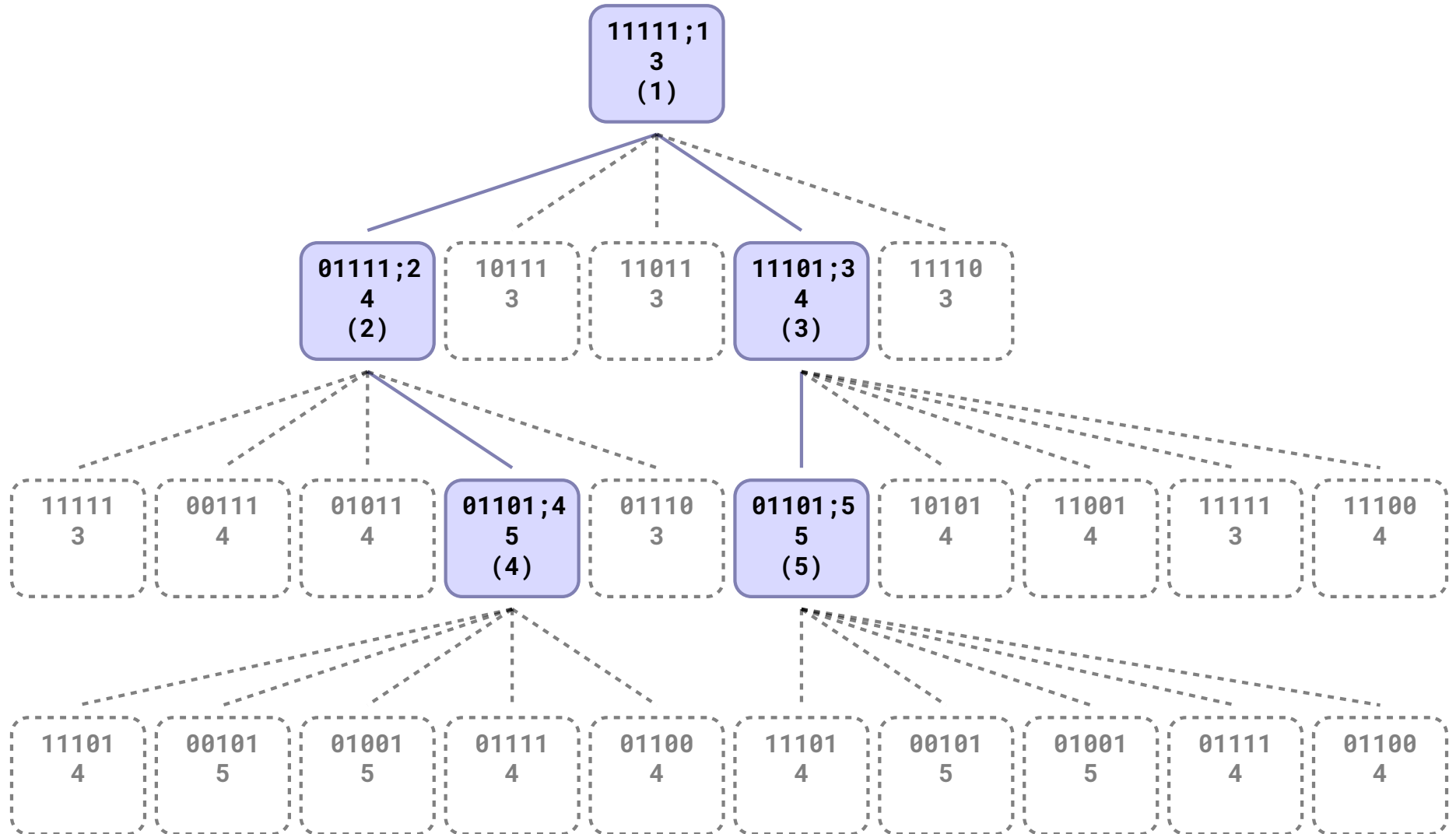
The start state is “11111”.

MoveGen is a one bit flip function.
It flips the bits from left to right, one bit at a time, and accordingly returns the neighbours.

$$F(abcde) = (b \vee \neg c) \wedge (c \vee \neg d) \wedge (\neg b) \wedge (\neg a \vee \neg e) \wedge (e \vee \neg c) \wedge (\neg c \vee \neg d)$$

S.No.	abcde	h(F)	eval(F)	eval					
				$(b \vee \neg c)$	$(c \vee \neg d)$	$(\neg b)$	$(\neg a \vee \neg e)$	$(e \vee \neg c)$	$(\neg c \vee \neg d)$
1	00000	6	1	1	1	1	1	1	1
2	00001	6	1	1	1	1	1	1	1
3	00010	5	0	1	0	1	1	1	1
4	00011	5	0	1	0	1	1	1	1
5	00100	4	0	0	1	1	1	0	1
6	00101	5	0	0	1	1	1	1	1
7	00110	3	0	0	1	1	1	0	0
8	00111	4	0	0	1	1	1	1	0
9	01000	5	0	1	1	0	1	1	1
10	01001	5	0	1	1	0	1	1	1
11	01010	4	0	1	0	0	1	1	1
12	01011	4	0	1	0	0	1	1	1
13	01100	4	0	1	1	0	1	0	1
14	01101	5	0	1	1	0	1	1	1
15	01110	3	0	1	1	0	1	0	0
16	01111	4	0	1	1	0	1	1	0
17	10000	6	1	1	1	1	1	1	1
18	10001	5	0	1	1	1	0	1	1
19	10010	5	0	1	0	1	1	1	1
20	10011	4	0	1	0	1	0	1	1
21	10100	4	0	0	1	1	1	0	1
22	10101	4	0	0	1	1	0	1	1
23	10110	3	0	0	1	1	1	0	0
24	10111	3	0	0	1	1	0	1	0
25	11000	5	0	1	1	0	1	1	1
26	11001	4	0	1	1	0	0	1	1
27	11010	4	0	1	0	0	1	1	1
28	11011	3	0	1	0	0	0	1	1
29	11100	4	0	1	1	0	1	0	1
30	11101	4	0	1	1	0	0	1	1
31	11110	3	0	1	1	0	1	0	0
32	11111	3	0	1	1	0	0	1	0

Search Tree



Solution (w=2)

Break ties by selecting the smallest bit-string in numerical order.

Tuple: (NODE,H-VALUE)

1.

OPEN (11111,3):[]

moveGen 01111:10111:11011:11101:11110:[]

neighbours (01111,4):(11101,4):(10111,3):(11011,3):(11110,3):[]

OPEN (01111,4):(11101,4):[]

2.

OPEN (01111,4):(11101,4):[]

moveGen 11111:00111:01011:01101:01110:[]

moveGen 01101:10101:11001:11111:11100:[]

neighbours (01101,5):(01101,5):(00111,4):(01011,4):(10101,4):
(11001,4):(11100,4):(01110,3):(11111,3):(11111,3):[]

OPEN (01101,5):(01101,5):[]

3.

OPEN (01101,5):(01101,5):[]

moveGen 11101:00101:01001:01111:01100:[]

moveGen 11101:00101:01001:01111:01100:[]

neighbours (00101,5):(00101,5):(01001,5):(01001,5):(01100,4):
(01100,4):(01111,4):(01111,4):(11101,4):(11101,4):[]

OPEN []

PATH []