Here we denote variables by numbers and negation by overlining.

The model stack (the partial interpretation being explored) grows to the right.

Five clauses:

Here we denote variables by numbers and negation by overlining.

The model stack (the partial interpretation being explored) grows to the right.

#### **Five clauses:**

$$\overline{1}\lor2$$
,  $\overline{3}\lor4$ ,  $\overline{4}\lor\overline{2}\lor\overline{1}\lor\overline{7}$ ,  $\overline{5}\lor\overline{6}$ ,  $6\lor\overline{5}\lor\overline{2}$ 

Here we denote variables by numbers and negation by overlining.

The model stack (the partial interpretation being explored) grows to the right.

$$\begin{array}{lll} \overline{1} \lor 2, \ \overline{3} \lor 4, \ \overline{4} \lor \overline{2} \lor \overline{1} \lor \overline{7}, \ \overline{5} \lor \overline{6}, \ 6 \lor \overline{5} \lor \overline{2} & \Rightarrow & \text{(Decide)} \\ \overline{1} \lor 2, \ \overline{3} \lor 4, \ \overline{4} \lor \overline{2} \lor \overline{1} \lor \overline{7}, \ \overline{5} \lor \overline{6}, \ 6 \lor \overline{5} \lor \overline{2} & \Rightarrow & \end{array}$$

Here we denote variables by numbers and negation by overlining.

The model stack (the partial interpretation being explored) grows to the right.

Here we denote variables by numbers and negation by overlining.

The model stack (the partial interpretation being explored) grows to the right.

```
Model Stack: Five clauses:
```

Here we denote variables by numbers and negation by overlining.

The model stack (the partial interpretation being explored) grows to the right.

```
Model Stack: Five clauses:
```

```
\overline{1} \lor 2, \overline{3} \lor 4, \overline{4} \lor \overline{2} \lor \overline{1} \lor \overline{7}, \overline{5} \lor \overline{6}, 6 \lor \overline{5} \lor \overline{2}
                                                                                                                                                                                                                     (Decide)
                                                  \overline{1} \vee 2, \overline{3} \vee 4, \overline{4} \vee \overline{2} \vee \overline{1} \vee \overline{7}, \overline{5} \vee \overline{6}, 6 \vee \overline{5} \vee \overline{2}
                                                                                                                                                                                                \Rightarrow
                                                                                                                                                                                                                     (UnitPropagate)
                                                  \overline{1} \lor 2, \overline{3} \lor 4, \overline{4} \lor \overline{2} \lor \overline{1} \lor \overline{7}, \overline{5} \lor \overline{6}, 6 \lor \overline{5} \lor \overline{2}
                                                                                                                                                                                                \Rightarrow
                                                                                                                                                                                                                     (Decide)
12
                                                  \overline{1} \vee 2, \overline{3} \vee 4, \overline{4} \vee \overline{2} \vee \overline{1} \vee \overline{7}, \overline{5} \vee \overline{6}, 6 \vee \overline{5} \vee \overline{2}
                                                                                                                                                                                                \Rightarrow
                                                                                                                                                                                                                     (UnitPropagate)
123
                                                  \overline{1} \lor 2, \overline{3} \lor 4, \overline{4} \lor \overline{2} \lor \overline{1} \lor \overline{7}, \overline{5} \lor \overline{6}, 6 \lor \overline{5} \lor \overline{2}
1234
                                                                                                                                                                                                \Rightarrow
```

Here we denote variables by numbers and negation by overlining.

The model stack (the partial interpretation being explored) grows to the right.

```
\overline{1} \lor 2, \overline{3} \lor 4, \overline{4} \lor \overline{2} \lor \overline{1} \lor \overline{7}, \overline{5} \lor \overline{6}, 6 \lor \overline{5} \lor \overline{2}
                                                                                                                                                                                                                 (Decide)
                                                 \overline{1} \vee 2, \overline{3} \vee 4, \overline{4} \vee \overline{2} \vee \overline{1} \vee \overline{7}, \overline{5} \vee \overline{6}, 6 \vee \overline{5} \vee \overline{2}
                                                                                                                                                                                            \Rightarrow
                                                                                                                                                                                                                 (UnitPropagate)
                                                 \overline{1} \lor 2, \overline{3} \lor 4, \overline{4} \lor \overline{2} \lor \overline{1} \lor \overline{7}, \overline{5} \lor \overline{6}, 6 \lor \overline{5} \lor \overline{2}
12
                                                                                                                                                                                            \Rightarrow
                                                                                                                                                                                                                (Decide)
                                                 \overline{1} \vee 2, \overline{3} \vee 4, \overline{4} \vee \overline{2} \vee \overline{1} \vee \overline{7}, \overline{5} \vee \overline{6}, 6 \vee \overline{5} \vee \overline{2}
                                                                                                                                                                                            \Rightarrow
                                                                                                                                                                                                                 (UnitPropagate)
123
                                                \overline{1} \vee 2, \overline{3} \vee 4, \overline{4} \vee \overline{2} \vee \overline{1} \vee \overline{7}, \overline{5} \vee \overline{6}, 6 \vee \overline{5} \vee \overline{2}
                                                                                                                                                                                                                 (UnitPropagate)
1234
                                                                                                                                                                                            \Rightarrow
                                                 \overline{1} \lor 2, \overline{3} \lor 4, \overline{4} \lor \overline{2} \lor \overline{1} \lor \overline{7}, \overline{5} \lor \overline{6}, 6 \lor \overline{5} \lor \overline{2}
12347
                                                                                                                                                                                            \Rightarrow
```

Here we denote variables by numbers and negation by overlining.

The model stack (the partial interpretation being explored) grows to the right.

```
\overline{1} \lor 2, \overline{3} \lor 4, \overline{4} \lor \overline{2} \lor \overline{1} \lor \overline{7}, \overline{5} \lor \overline{6}, 6 \lor \overline{5} \lor \overline{2}
                                                                                                                                                                                                                 (Decide)
                                                 \overline{1} \vee 2, \overline{3} \vee 4, \overline{4} \vee \overline{2} \vee \overline{1} \vee \overline{7}, \overline{5} \vee \overline{6}, 6 \vee \overline{5} \vee \overline{2}
                                                                                                                                                                                             \Rightarrow
                                                                                                                                                                                                                 (UnitPropagate)
                                                 \overline{1} \lor 2, \overline{3} \lor 4, \overline{4} \lor \overline{2} \lor \overline{1} \lor \overline{7}, \overline{5} \lor \overline{6}, 6 \lor \overline{5} \lor \overline{2}
12
                                                                                                                                                                                             \Rightarrow
                                                                                                                                                                                                                 (Decide)
                                                 \overline{1} \vee 2, \overline{3} \vee 4, \overline{4} \vee \overline{2} \vee \overline{1} \vee \overline{7}, \overline{5} \vee \overline{6}, 6 \vee \overline{5} \vee \overline{2}
                                                                                                                                                                                             \Rightarrow
                                                                                                                                                                                                                 (UnitPropagate)
123
                                                 \overline{1} \lor 2, \overline{3} \lor 4, \overline{4} \lor \overline{2} \lor \overline{1} \lor \overline{7}, \overline{5} \lor \overline{6}, 6 \lor \overline{5} \lor \overline{2}
1234
                                                                                                                                                                                             \Rightarrow
                                                                                                                                                                                                                 (UnitPropagate)
1 2 3 4 \overline{7} \overline{1} \lor 2, \overline{3} \lor 4, \overline{4} \lor \overline{2} \lor \overline{1} \lor \overline{7}, \overline{5} \lor \overline{6}, 6 \lor \overline{5} \lor \overline{2}
                                                                                                                                                                                                                 (Decide)
                                                                                                                                                                                             \Rightarrow
                                                 \overline{1} \lor 2, \overline{3} \lor 4, \overline{4} \lor \overline{2} \lor \overline{1} \lor \overline{7}, \overline{5} \lor \overline{6}, 6 \lor \overline{5} \lor \overline{2}
123475
                                                                                                                                                                                             \Rightarrow
```

Here we denote variables by numbers and negation by overlining.

The model stack (the partial interpretation being explored) grows to the right.

#### Model Stack: Five clauses: $\overline{1} \lor 2$ , $\overline{3} \lor 4$ , $\overline{4} \lor \overline{2} \lor \overline{1} \lor \overline{7}$ , $\overline{5} \lor \overline{6}$ , $6 \lor \overline{5} \lor \overline{2}$ (Decide) $\Rightarrow$ $\overline{1} \vee 2$ , $\overline{3} \vee 4$ , $\overline{4} \vee \overline{2} \vee \overline{1} \vee \overline{7}$ , $\overline{5} \vee \overline{6}$ , $6 \vee \overline{5} \vee \overline{2}$ $\Rightarrow$ (UnitPropagate) $\overline{1}\lor2$ , $\overline{3}\lor4$ , $\overline{4}\lor\overline{2}\lor\overline{1}\lor\overline{7}$ , $\overline{5}\lor\overline{6}$ , $6\lor\overline{5}\lor\overline{2}$ 12 $\Rightarrow$ (Decide) $\overline{1} \vee 2$ , $\overline{3} \vee 4$ , $\overline{4} \vee \overline{2} \vee \overline{1} \vee \overline{7}$ , $\overline{5} \vee \overline{6}$ , $6 \vee \overline{5} \vee \overline{2}$ (UnitPropagate) 123 $\Rightarrow$ $\overline{1} \vee 2$ , $\overline{3} \vee 4$ , $\overline{4} \vee \overline{2} \vee \overline{1} \vee \overline{7}$ , $\overline{5} \vee \overline{6}$ , $6 \vee \overline{5} \vee \overline{2}$ 1234 $\Rightarrow$ (UnitPropagate) $\overline{1} \lor 2$ , $\overline{3} \lor 4$ , $\overline{4} \lor \overline{2} \lor \overline{1} \lor \overline{7}$ , $\overline{5} \lor \overline{6}$ , $6 \lor \overline{5} \lor \overline{2}$ 12347 (Decide) $\Rightarrow$ 1234 $\overline{7}$ 5 $\overline{1}$ $\sqrt{2}$ , $\overline{3}$ $\sqrt{4}$ , $\overline{4}$ $\sqrt{2}$ $\sqrt{1}$ $\sqrt{7}$ , $\overline{5}$ $\sqrt{6}$ , 6 $\sqrt{5}$ $\sqrt{2}$ (UnitPropagate) $\Rightarrow$ 1234756 $\overline{1} \vee 2$ , $\overline{3} \vee 4$ , $\overline{4} \vee \overline{2} \vee \overline{1} \vee \overline{7}$ , $\overline{5} \vee \overline{6}$ , $6 \vee \overline{5} \vee \overline{2}$ CONFLICT!

Here we denote variables by numbers and negation by overlining.

The model stack (the partial interpretation being explored) grows to the right.

```
\overline{1} \lor 2, \overline{3} \lor 4, \overline{4} \lor \overline{2} \lor \overline{1} \lor \overline{7}, \overline{5} \lor \overline{6}, 6 \lor \overline{5} \lor \overline{2}
                                                                                                                                                                                                    (Decide)
                                                                                                                                                                                 \Rightarrow
                                              \overline{1} \vee 2, \overline{3} \vee 4, \overline{4} \vee \overline{2} \vee \overline{1} \vee \overline{7}, \overline{5} \vee \overline{6}, 6 \vee \overline{5} \vee \overline{2}
                                                                                                                                                                                 \Rightarrow
                                                                                                                                                                                                    (UnitPropagate)
                                              \overline{1}\lor2, \overline{3}\lor4, \overline{4}\lor\overline{2}\lor\overline{1}\lor\overline{7}, \overline{5}\lor\overline{6}, 6\lor\overline{5}\lor\overline{2}
12
                                                                                                                                                                                 \Rightarrow
                                                                                                                                                                                                    (Decide)
                                              \overline{1} \vee 2, \overline{3} \vee 4, \overline{4} \vee \overline{2} \vee \overline{1} \vee \overline{7}, \overline{5} \vee \overline{6}, 6 \vee \overline{5} \vee \overline{2}
                                                                                                                                                                                                    (UnitPropagate)
123
                                                                                                                                                                                 \Rightarrow
                                              \overline{1} \vee 2, \overline{3} \vee 4, \overline{4} \vee \overline{2} \vee \overline{1} \vee \overline{7}, \overline{5} \vee \overline{6}, 6 \vee \overline{5} \vee \overline{2}
1234
                                                                                                                                                                                 \Rightarrow
                                                                                                                                                                                                    (UnitPropagate)
                                              \overline{1} \lor 2, \overline{3} \lor 4, \overline{4} \lor \overline{2} \lor \overline{1} \lor \overline{7}, \overline{5} \lor \overline{6}, 6 \lor \overline{5} \lor \overline{2}
12347
                                                                                                                                                                                                    (Decide)
                                                                                                                                                                                 \Rightarrow
1234\overline{7}5 \overline{1}\sqrt{2}, \overline{3}\sqrt{4}, \overline{4}\sqrt{2}\sqrt{1}\sqrt{7}, \overline{5}\sqrt{6}, 6\sqrt{5}\sqrt{2}
                                                                                                                                                                                                    (UnitPropagate)
                                                                                                                                                                                 \Rightarrow
1234756
                                              \overline{1} \vee 2, \overline{3} \vee 4, \overline{4} \vee \overline{2} \vee \overline{1} \vee \overline{7}, \overline{5} \vee \overline{6}, 6 \vee \overline{5} \vee \overline{2}
                                                                                                                                                                                                    (Backtrack)
                                                                                                                                                                                 \Rightarrow
```

Here we denote variables by numbers and negation by overlining.

Five clauses:

The model stack (the partial interpretation being explored) grows to the right.

#### $\overline{1} \lor 2$ , $\overline{3} \lor 4$ , $\overline{4} \lor \overline{2} \lor \overline{1} \lor \overline{7}$ , $\overline{5} \lor \overline{6}$ , $6 \lor \overline{5} \lor \overline{2}$ (Decide) $\Rightarrow$ $\overline{1} \vee 2$ , $\overline{3} \vee 4$ , $\overline{4} \vee \overline{2} \vee \overline{1} \vee \overline{7}$ , $\overline{5} \vee \overline{6}$ , $6 \vee \overline{5} \vee \overline{2}$ $\Rightarrow$ (UnitPropagate) $\overline{1} \lor 2$ , $\overline{3} \lor 4$ , $\overline{4} \lor \overline{2} \lor \overline{1} \lor \overline{7}$ , $\overline{5} \lor \overline{6}$ , $6 \lor \overline{5} \lor \overline{2}$ 12 $\Rightarrow$ (Decide) $\overline{1} \vee 2$ , $\overline{3} \vee 4$ , $\overline{4} \vee \overline{2} \vee \overline{1} \vee \overline{7}$ , $\overline{5} \vee \overline{6}$ , $6 \vee \overline{5} \vee \overline{2}$ (UnitPropagate) 123 $\Rightarrow$ $\overline{1} \vee 2$ , $\overline{3} \vee 4$ , $\overline{4} \vee \overline{2} \vee \overline{1} \vee \overline{7}$ , $\overline{5} \vee \overline{6}$ , $6 \vee \overline{5} \vee \overline{2}$ 1234 $\Rightarrow$ (UnitPropagate) 12347 $\overline{1} \vee 2$ , $\overline{3} \vee 4$ , $\overline{4} \vee \overline{2} \vee \overline{1} \vee \overline{7}$ , $\overline{5} \vee \overline{6}$ , $6 \vee \overline{5} \vee \overline{2}$ (Decide) $\Rightarrow$

 $\overline{1} \vee 2$ ,  $\overline{3} \vee 4$ ,  $\overline{4} \vee \overline{2} \vee \overline{1} \vee \overline{7}$ ,  $\overline{5} \vee \overline{6}$ ,  $6 \vee \overline{5} \vee \overline{2}$ 

 $\overline{1} \vee 2$ ,  $\overline{3} \vee 4$ ,  $\overline{4} \vee \overline{2} \vee \overline{1} \vee \overline{7}$ ,  $\overline{5} \vee \overline{6}$ ,  $6 \vee \overline{5} \vee \overline{2}$ 

 $\overline{1} \vee 2$ ,  $\overline{3} \vee 4$ ,  $\overline{4} \vee \overline{2} \vee \overline{1} \vee \overline{7}$ ,  $\overline{5} \vee \overline{6}$ ,  $6 \vee \overline{5} \vee \overline{2}$ 

Model Stack:

123475

123475

 $123475\overline{6}$ 

 $\Rightarrow$ 

 $\Rightarrow$ 

(UnitPropagate)

(Backtrack)

Here we denote variables by numbers and negation by overlining.

The model stack (the partial interpretation being explored) grows to the right.

#### Model Stack: Five clauses: $\overline{1} \lor 2$ , $\overline{3} \lor 4$ , $\overline{4} \lor \overline{2} \lor \overline{1} \lor \overline{7}$ , $\overline{5} \lor \overline{6}$ , $6 \lor \overline{5} \lor \overline{2}$ (Decide) $\Rightarrow$ $\overline{1} \vee 2$ , $\overline{3} \vee 4$ , $\overline{4} \vee \overline{2} \vee \overline{1} \vee \overline{7}$ , $\overline{5} \vee \overline{6}$ , $6 \vee \overline{5} \vee \overline{2}$ $\Rightarrow$ (UnitPropagate) $\overline{1} \lor 2$ , $\overline{3} \lor 4$ , $\overline{4} \lor \overline{2} \lor \overline{1} \lor \overline{7}$ , $\overline{5} \lor \overline{6}$ , $6 \lor \overline{5} \lor \overline{2}$ 12 $\Rightarrow$ (Decide) $\overline{1} \lor 2$ , $\overline{3} \lor 4$ , $\overline{4} \lor \overline{2} \lor \overline{1} \lor \overline{7}$ , $\overline{5} \lor \overline{6}$ , $6 \lor \overline{5} \lor \overline{2}$ (UnitPropagate) 123 $\Rightarrow$ $\overline{1} \vee 2$ , $\overline{3} \vee 4$ , $\overline{4} \vee \overline{2} \vee \overline{1} \vee \overline{7}$ , $\overline{5} \vee \overline{6}$ , $6 \vee \overline{5} \vee \overline{2}$ 1234 $\Rightarrow$ (UnitPropagate) 12347 $\overline{1} \vee 2$ , $\overline{3} \vee 4$ , $\overline{4} \vee \overline{2} \vee \overline{1} \vee \overline{7}$ , $\overline{5} \vee \overline{6}$ , $6 \vee \overline{5} \vee \overline{2}$ (Decide) $\Rightarrow$ 123475 $\overline{1} \vee 2$ , $\overline{3} \vee 4$ , $\overline{4} \vee \overline{2} \vee \overline{1} \vee \overline{7}$ , $\overline{5} \vee \overline{6}$ , $6 \vee \overline{5} \vee \overline{2}$ (UnitPropagate) $\Rightarrow$ 1234756 $\overline{1}$ $\vee$ 2, $\overline{3}$ $\vee$ 4, $\overline{4}$ $\vee$ $\overline{2}$ $\vee$ $\overline{1}$ $\vee$ $\overline{7}$ , $\overline{5}$ $\vee$ $\overline{6}$ , 6 $\vee$ $\overline{5}$ $\vee$ $\overline{2}$ (Backtrack) $\Rightarrow$ 123475 $\overline{1} \lor 2$ , $\overline{3} \lor 4$ , $\overline{4} \lor \overline{2} \lor \overline{1} \lor \overline{7}$ , $\overline{5} \lor \overline{6}$ , $6 \lor \overline{5} \lor \overline{2}$ (Decide) $\Rightarrow$

Here we denote variables by numbers and negation by overlining.

The model stack (the partial interpretation being explored) grows to the right.

#### **Model Stack:** Five clauses: $\overline{1} \lor 2$ , $\overline{3} \lor 4$ , $\overline{4} \lor \overline{2} \lor \overline{1} \lor \overline{7}$ , $\overline{5} \lor \overline{6}$ , $6 \lor \overline{5} \lor \overline{2}$ (Decide) $\Rightarrow$ $\overline{1} \vee 2$ , $\overline{3} \vee 4$ , $\overline{4} \vee \overline{2} \vee \overline{1} \vee \overline{7}$ , $\overline{5} \vee \overline{6}$ , $6 \vee \overline{5} \vee \overline{2}$ $\Rightarrow$ (UnitPropagate) $\overline{1} \lor 2$ , $\overline{3} \lor 4$ , $\overline{4} \lor \overline{2} \lor \overline{1} \lor \overline{7}$ , $\overline{5} \lor \overline{6}$ , $6 \lor \overline{5} \lor \overline{2}$ 12 (Decide) $\Rightarrow$ $\overline{1} \vee 2$ , $\overline{3} \vee 4$ , $\overline{4} \vee \overline{2} \vee \overline{1} \vee \overline{7}$ , $\overline{5} \vee \overline{6}$ , $6 \vee \overline{5} \vee \overline{2}$ (UnitPropagate) 123 $\Rightarrow$ $\overline{1} \vee 2$ , $\overline{3} \vee 4$ , $\overline{4} \vee \overline{2} \vee \overline{1} \vee \overline{7}$ , $\overline{5} \vee \overline{6}$ , $6 \vee \overline{5} \vee \overline{2}$ 1234 $\Rightarrow$ (UnitPropagate) 12347 $\overline{1} \vee 2$ , $\overline{3} \vee 4$ , $\overline{4} \vee \overline{2} \vee \overline{1} \vee \overline{7}$ , $\overline{5} \vee \overline{6}$ , $6 \vee \overline{5} \vee \overline{2}$ (Decide) $\Rightarrow$ 123475 $\overline{1} \vee 2$ , $\overline{3} \vee 4$ , $\overline{4} \vee \overline{2} \vee \overline{1} \vee \overline{7}$ , $\overline{5} \vee \overline{6}$ , $6 \vee \overline{5} \vee \overline{2}$ (UnitPropagate) $\Rightarrow$ 1234756 $\overline{1} \vee 2$ , $\overline{3} \vee 4$ , $\overline{4} \vee \overline{2} \vee \overline{1} \vee \overline{7}$ , $\overline{5} \vee \overline{6}$ , $6 \vee \overline{5} \vee \overline{2}$ (Backtrack) $\Rightarrow$ $\overline{1} \vee 2$ , $\overline{3} \vee 4$ , $\overline{4} \vee \overline{2} \vee \overline{1} \vee \overline{7}$ , $\overline{5} \vee \overline{6}$ , $6 \vee \overline{5} \vee \overline{2}$ $12347\overline{5}$ (Decide) $\Rightarrow$ $\overline{1} \lor 2$ , $\overline{3} \lor 4$ , $\overline{4} \lor \overline{2} \lor \overline{1} \lor \overline{7}$ , $\overline{5} \lor \overline{6}$ , $6 \lor \overline{5} \lor \overline{2}$ 1234756 solution found!