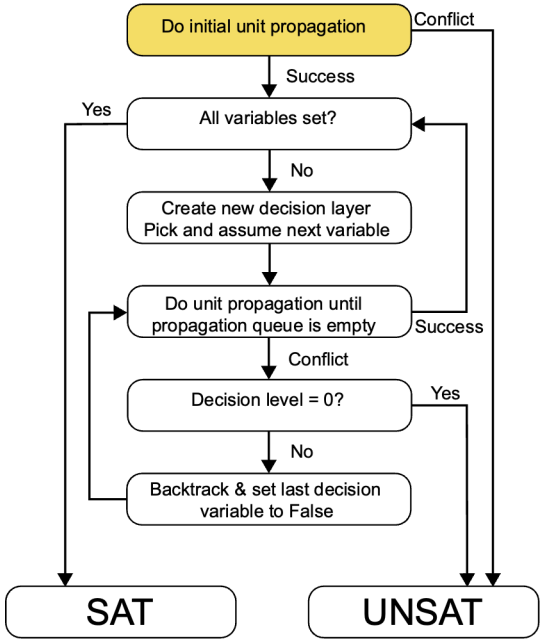
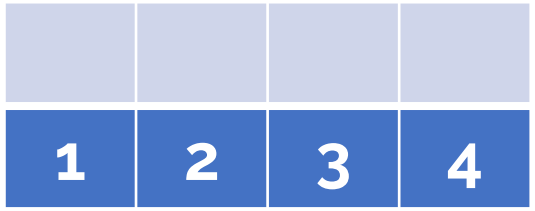
PennSAT example

```
[-1]
[1, -2, 3]
[-3, 4]
[2, 3]
[2, -3]
[-3, -4]
```





Assignment stack

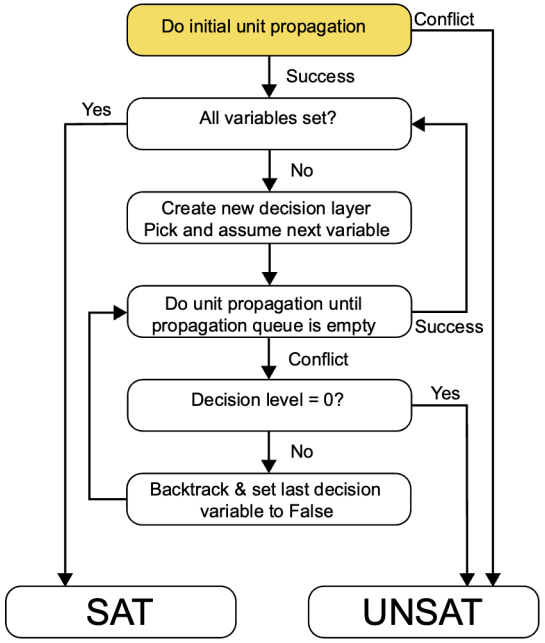
Decision stack

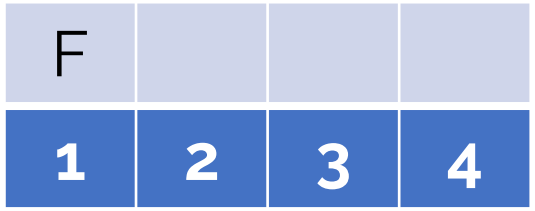
Propagation queue

PennSAT example

```
[-1]
[1, -2, 3]
[-3, 4]
[2, 3]
[2, -3]
[-3, -4]
```

Since `[-1]` is a unit clause, set `1 = F`!





Assignment stack

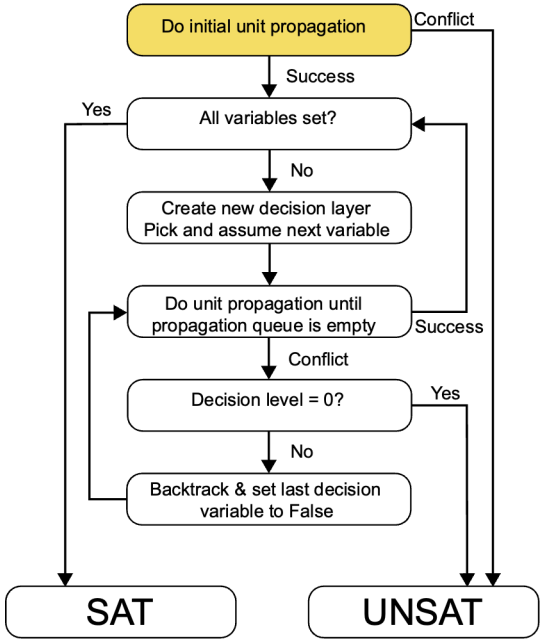
Decision stack

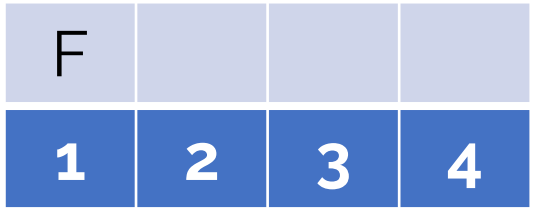
Propagation queue

PennSAT example

```
[-1]
[1, -2, 3]
[-3, 4]
[2, 3]
[2, -3]
[-3, -4]
```

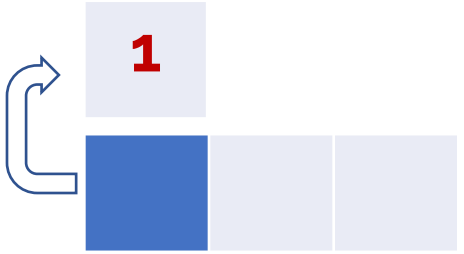
`[1,-2,3]` contains `1`, but it's not empty or unit, so do nothing.





Assignment stack

Decision stack

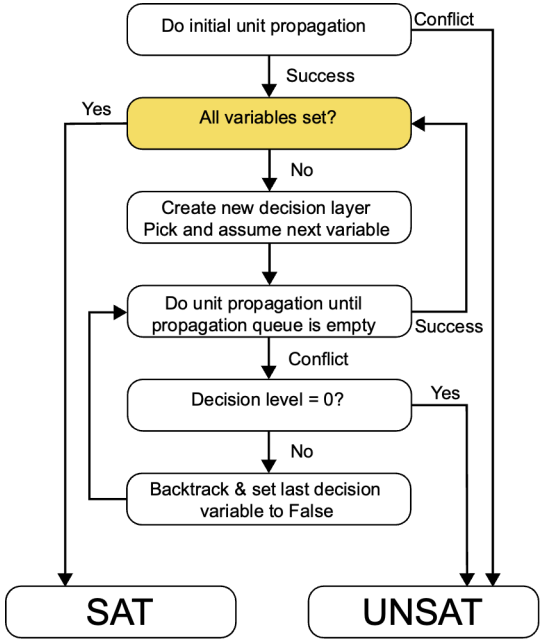


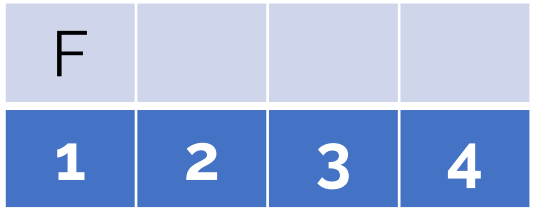
Propagation queue

PennSAT example

```
[-1]
[1, -2, 3]
[-3, 4]
[2, 3]
[2, -3]
[-3, -4]
```

Not all variables are set, so we aren't finished.





Assignment stack

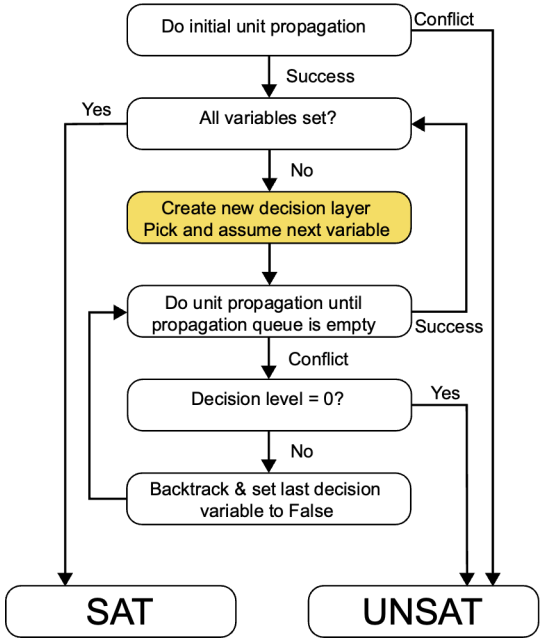
Decision stack

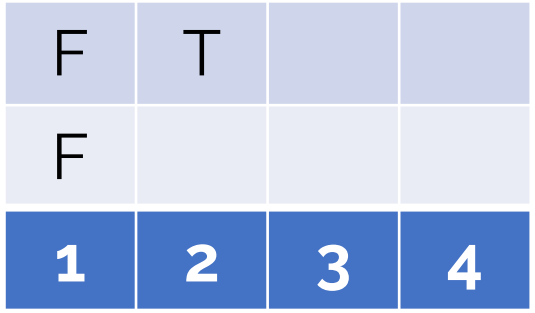
Propagation queue

PennSAT example

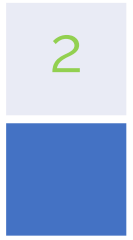
```
[-1]
[1, -2, 3]
[-3, 4]
[2, 3]
[2, -3]
[-3, -4]
```

Pick **2** as the next decision variable and assume it.





Assignment stack



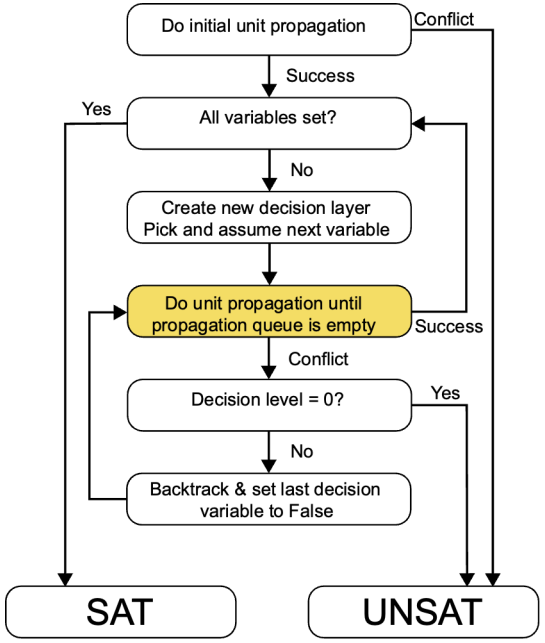
Decision stack

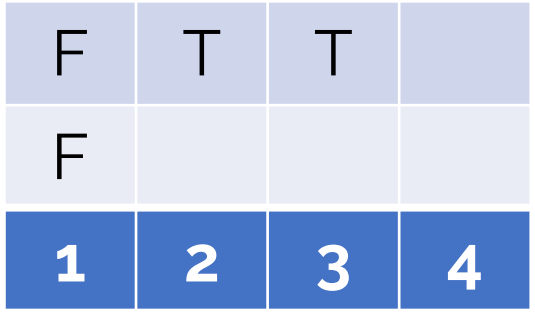
Propagation queue

PennSAT example

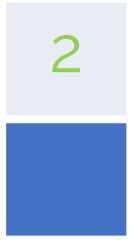
```
[-1]
[1, -2, 3]
[-3, 4]
[2, 3]
[2, -3]
[-3, -4]
```

[1,-2,3] contains **-2**, and it has become unit, so set **3 = T**.

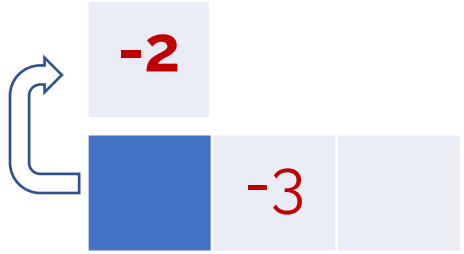




Assignment stack



Decision stack

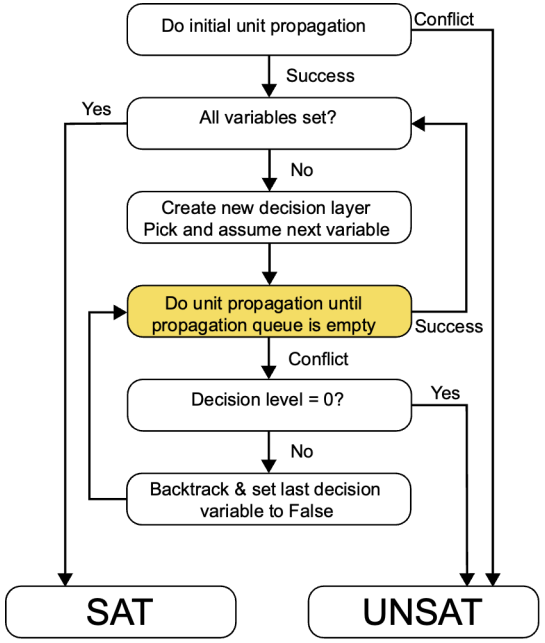


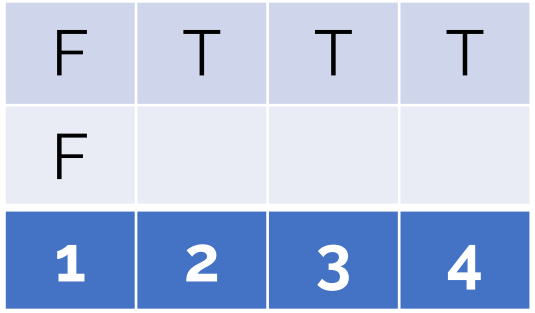
Propagation queue

PennSAT example

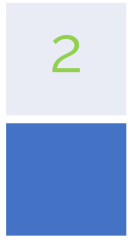
```
[-1]
[1, -2, 3]
[-3, 4]
[2, 3]
[2, -3]
[-3, -4]
```

`[-3, 4]` contains **`-3`**, and it has become unit, so set **`4 = T`**.





Assignment stack



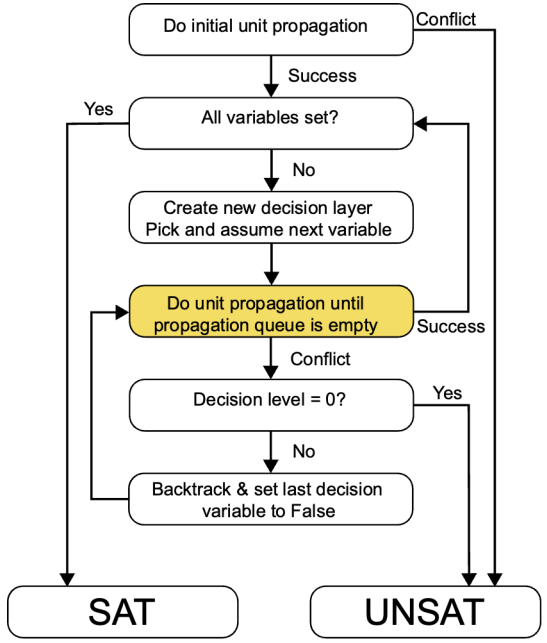
Decision stack

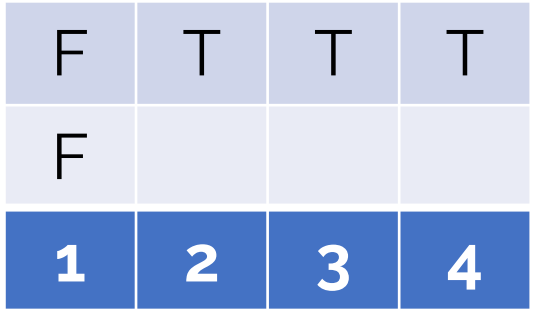
Propagation queue

PennSAT example

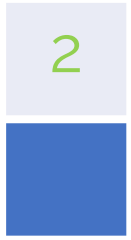
```
[-1]
[1, -2, 3]
[-3, 4]
[2, 3]
[2, -3]
[-3, -4]
```

[2, -3] contains **-3**, but it is already satisfied, so do nothing.





Assignment stack



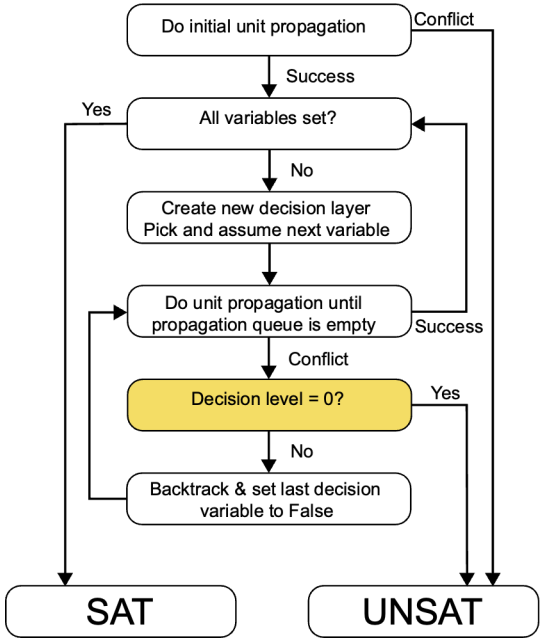
Decision stack

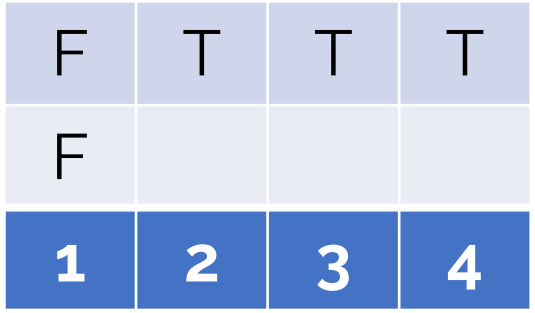
Propagation queue

PennSAT example

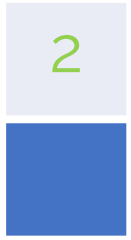
```
[-1]
[1, -2, 3]
[-3, 4]
[2, 3]
[2, -3]
[-3, -4]
```

[-3, -4] contains **-3**, and it is now empty, so we detect a conflict.





Assignment stack



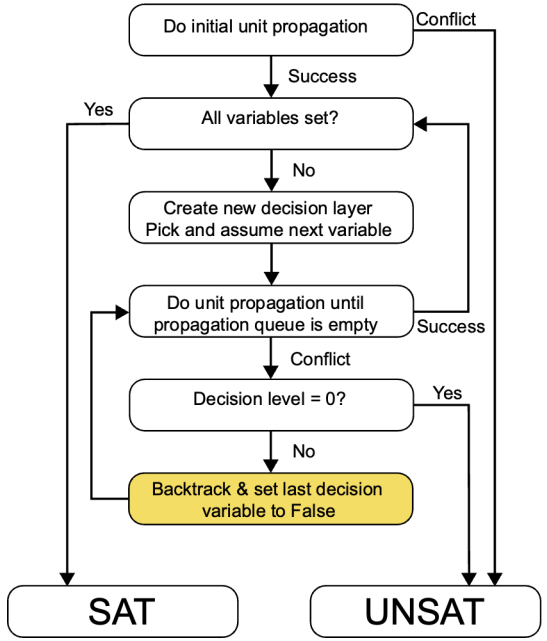
Decision stack

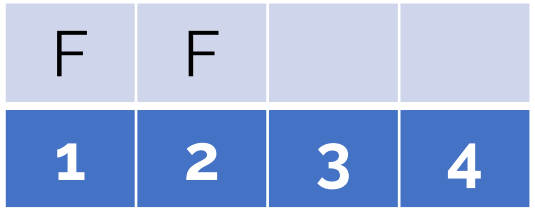
Propagation queue

PennSAT example

```
[-1]
[1, -2, 3]
[-3, 4]
[2, 3]
[2, -3]
[-3, -4]
```

We were on decision level 1, so backtrack to level 0 and set **2 = F**.





Assignment stack

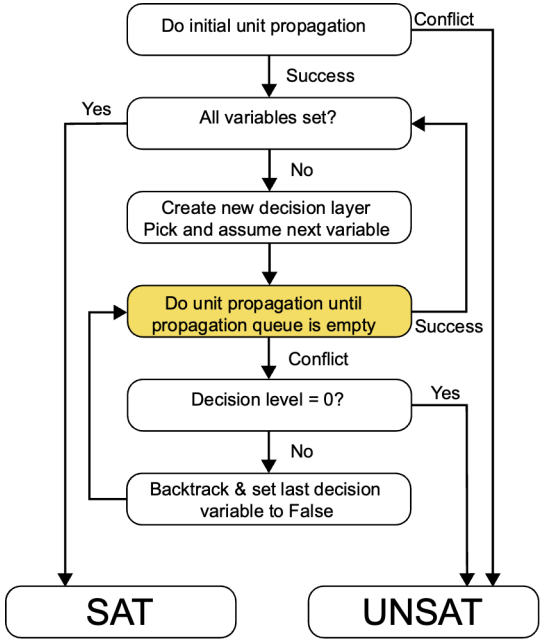
Decision stack

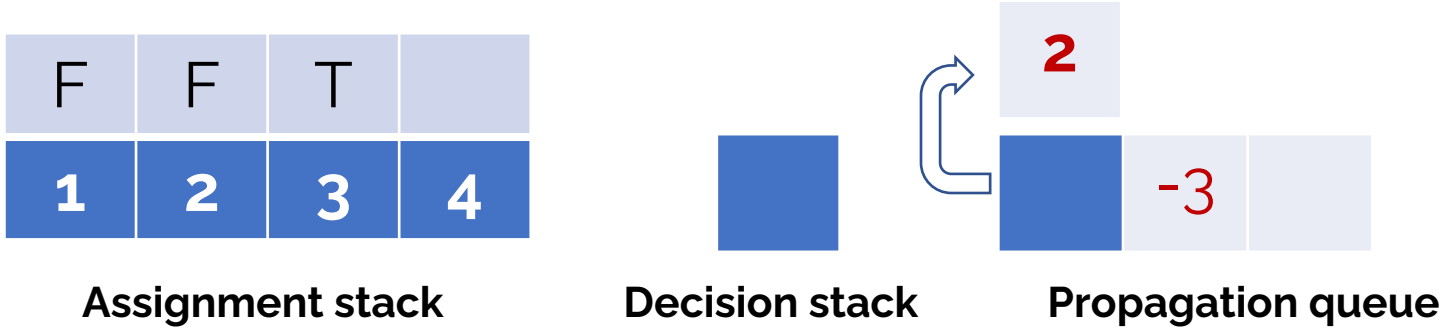
Propagation queue

PennSAT example

```
[-1]
[1, -2, 3]
[-3, 4]
[2, 3]
[2, -3]
[-3, -4]
```

`[2, 3]` contains **2**, and it has become unit, so set **3 = T**.

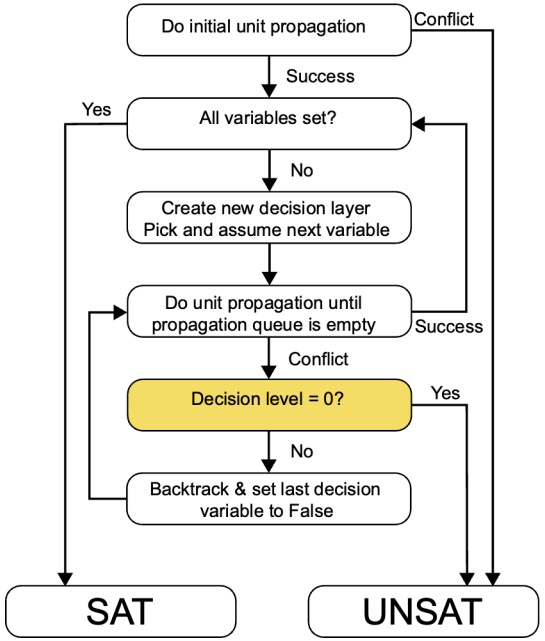


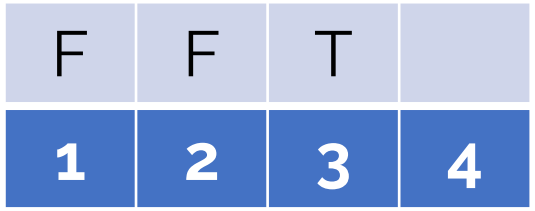


PennSAT example

```
[-1]
[1, -2, 3]
[-3, 4]
[2, 3]
[2, -3]
[-3, -4]
```

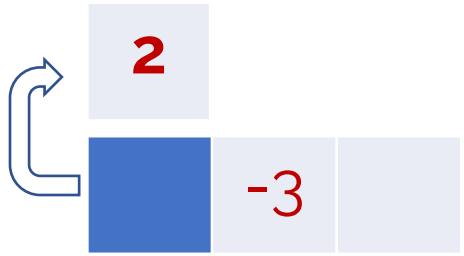
[2, -3] contains **2**, and it is now empty, so we detect a conflict.





Assignment stack

Decision stack



Propagation queue

PennSAT example

```
[-1]
[1, -2, 3]
[-3, 4]
[2, 3]
[2, -3]
[-3, -4]
```

Since we were on decision level 0, the formula is UNSAT!