

# From “p U q” to a GBA

(using the simple on-the-fly translation)

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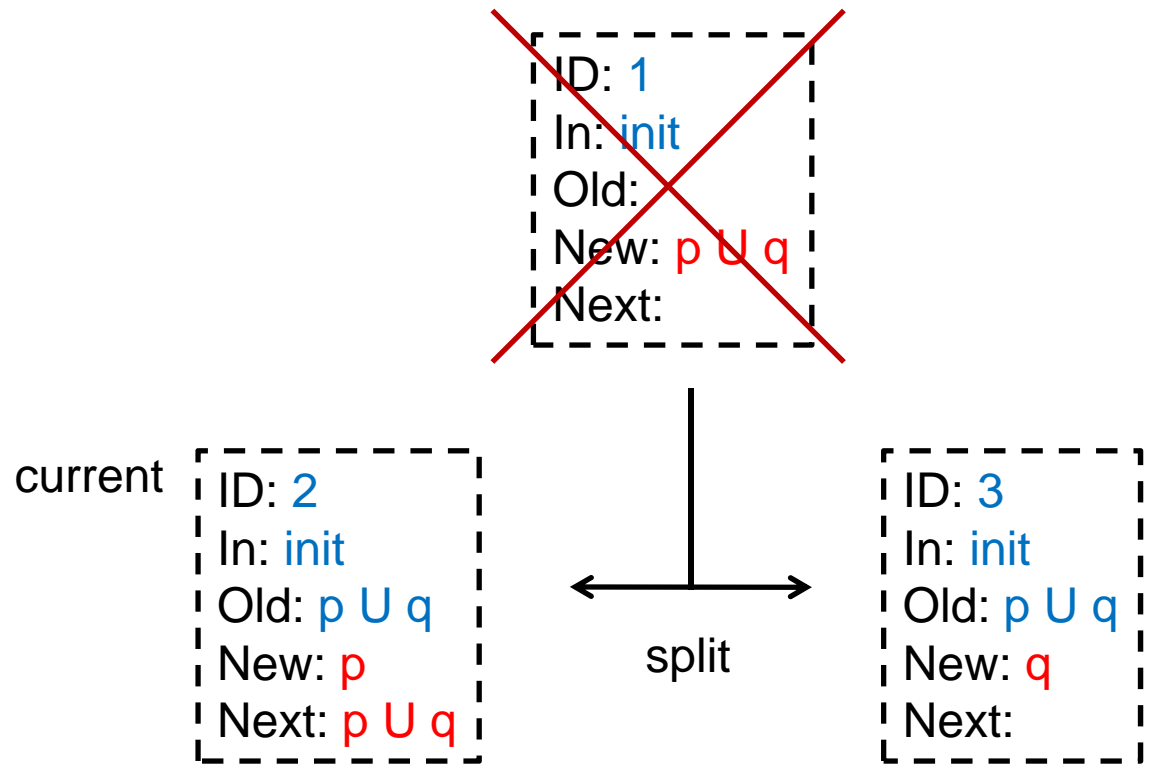
# Start with One Node

current

ID: 1
In: <i>init</i>
Old:
New: <i>p U q</i>
Next:

# Process the Current Node

Take one formula from *New*;  $p \cup q = q \vee (p \wedge X(p \cup q))$ ; split



# Expand Nodes in a DFS Manner

Process the literal p

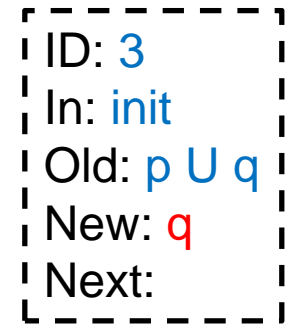
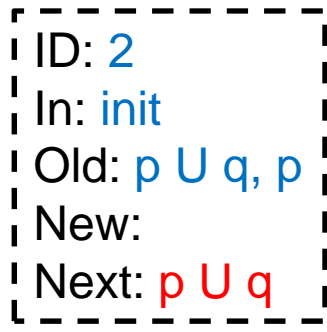
```
ID: 2  
In: init  
Old: p U q  
New: p  
Next: p U q
```

↓ becomes

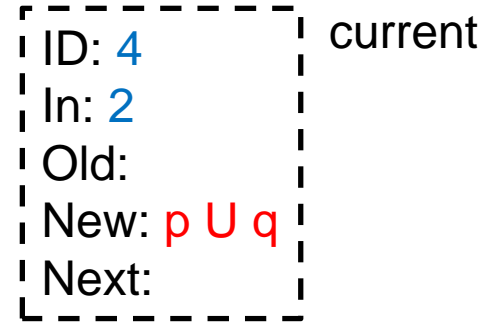
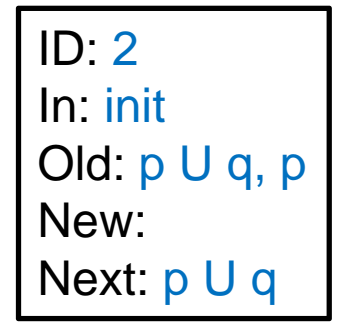
```
ID: 2  
In: init  
Old: p U q, p  
New:  
Next: p U q
```

```
ID: 3  
In: init  
Old: p U q  
New: q  
Next:
```

# Create a Node for a Formula in *Next*



↓ create a new node



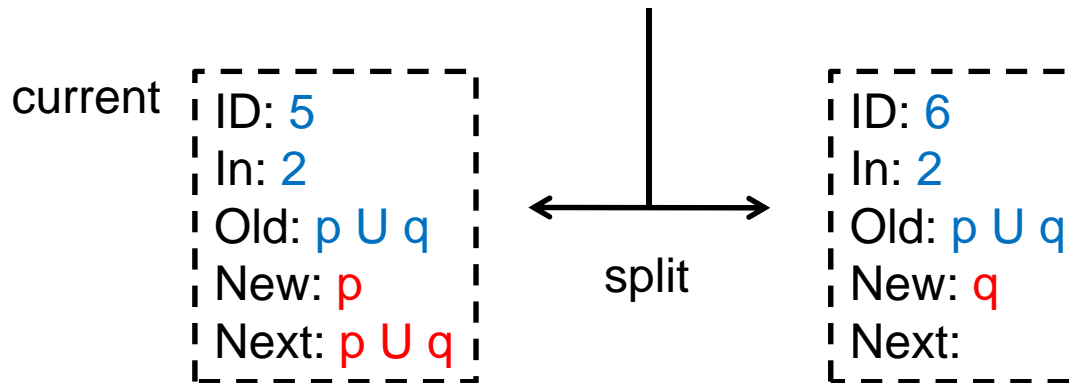
Node 2 is added to the *Nodes* list.

# Split (Again) for p U q

ID: 2  
 In: *init*  
 Old: *p U q*, *p*  
 New:  
 Next: *p U q*

~~ID: 4  
 In: 2  
 Old:  
 New: *p U q*  
 Next:~~

ID: 3  
 In: *init*  
 Old: *p U q*  
 New: *q*  
 Next:



# Expand Nodes in a DFS Manner

ID: 2  
 In: *init*  
 Old: *p U q, p*  
 New:  
 Next: *p U q*

ID: 5  
 In: 2  
 Old: *p U q*  
 New: *p*  
 Next: *p U q*

ID: 6  
 In: 2  
 Old: *p U q*  
 New: *q*  
 Next:

↓ becomes

ID: 5  
 In: 2  
 Old: *p U q, p*  
 New:  
 Next: *p U q*

ID: 3  
 In: *init*  
 Old: *p U q*  
 New: *q*  
 Next:

# Expand Nodes in a DFS Manner

ID: 2  
 In: *init*  
 Old: *p U q, p*  
 New:  
 Next: *p U q*

merge

~~ID: 5  
 In: 2  
 Old: *p U q, p*  
 New:  
 Next: *p U q*~~

ID: 2  
 In: *init, 2*  
 Old: *p U q, p*  
 New:  
 Next: *p U q*

~~ID: 6  
 In: 2  
 Old: *p U q*  
 New: *q*  
 Next:~~

~~ID: 3  
 In: *init*  
 Old: *p U q*  
 New: *q*  
 Next:~~



# Expand Nodes in a DFS Manner

ID: 2  
In: *init*, 2  
Old: p U q, p  
New:  
Next: p U q

ID: 6  
In: 2  
Old: p U q  
New: q  
Next:

ID: 3  
In: *init*  
Old: p U q  
New: q  
Next:

↓  
becomes

ID: 6  
In: 2  
Old: p U q, q  
New:  
Next:

# Create a Node for *Next*

ID: 2  
 In: *init*, 2  
 Old: p U q, p  
 New:  
 Next: p U q

ID: 6  
 In: 2  
 Old: p U q, q  
 New:  
 Next:

ID: 3  
 In: *init*  
 Old: p U q  
 New: q  
 Next:

↓ create a new node

ID: 6  
 In: 2  
 Old: p U q, q  
 New:  
 Next:

ID: 7 current  
 In: 6  
 Old:  
 New:  
 Next:

Node 6 is added to the *Nodes* list.

# Create a Node Again for *New*

ID: 2  
 In: *init*, 2  
 Old: p U q, p  
 New:  
 Next: p U q

ID: 7  
 In: 6  
 Old:  
 New:  
 Next:

ID: 3  
 In: *init*  
 Old: p U q  
 New: q  
 Next:

ID: 6  
 In: 2  
 Old: p U q, q  
 New:  
 Next:

↓ create a new node

ID: 7  
 In: 6  
 Old:  
 New:  
 Next:

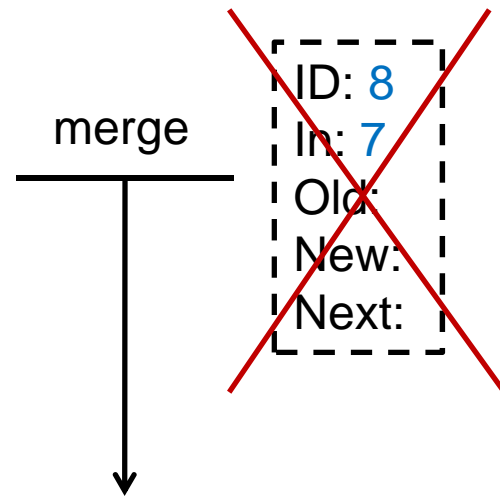
ID: 8 current  
 In: 7  
 Old:  
 New:  
 Next:

Node 7 is added to the *Nodes* list.

# Merge into an Existing Node

ID: 2  
 In: *init*, 2  
 Old: p U q, p  
 New:  
 Next: p U q

ID: 7  
 In: 6  
 Old:  
 New:  
 Next:



ID: 3  
 In: *init*  
 Old: p U q  
 New: q  
 Next:

ID: 6  
 In: 2  
 Old: p U q, q  
 New:  
 Next:

ID: 7  
 In: 6,7  
 Old:  
 New:  
 Next:

# Process a Literal

ID: 2  
In: *init*, 2  
Old: *p U q*, *p*  
New:  
Next: *p U q*

ID: 6  
In: 2  
Old: *p U q*, *q*  
New:  
Next:

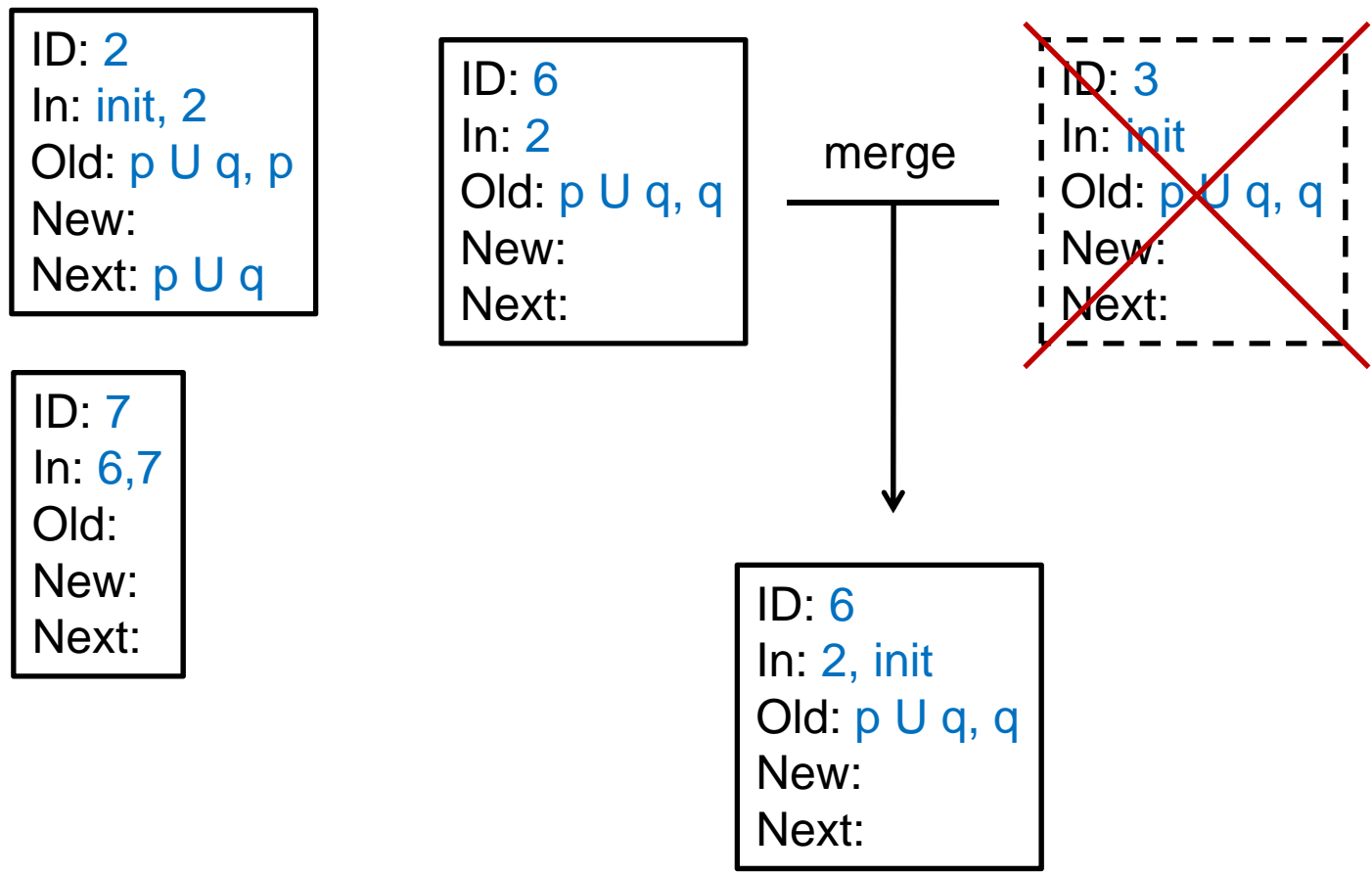
ID: 7  
In: 6,7  
Old:  
New:  
Next:

ID: 3  
In: *init*  
Old: *p U q*  
New: *q*  
Next:

↓ becomes

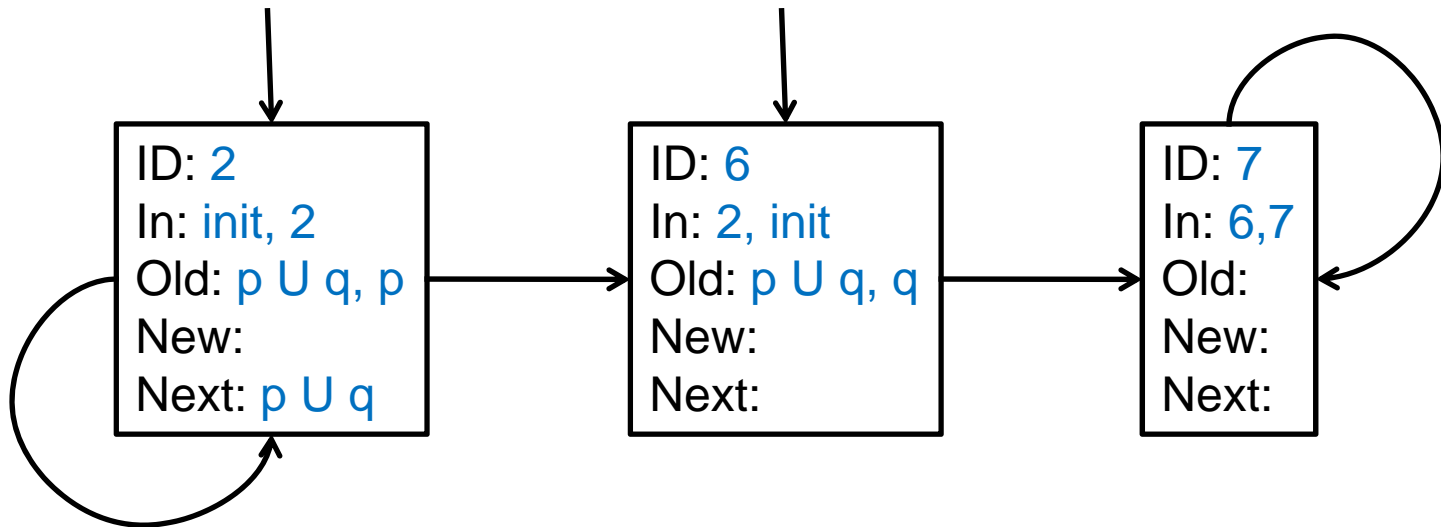
ID: 3  
In: *init*  
Old: *p U q*, *q*  
New:  
Next:

# Merge into an Existing Node

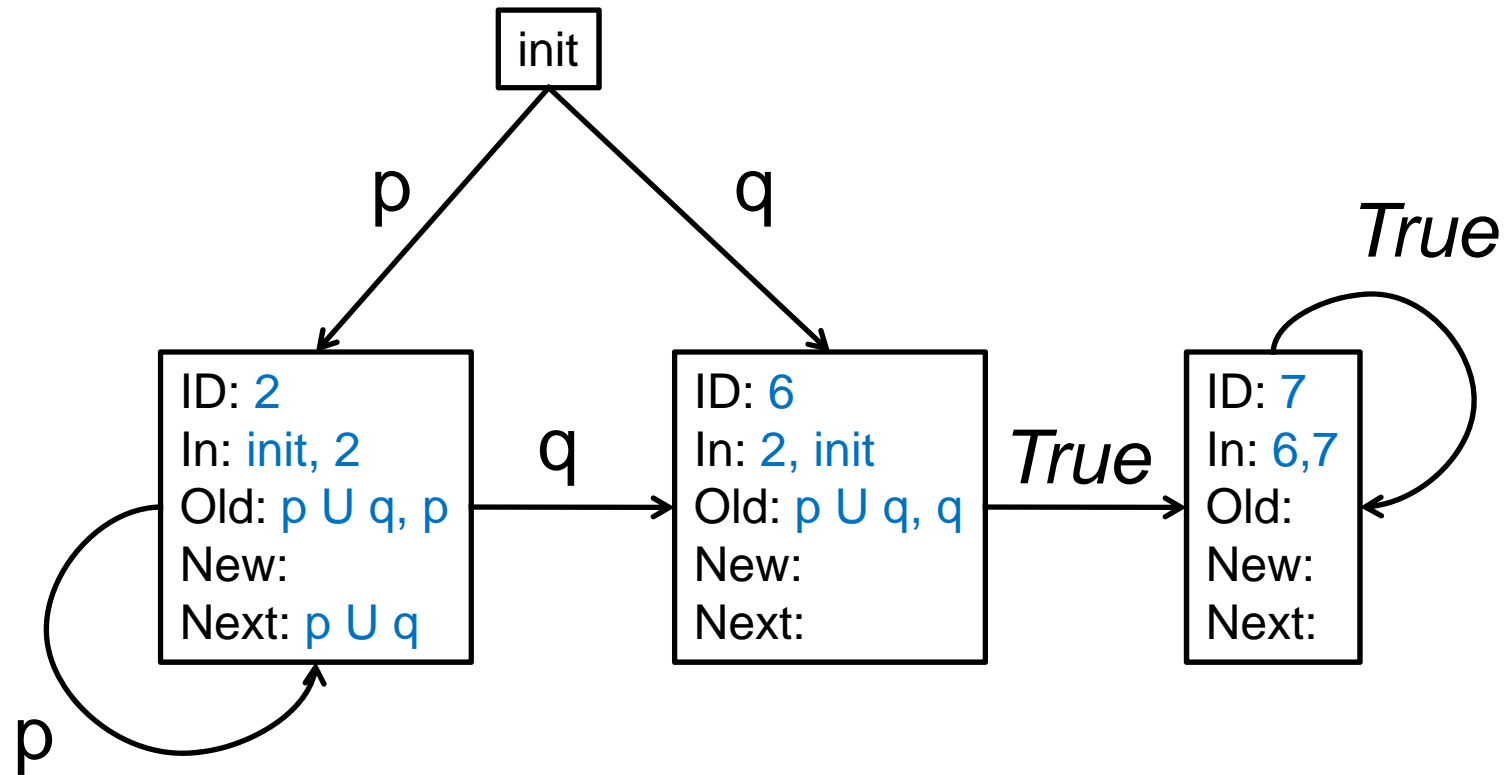


All nodes have been expanded!

# Connect the Nodes



# Complete the GBA



$$F = \{\{init, 6, 7\}\}$$