Lecture SAT Example
Hill Climbing

Prepared by S. Baskaran

State Space

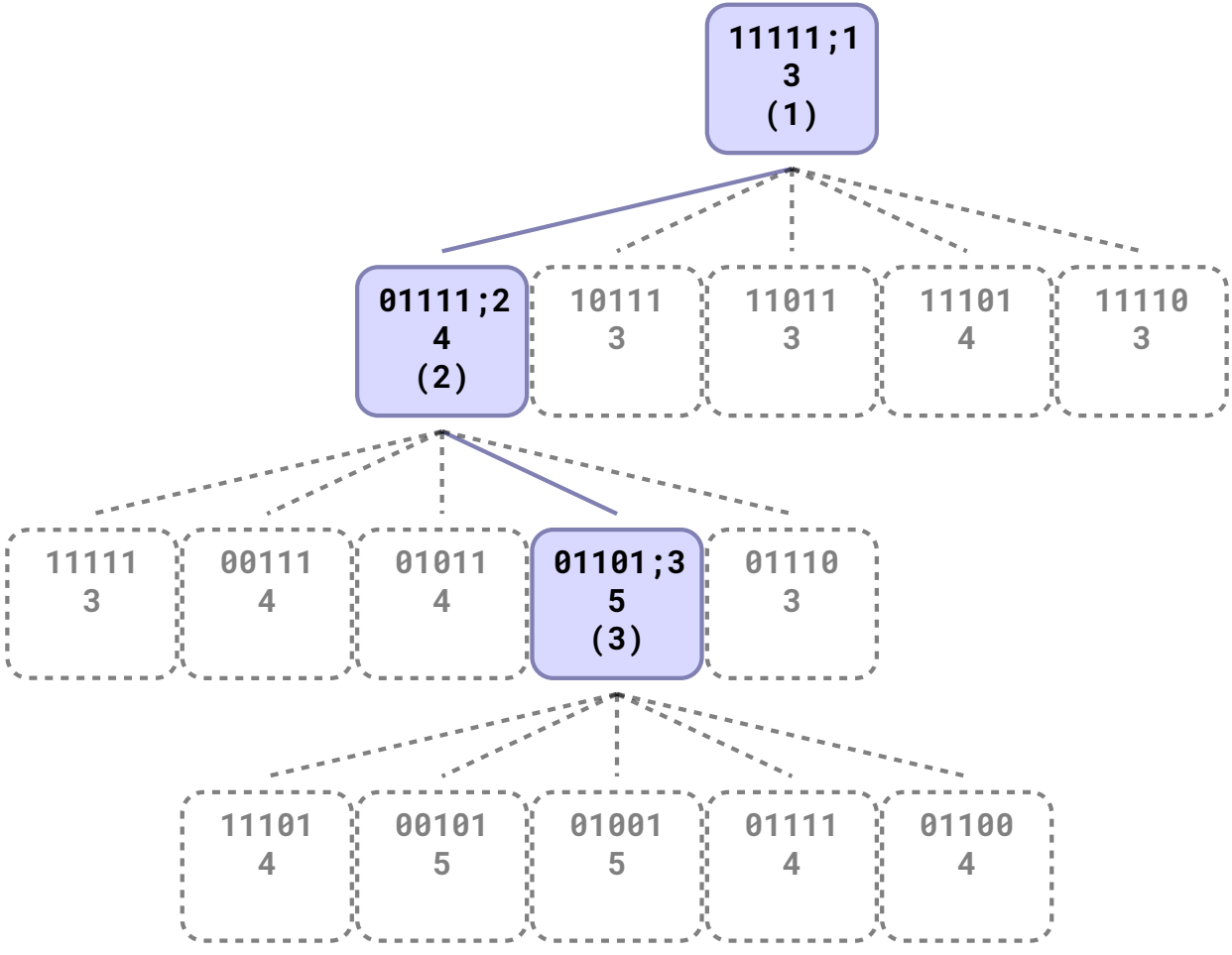
The start state is “11111”.

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.

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

				eval					
S.No.	abcde	h(F)	eval(F)	$(b \vee \neg c)$	$(c \vee \neg d)$	$(\neg b)$	$(\neg a \vee \neg e)$	$(e \vee \neg c)$	$(\neg c \vee \neg d)$
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


11111;13
(1)
01111;24
(2)
10111
3
11011
3
11101
4
11110
3
11111
3
00111
4
01011
4
01101;35
(3)
01110
3
11101
4
00101
5
01001
5
01111
4
01100
4

Solution

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

```
Tuple: (NODE,H-VALUE)

1.
NODE        11111
close       (11111,3)
moveGen     01111:10111:11011:11101:11110:[]
children    (01111,4):(10111,3):(11011,3):(11101,4):(11110,3):[]

2.
NODE        01111
close       (01111,4)
moveGen     11111:00111:01011:01101:01110:[]
children    (11111,3):(00111,4):(01011,4):(01101,5):(01110,3):[]

3.
NODE        01101
close       (01101,5)
moveGen     11101:00101:01001:01111:01100:[]
children    (11101,4):(00101,5):(01001,5):(01111,4):(01100,4):[]

PATH        []
```