

Practice Assignment: SAT Example

Best First Search

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State Space

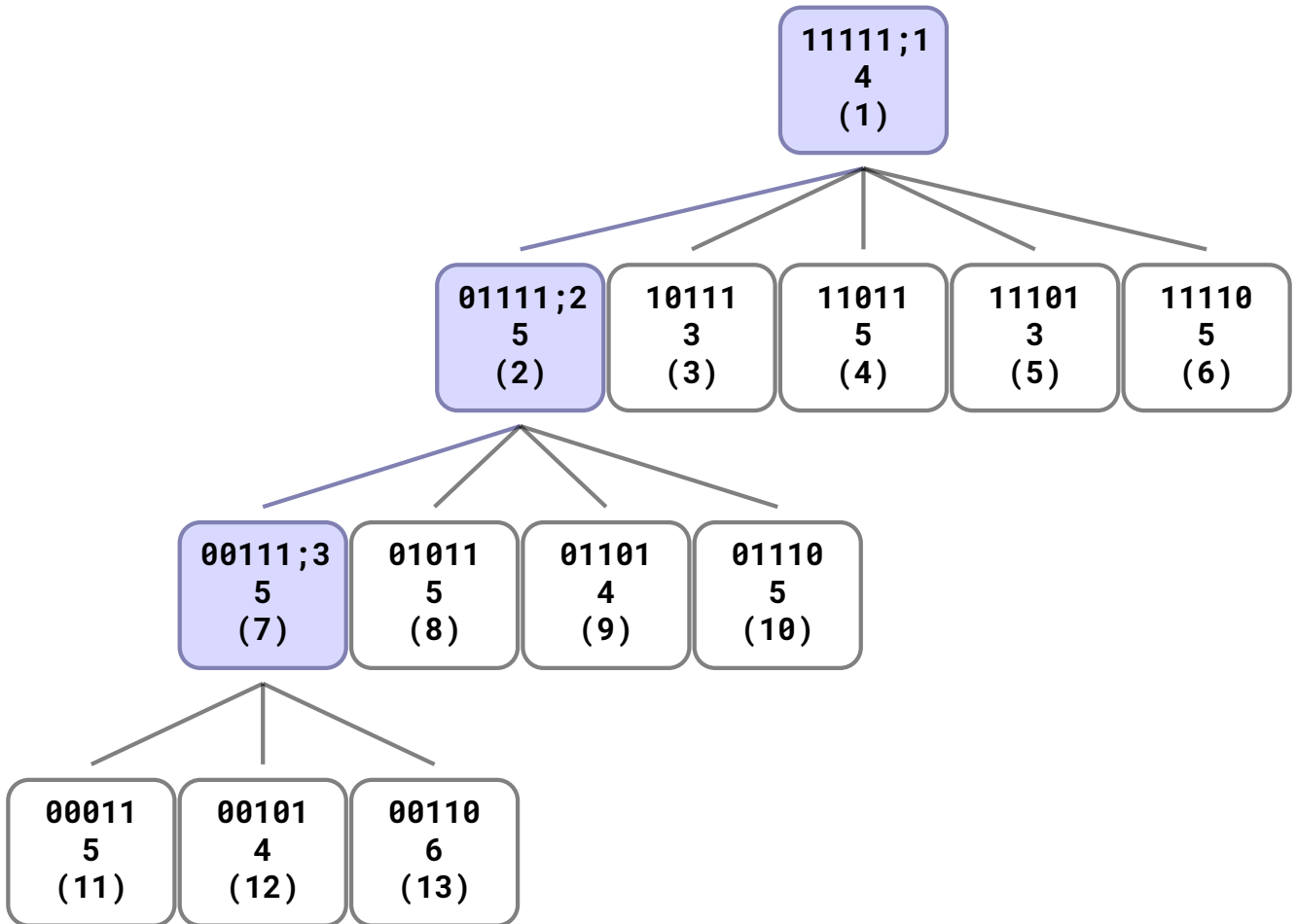
The start state is “11111”.

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.

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

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

Search Tree



Solution

OPEN and CLOSED carry tuples: (NODE,PARENT,H-VALUE)

OPEN (11111,null,4):[]
CLOSED []

1.
NODE 11111
close (11111,null,4)
moveGen 01111:10111:11011:11101:11110:[]
newNodes 01111:10111:11011:11101:11110:[]

newPairs (01111,11111,5):(10111,11111,3):(11011,11111,5):
(11101,11111,3):(11110,11111,5):[]

OPEN (01111,11111,5):(11011,11111,5):(11110,11111,5):
(10111,11111,3):(11101,11111,3):[]

CLOSED (11111,null,4):[]

2.
NODE 01111
close (01111,11111,5)
moveGen 11111:00111:01011:01101:01110:[]
newNodes 00111:01011:01101:01110:[]

newPairs (00111,01111,5):(01011,01111,5):(01101,01111,4):
(01110,01111,5):[]

OPEN (00111,01111,5):(01011,01111,5):(01110,01111,5):
(11011,11111,5):(11110,11111,5):(01101,01111,4):
(10111,11111,3):(11101,11111,3):[]

CLOSED (01111,11111,5):(11111,null,4):[]

3.
NODE 00111
close (00111,01111,5)
moveGen 10111:01111:00011:00101:00110:[]
newNodes 00011:00101:00110:[]

newPairs (00011,00111,5):(00101,00111,4):(00110,00111,6):[]

OPEN (00110,00111,6):(00011,00111,5):(01011,01111,5):
(01110,01111,5):(11011,11111,5):(11110,11111,5):
(00101,00111,4):(01101,01111,4):(10111,11111,3):
(11101,11111,3):[]

CLOSED (00111,01111,5):(01111,11111,5):(11111,null,4):[]

4.
NODE 00110
GOAL 00110

OPEN (00110,00111,6):(00011,00111,5):(01011,01111,5):
(01110,01111,5):(11011,11111,5):(11110,11111,5):
(00101,00111,4):(01101,01111,4):(10111,11111,3):
(11101,11111,3):[]

CLOSED (00111,01111,5):(01111,11111,5):(11111,null,4):[]

PATH 11111:01111:00111:00110:[]