

The background image shows a sunny day on a large green lawn at Aalborg University. In the foreground, a young man lies on his back near a tree, while others sit or stand in small groups. In the background, a modern building with 'AAU' signage is visible under a clear blue sky.

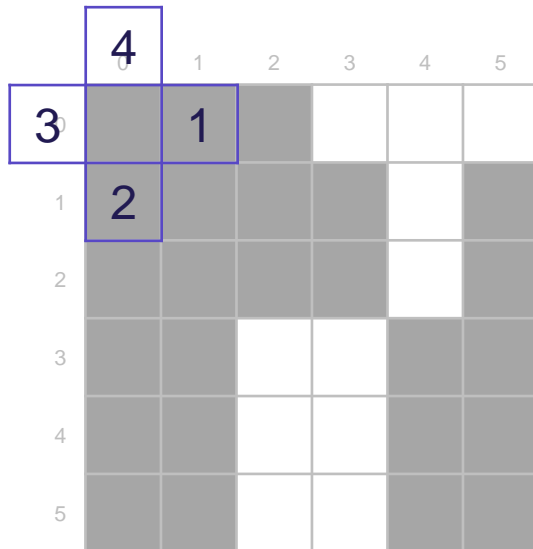
Implementing grassfire with a queue

Andreas Møgelmoose



AALBORG UNIVERSITY
DENMARK

Implementing grassfire using a queue

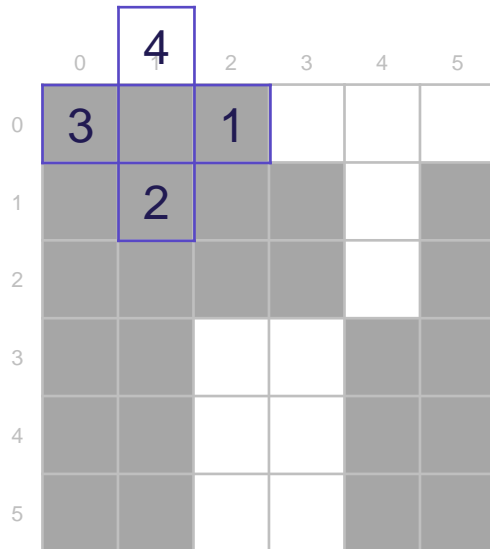


```
current_id = 1
```

```
burn_queue = [
]
```



Implementing grassfire using a queue

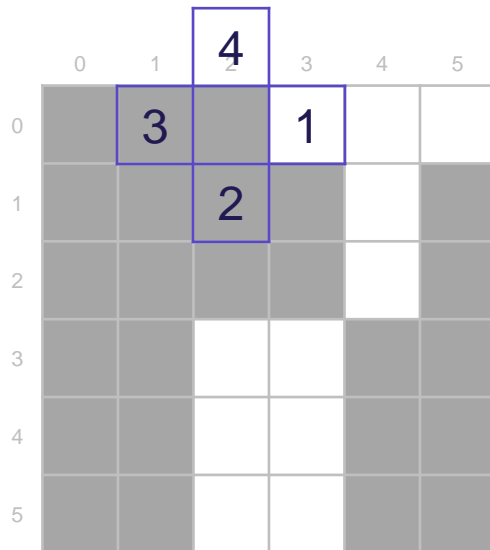


```
current_id = 1
```

```
burn_queue = [  
  
]
```



Implementing grassfire using a queue

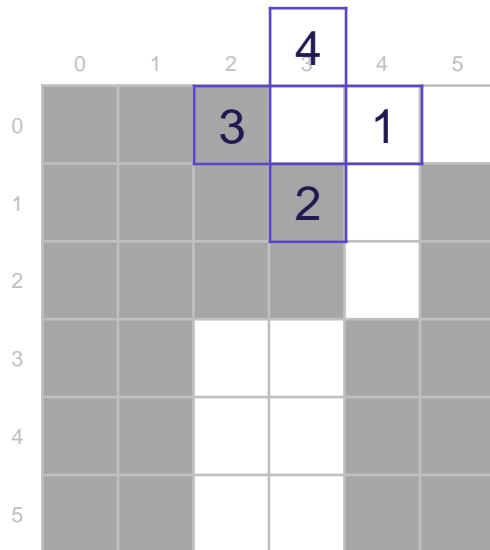


```
current_id = 1
```

```
burn_queue = [  
  
]
```



Implementing grassfire using a queue

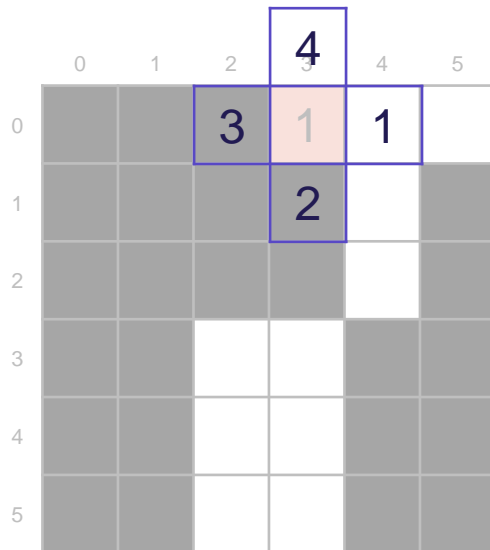


```
current_id = 1
```

```
burn_queue = [  
  
]
```



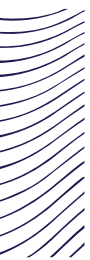
Implementing grassfire using a queue



```
current_id = 1
```

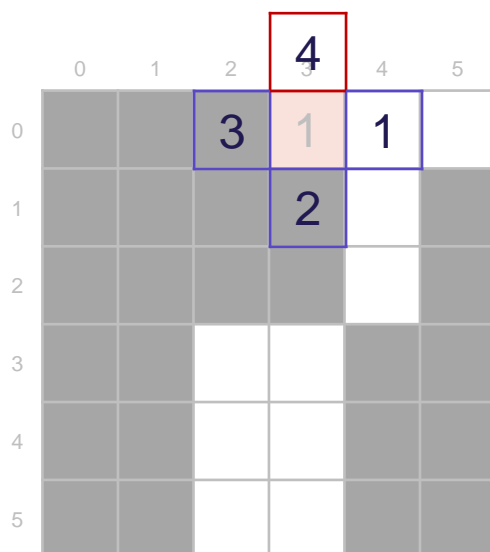
```
burn_queue = [  
  
]
```





Implementing grassfire using a queue

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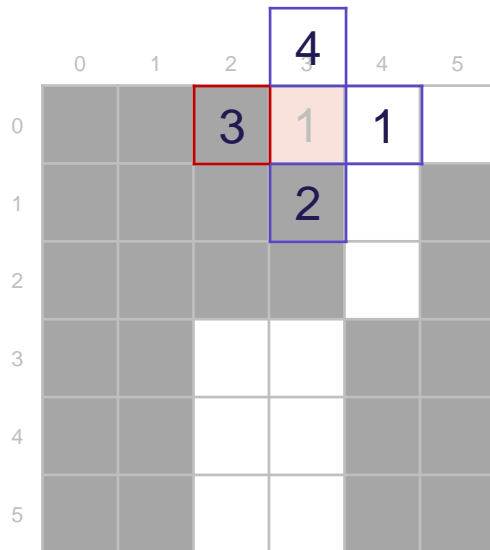


```
current_id = 1
```

```
burn_queue = [  
  
]
```



Implementing grassfire using a queue

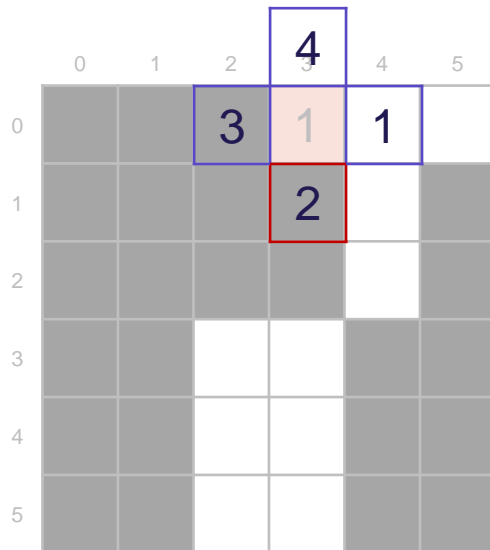


```
current_id = 1
```

```
burn_queue = [  
  
]
```



Implementing grassfire using a queue

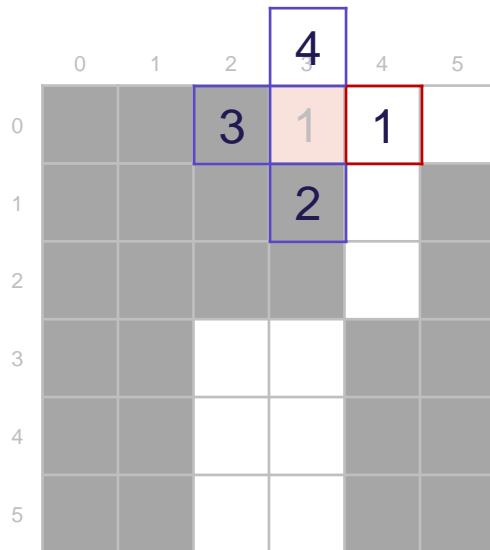


```
current_id = 1
```

```
burn_queue = [  
  
]
```



Implementing grassfire using a queue

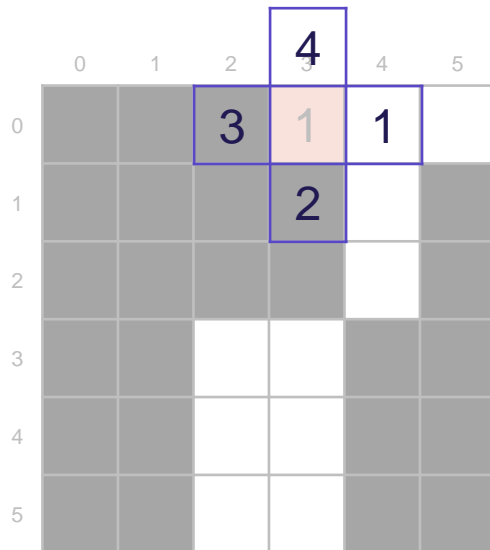


```
current_id = 1
```

```
burn_queue = [  
    (4, 0)  
]
```



Implementing grassfire using a queue

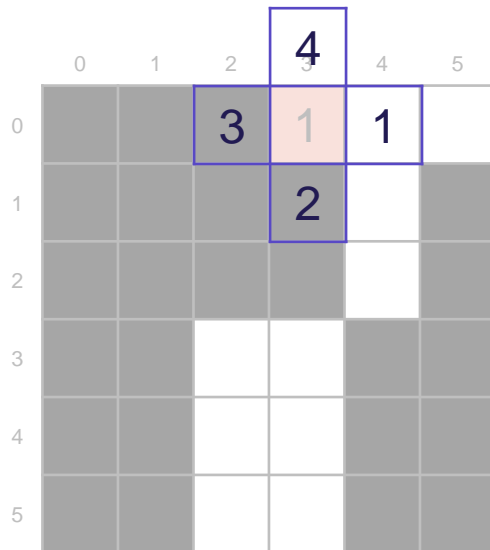


```
current_id = 1
```

```
burn_queue = [  
    (4, 0)  
]
```



Implementing grassfire using a queue



```
current_id = 1
```

```
burn_queue = [
    (4, 0)
]
```

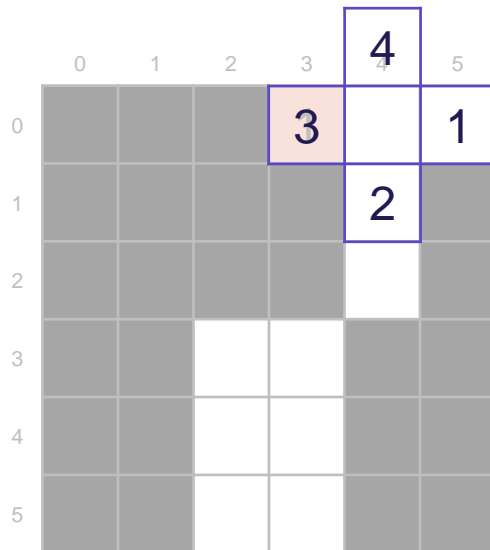
pop():

- Save to variable
- Remove from queue

Works if this is a Python deque



Implementing grassfire using a queue

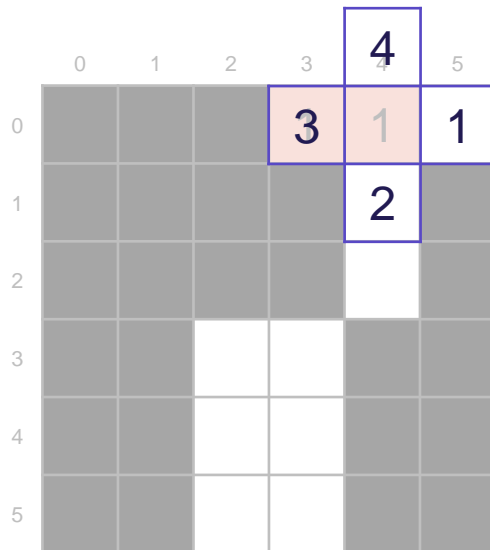


```
current_id = 1
```

```
burn_queue = [  
  
]
```



Implementing grassfire using a queue

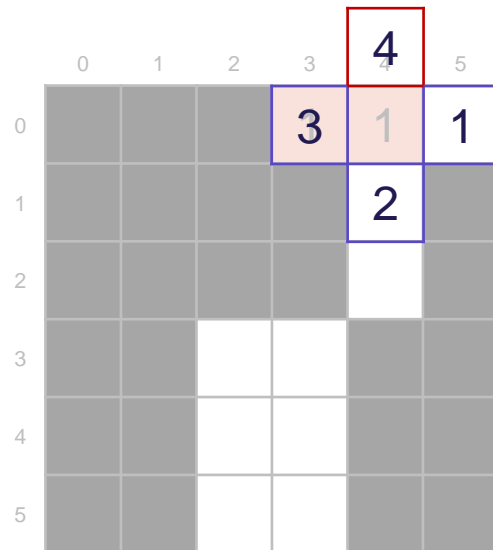


```
current_id = 1
```

```
burn_queue = [  
  
]
```



Implementing grassfire using a queue

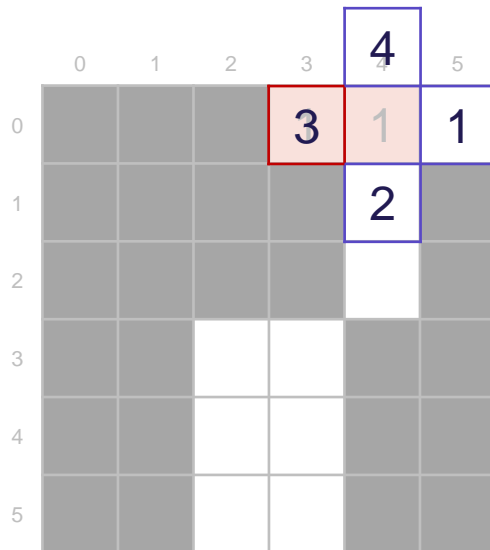


```
current_id = 1
```

```
burn_queue = [  
  
]
```



Implementing grassfire using a queue

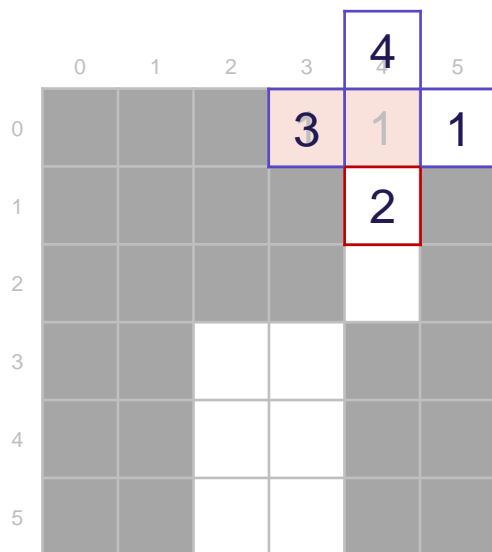


```
current_id = 1
```

```
burn_queue = [  
  
]
```



Implementing grassfire using a queue

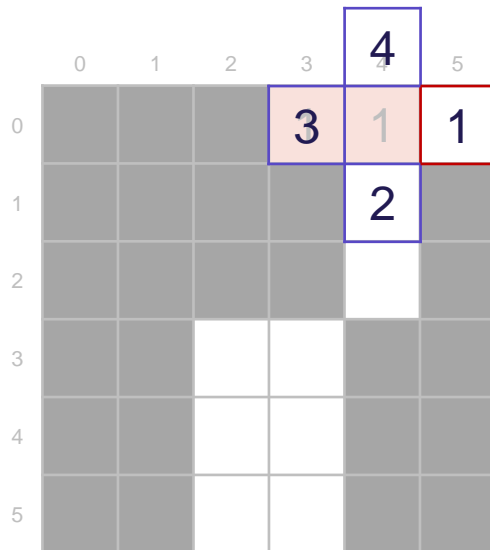


```
current_id = 1
```

```
burn_queue = [  
    (4, 1)  
]
```



Implementing grassfire using a queue

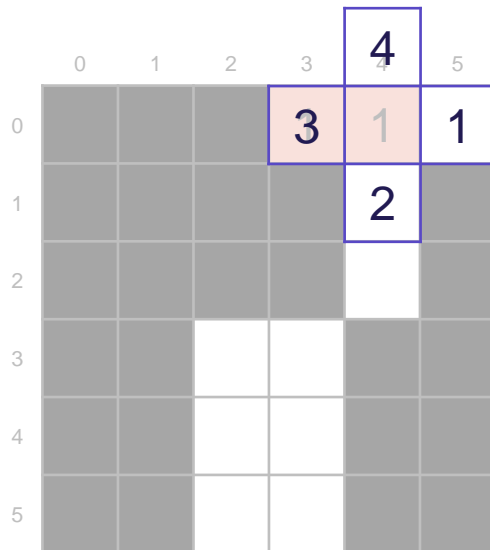


```
current_id = 1
```

```
burn_queue = [  
    (4, 1)  
    (5, 0)  
]
```



Implementing grassfire using a queue

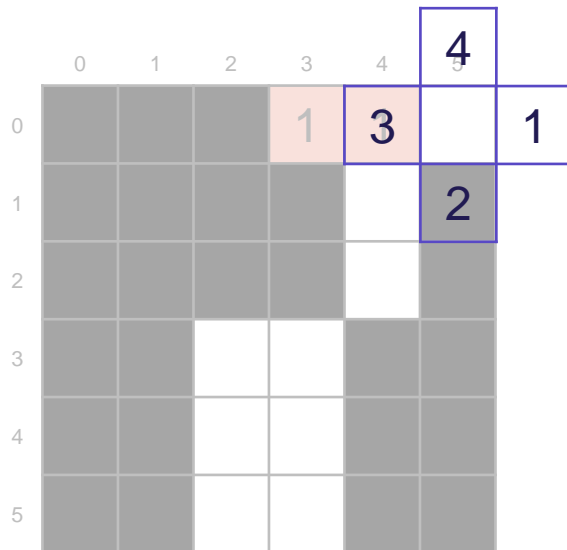


```
current_id = 1
```

```
burn_queue = [  
    (4, 1)  
    (5, 0)  
]
```



Implementing grassfire using a queue

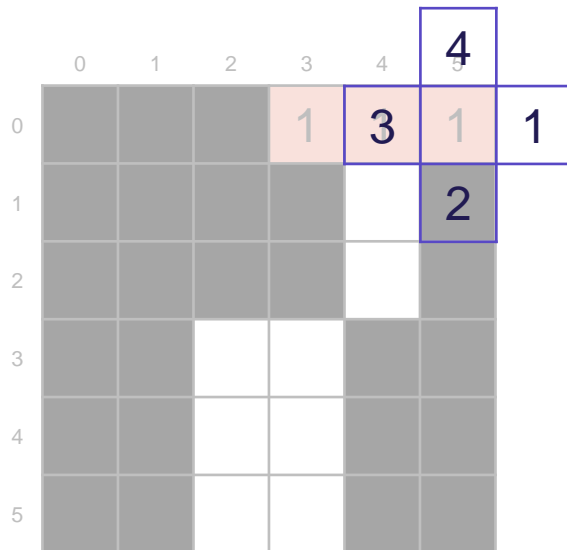


```
current_id = 1
```

```
burn_queue = [
    (4, 1)
]
```



Implementing grassfire using a queue

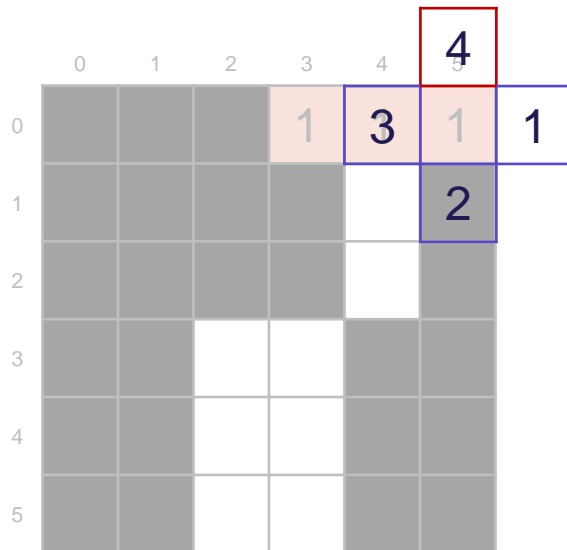


```
current_id = 1
```

```
burn_queue = [
    (4, 1)
]
```



Implementing grassfire using a queue

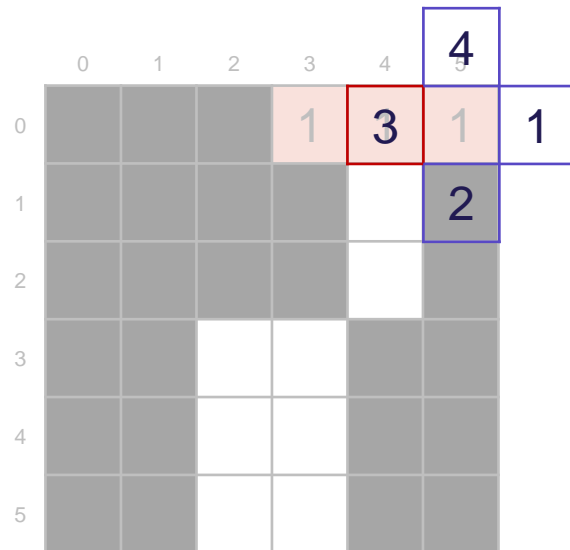


```
current_id = 1
```

```
burn_queue = [
    (4, 1)
]
```



Implementing grassfire using a queue

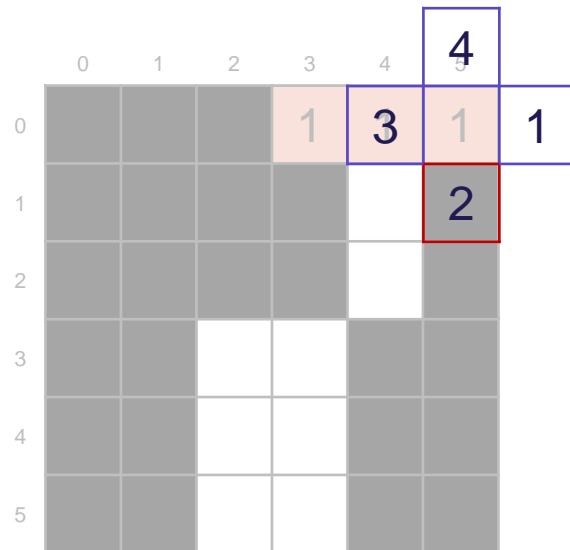


```
current_id = 1
```

```
burn_queue = [
    (4, 1)
]
```



Implementing grassfire using a queue

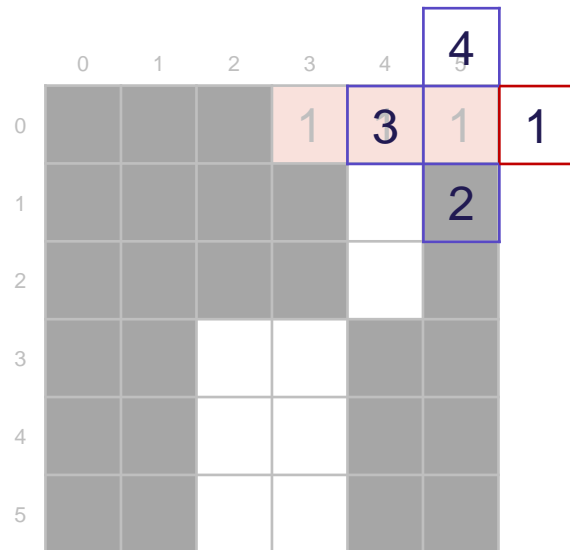


```
current_id = 1
```

```
burn_queue = [
    (4, 1)
]
```



Implementing grassfire using a queue

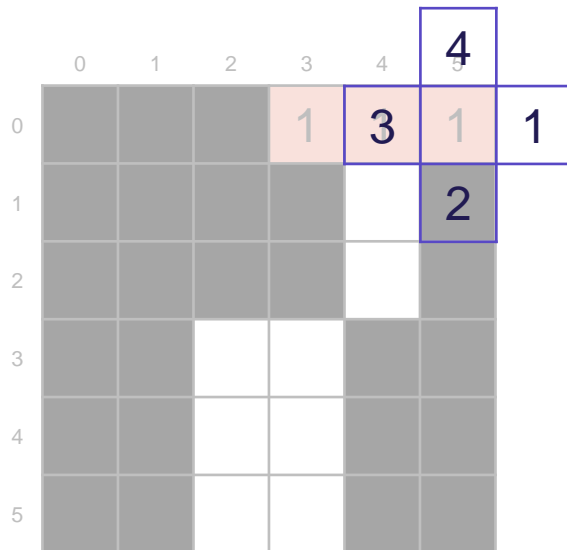


```
current_id = 1
```

```
burn_queue = [
    (4, 1)
]
```



Implementing grassfire using a queue

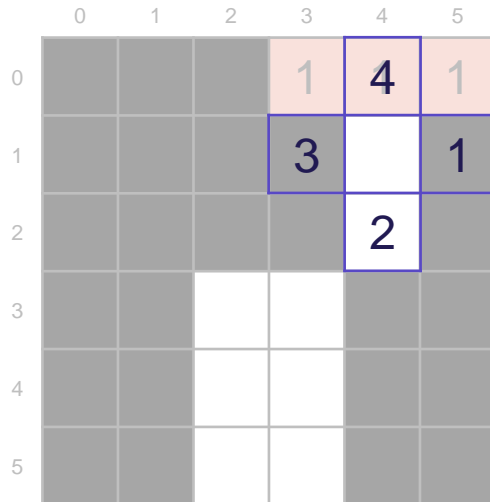


```
current_id = 1
```

```
burn_queue = [
    (4, 1)
]
```



Implementing grassfire using a queue

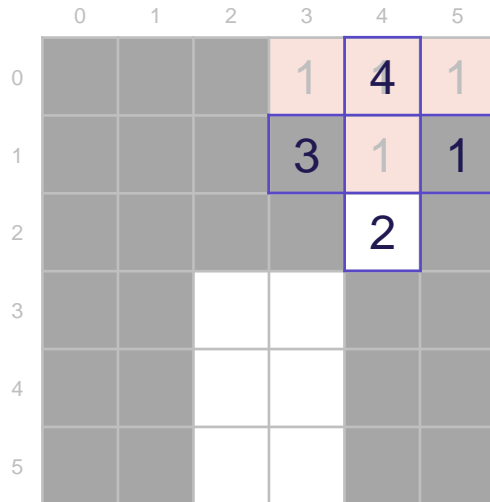


```
current_id = 1
```

```
burn_queue = [  
  
]
```



Implementing grassfire using a queue

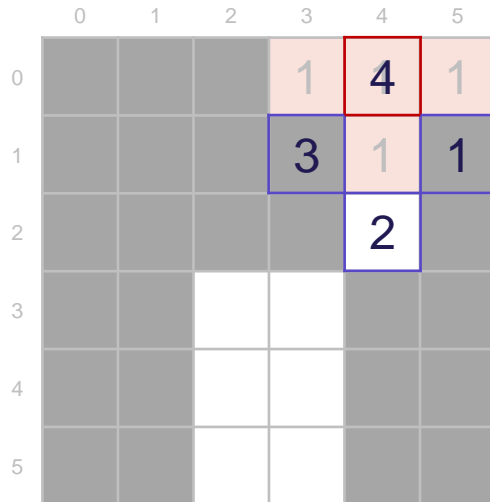


```
current_id = 1
```

```
burn_queue = [  
  
]
```



Implementing grassfire using a queue

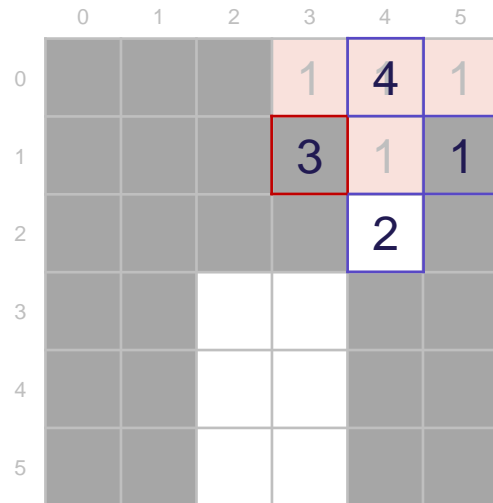


```
current_id = 1
```

```
burn_queue = [  
  
]
```



Implementing grassfire using a queue

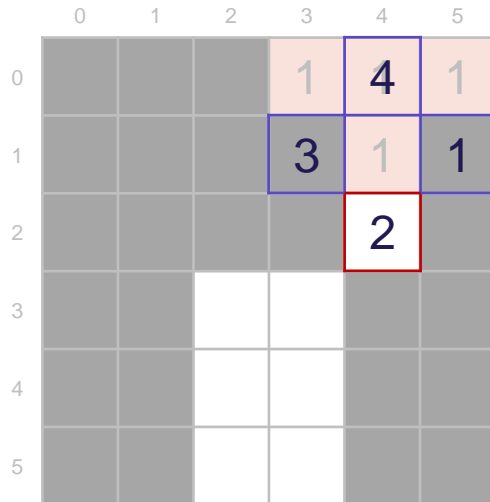


```
current_id = 1
```

```
burn_queue = [  
  
]
```



Implementing grassfire using a queue

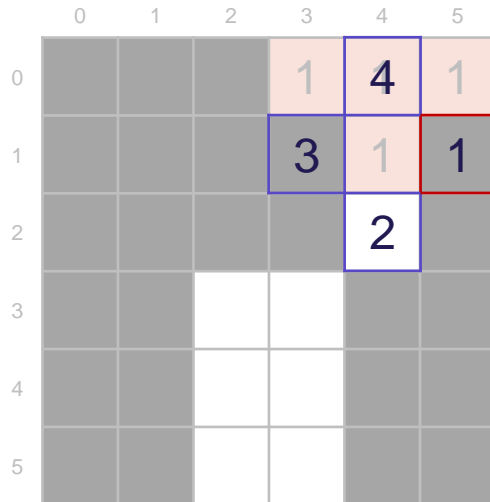


```
current_id = 1
```

```
burn_queue = [  
    (4, 2)  
]
```



Implementing grassfire using a queue

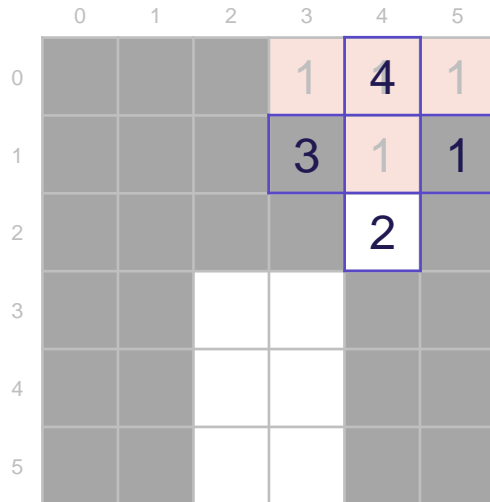


```
current_id = 1
```

```
burn_queue = [  
    (4, 2)  
]
```



Implementing grassfire using a queue

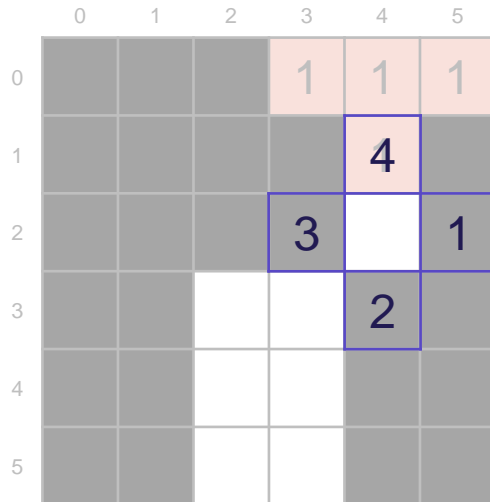


```
current_id = 1
```

```
burn_queue = [  
    (4, 2)  
]
```



Implementing grassfire using a queue

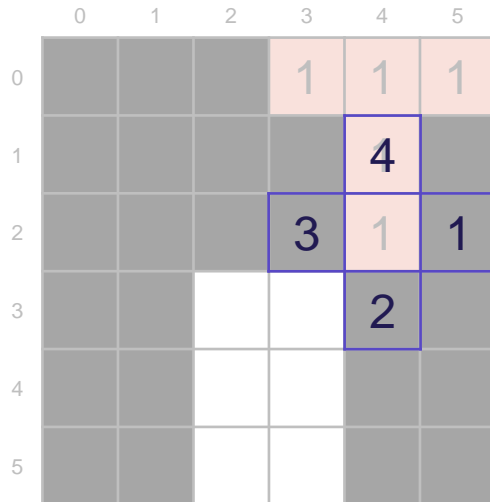


```
current_id = 1
```

```
burn_queue = [  
  
]
```



Implementing grassfire using a queue

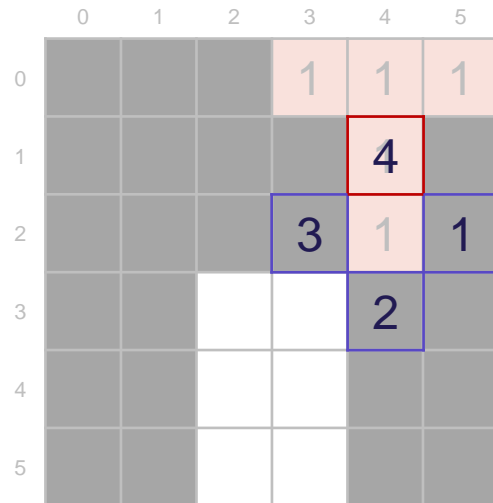


```
current_id = 1
```

```
burn_queue = [  
  
]
```



Implementing grassfire using a queue

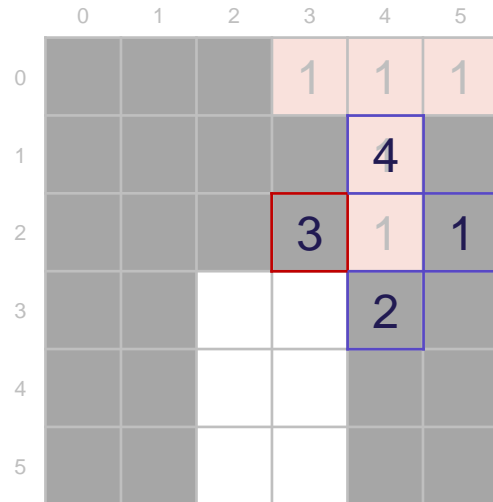


```
current_id = 1
```

```
burn_queue = [  
  
]
```



Implementing grassfire using a queue

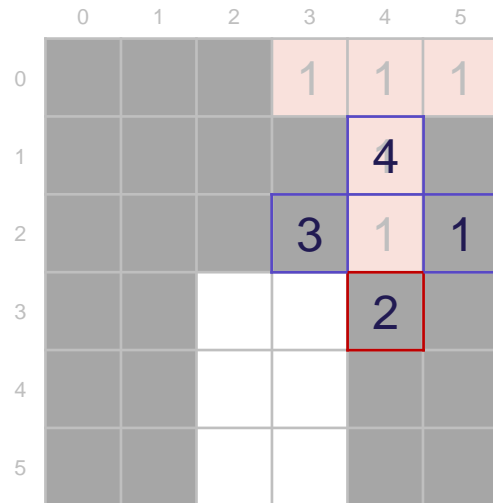


```
current_id = 1
```

```
burn_queue = [
]
```



Implementing grassfire using a queue

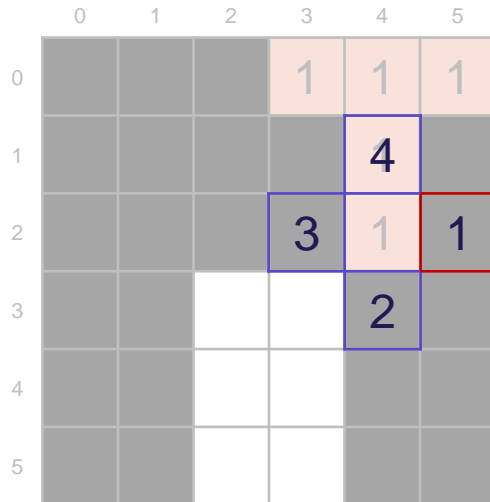


```
current_id = 1
```

```
burn_queue = [  
  
]
```



Implementing grassfire using a queue

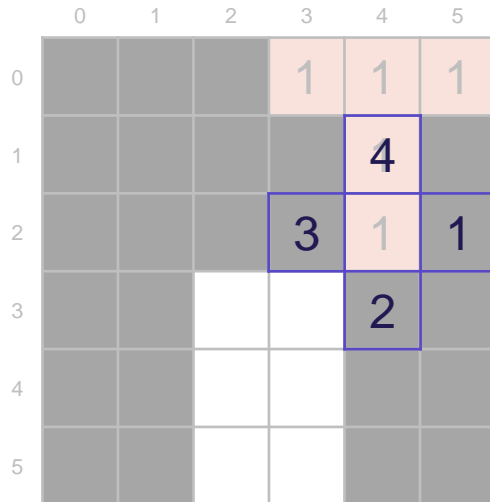


```
current_id = 1
```

```
burn_queue = [
]
```



Implementing grassfire using a queue

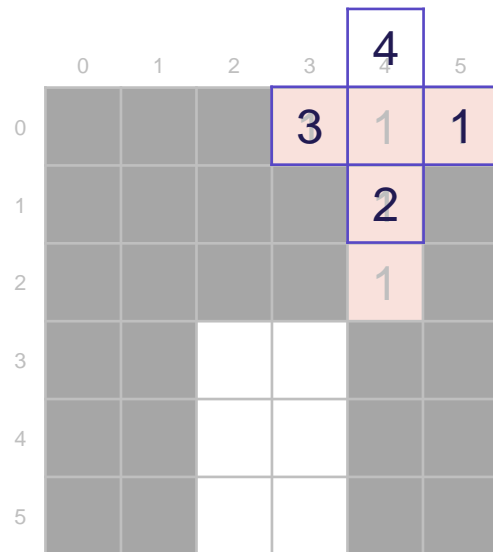


```
current_id = 1
burn_queue = [
    ]
```

Empty!
Jump back!



Implementing grassfire using a queue

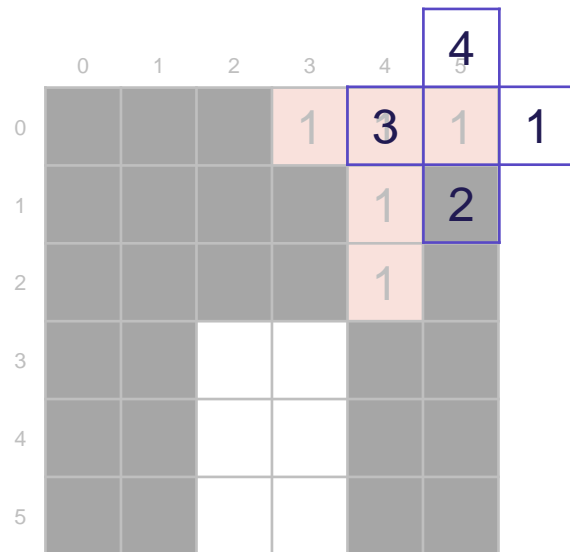


```
current_id = 2
```

```
burn_queue = [
]
```



Implementing grassfire using a queue

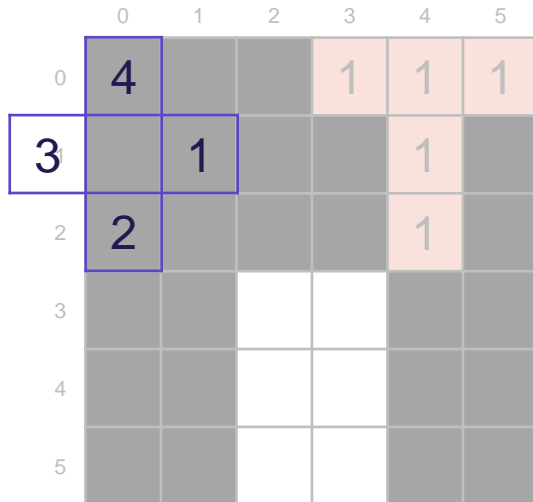


```
current_id = 2
```

```
burn_queue = [
]
```



Implementing grassfire using a queue

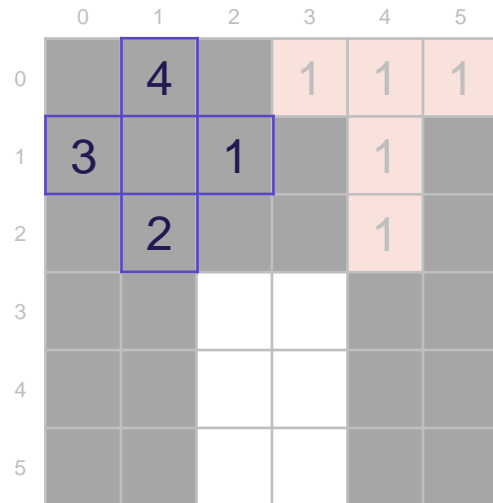


```
current_id = 2
```

```
burn_queue = [  
  
]
```



Implementing grassfire using a queue

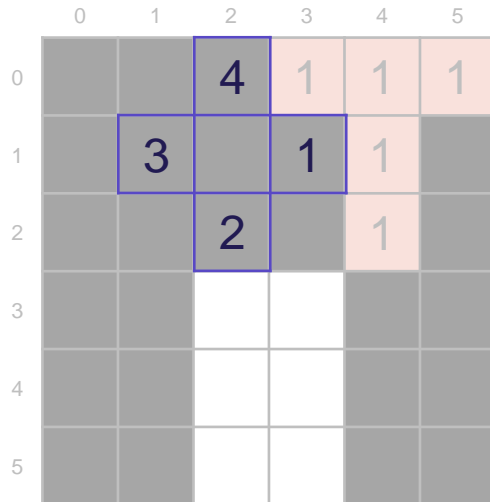


```
current_id = 2
```

```
burn_queue = [  
  
]
```



Implementing grassfire using a queue

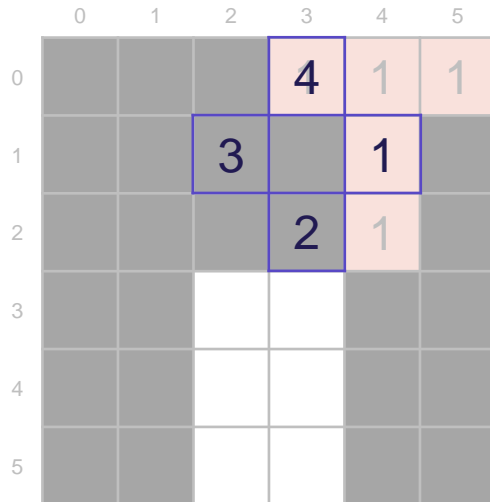


```
current_id = 2
```

```
burn_queue = [  
  
]
```



Implementing grassfire using a queue

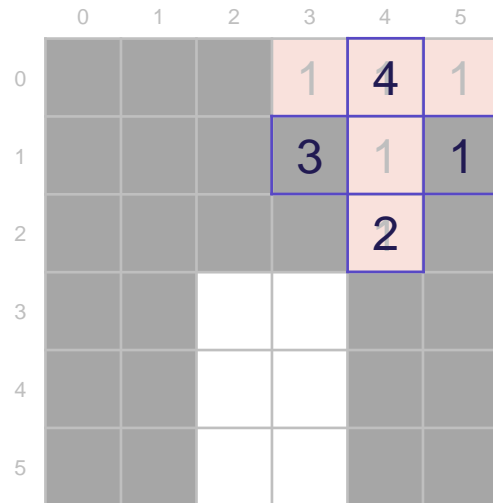


```
current_id = 2
```

```
burn_queue = [  
  
]
```



Implementing grassfire using a queue

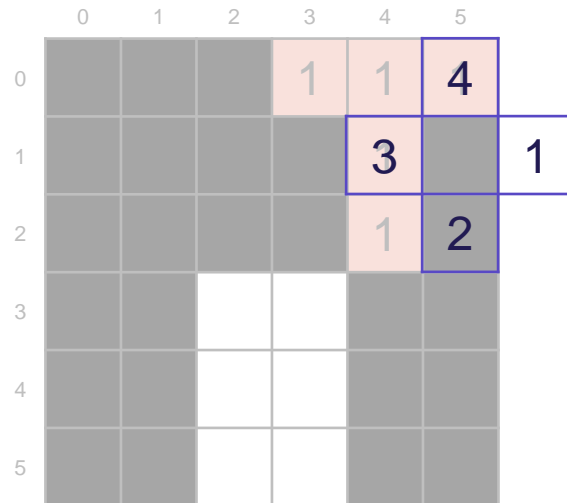


```
current_id = 2
```

```
burn_queue = [  
  
]
```



Implementing grassfire using a queue

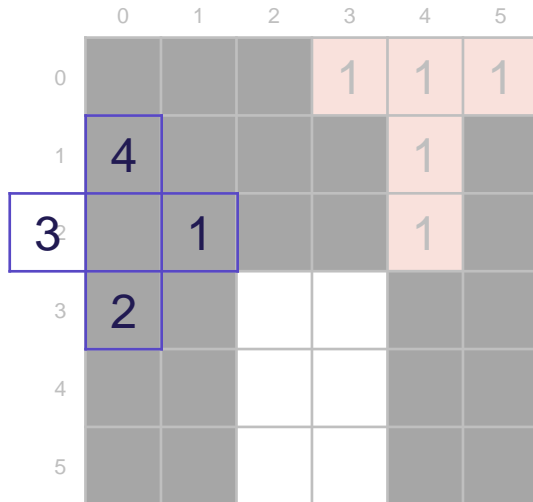


```
current_id = 2
```

```
burn_queue = [
]
```



Implementing grassfire using a queue

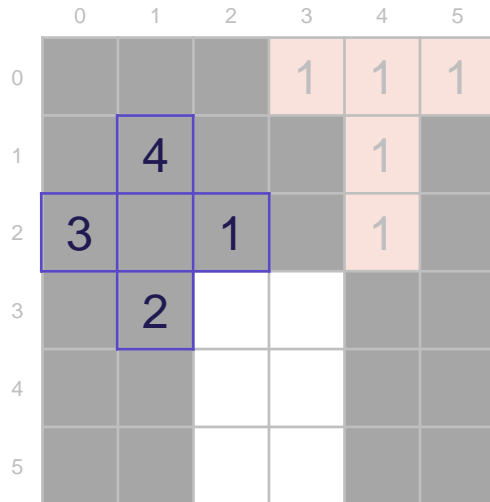


```
current_id = 2
```

```
burn_queue = [  
  
]
```



Implementing grassfire using a queue

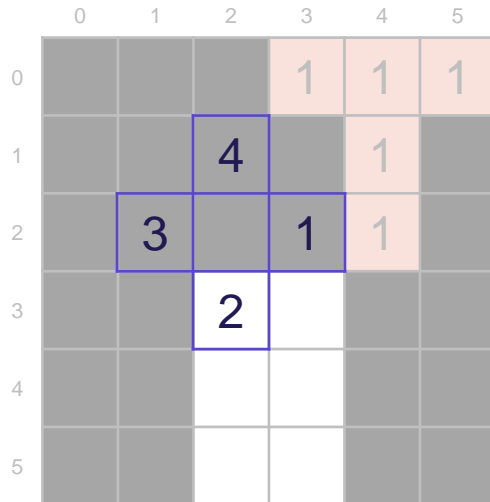


```
current_id = 2
```

```
burn_queue = [  
  
]
```



Implementing grassfire using a queue

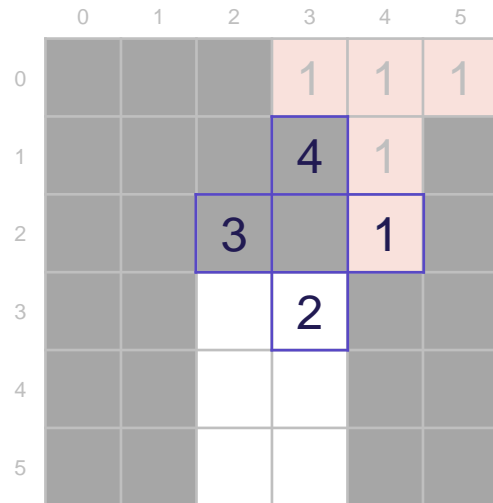


```
current_id = 2
```

```
burn_queue = [  
  
]
```



Implementing grassfire using a queue

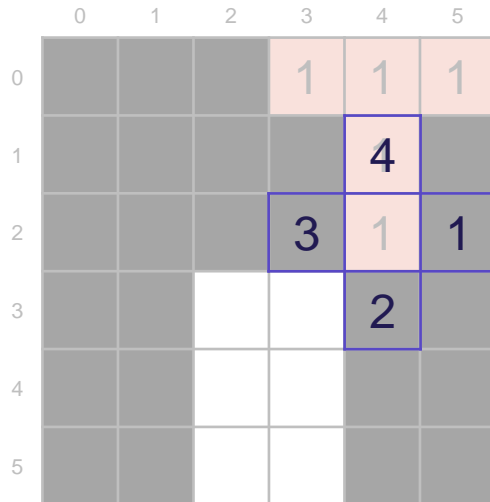


```
current_id = 2
```

```
burn_queue = [  
  
]
```



Implementing grassfire using a queue

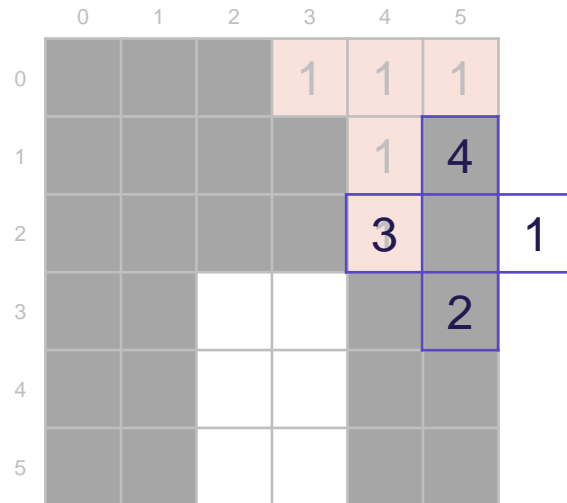


```
current_id = 2
```

```
burn_queue = [  
  
]
```



Implementing grassfire using a queue

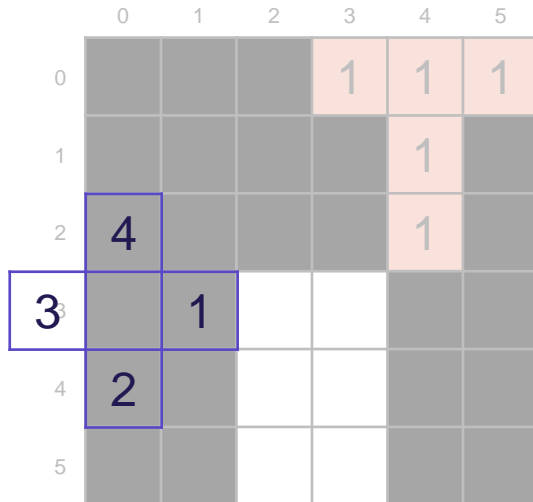


```
current_id = 2
```

```
burn_queue = [
]
```



Implementing grassfire using a queue

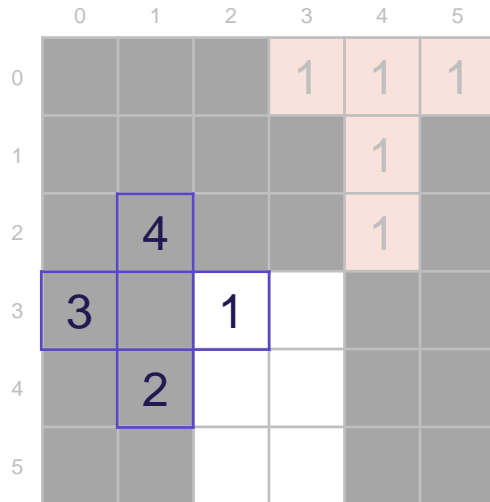


```
current_id = 2
```

```
burn_queue = [  
  
]
```



Implementing grassfire using a queue

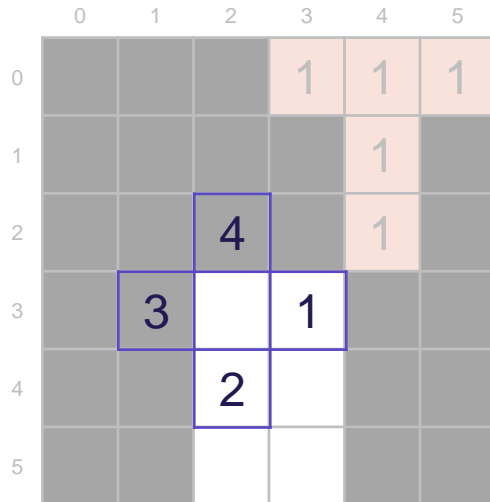


```
current_id = 2
```

```
burn_queue = [  
  
]
```



Implementing grassfire using a queue

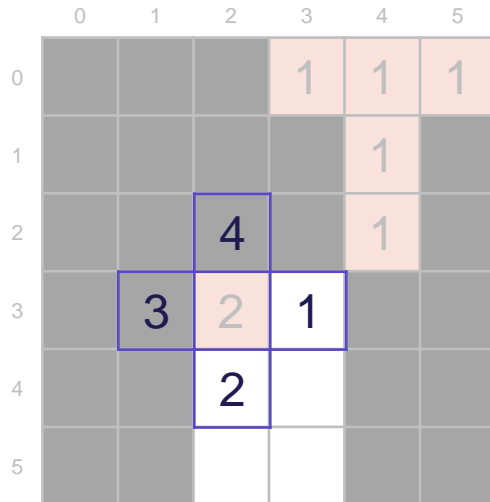


```
current_id = 2
```

```
burn_queue = [  
  
]
```



Implementing grassfire using a queue

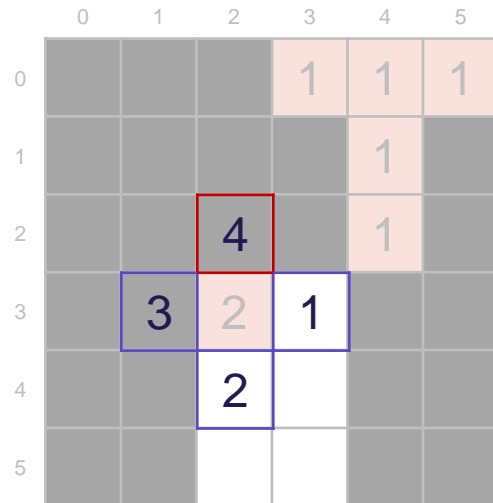


```
current_id = 2
```

```
burn_queue = [  
  
]
```



Implementing grassfire using a queue

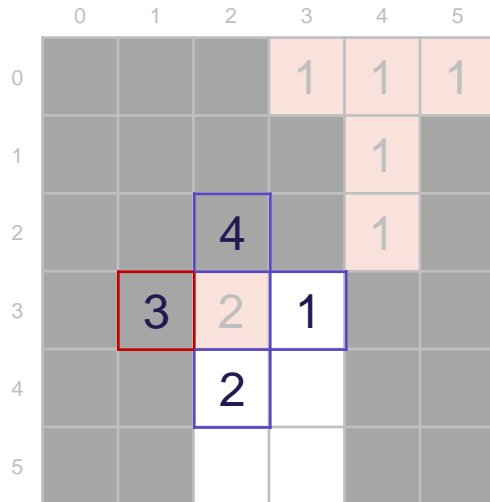


```
current_id = 2
```

```
burn_queue = [  
  
]
```



Implementing grassfire using a queue

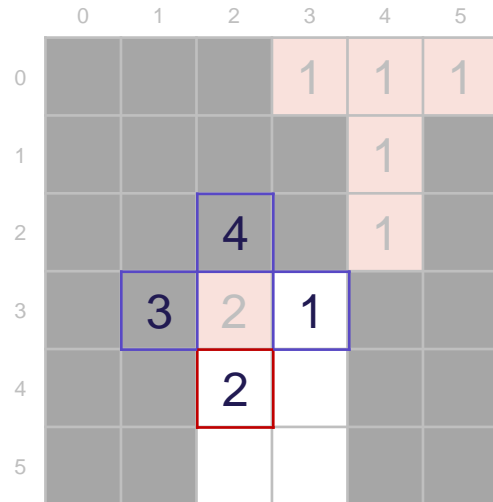


```
current_id = 2
```

```
burn_queue = [  
  
]
```



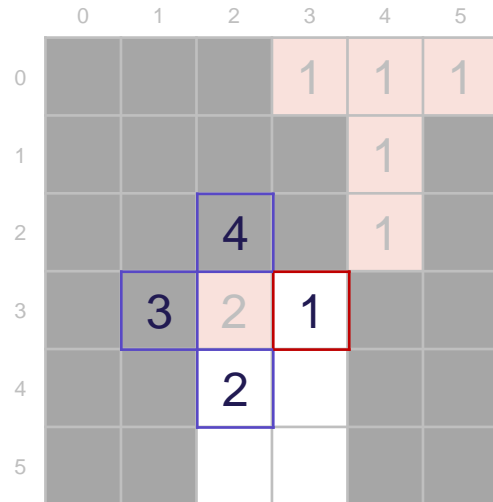
Implementing grassfire using a queue



```
current_id = 2
```

```
burn_queue = [
    (2, 4)
]
```

Implementing grassfire using a queue

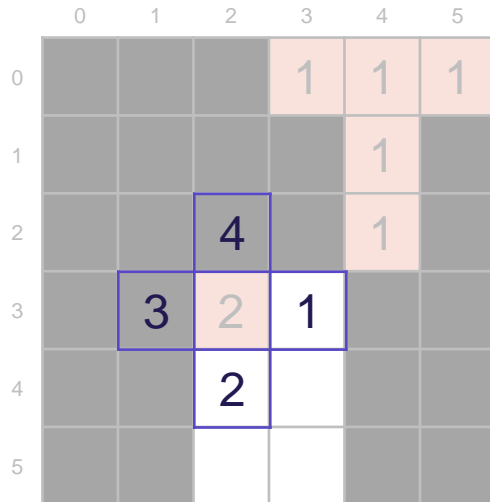


```
current_id = 2
```

```
burn_queue = [
    (2, 4)
    (3, 3)
]
```



Implementing grassfire using a queue

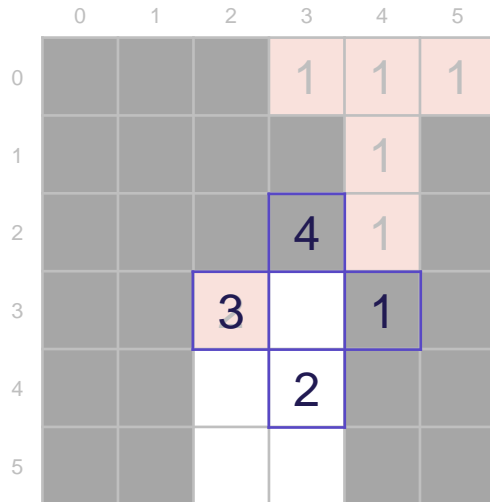


```
current_id = 2
```

```
burn_queue = [
    (2, 4)
    (3, 3)
]
```



Implementing grassfire using a queue

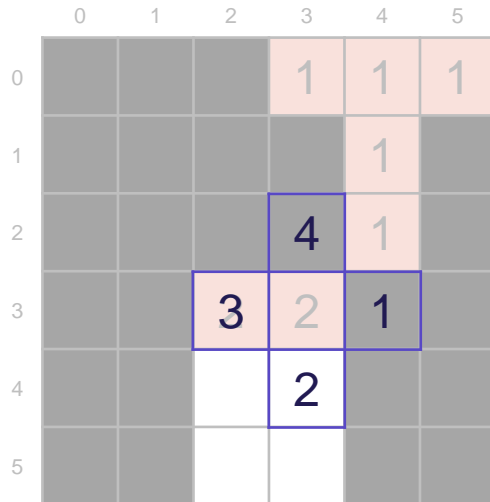


```
current_id = 2
```

```
burn_queue = [  
    (2, 4)  
]
```



Implementing grassfire using a queue

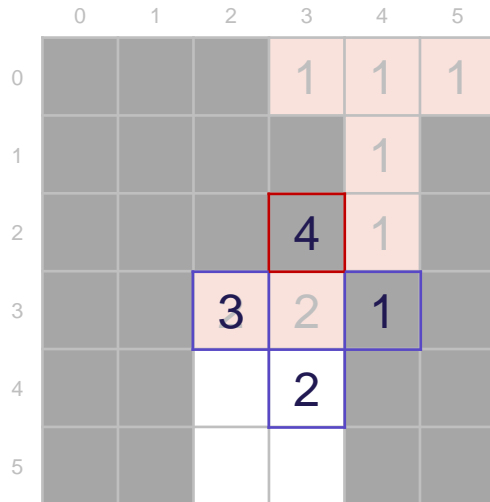


```
current_id = 2
```

```
burn_queue = [  
    (2, 4)  
]
```



Implementing grassfire using a queue

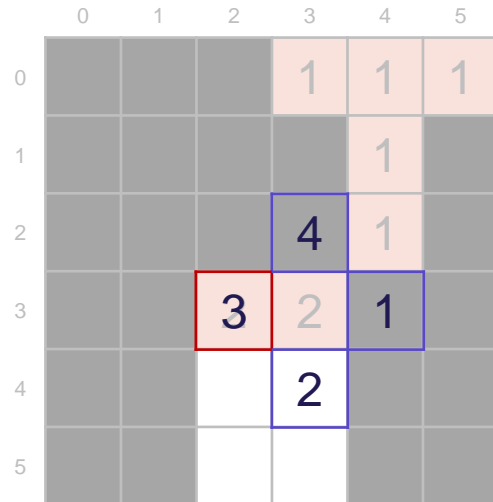


```
current_id = 2
```

```
burn_queue = [  
    (2, 4)  
]
```



Implementing grassfire using a queue

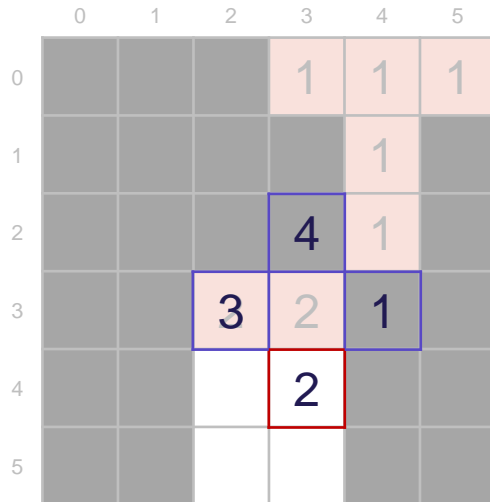


```
current_id = 2
```

```
burn_queue = [  
    (2, 4)  
]
```



Implementing grassfire using a queue

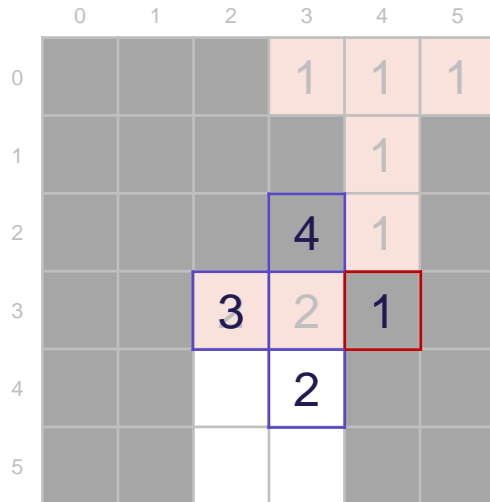


```
current_id = 2
```

```
burn_queue = [  
    (2, 4)  
    (3, 4)  
]
```



Implementing grassfire using a queue

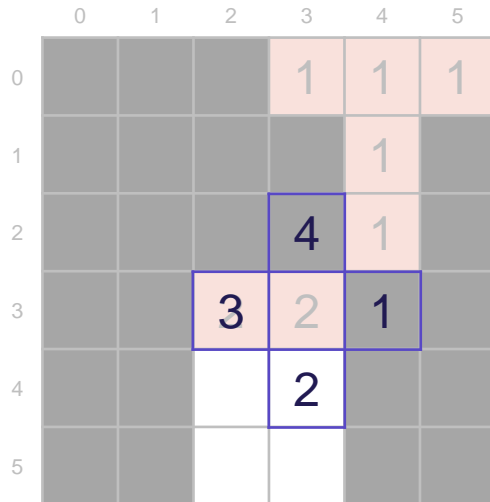


```
current_id = 2
```

```
burn_queue = [  
    (2, 4)  
    (3, 4)  
]
```



Implementing grassfire using a queue

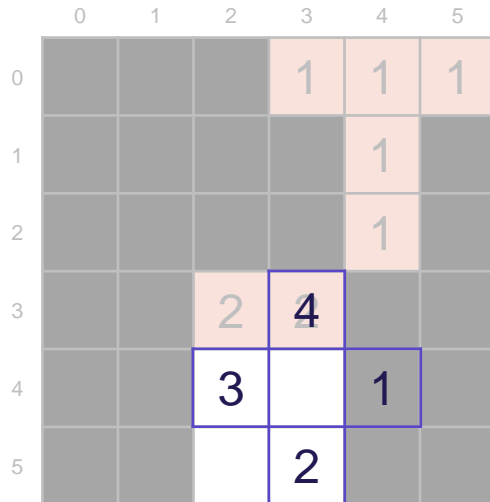


```
current_id = 2
```

```
burn_queue = [
    (2, 4)
    (3, 4)
]
```



Implementing grassfire using a queue

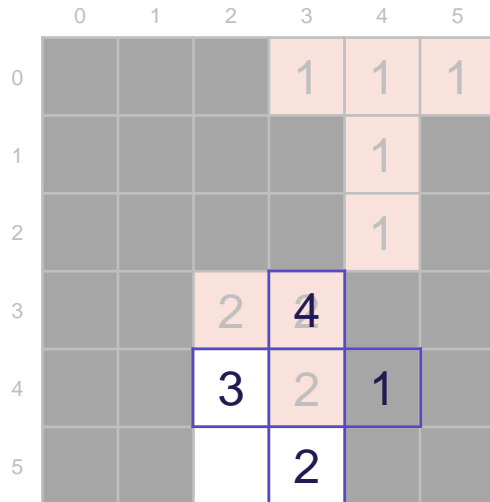


```
current_id = 2
```

```
burn_queue = [  
    (2, 4)  
]
```



Implementing grassfire using a queue

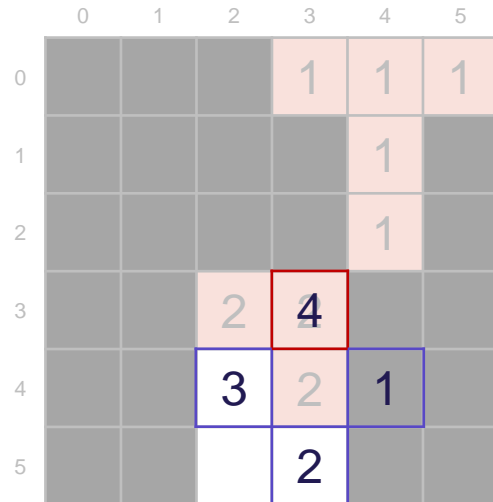


```
current_id = 2
```

```
burn_queue = [  
    (2, 4)  
]
```



Implementing grassfire using a queue

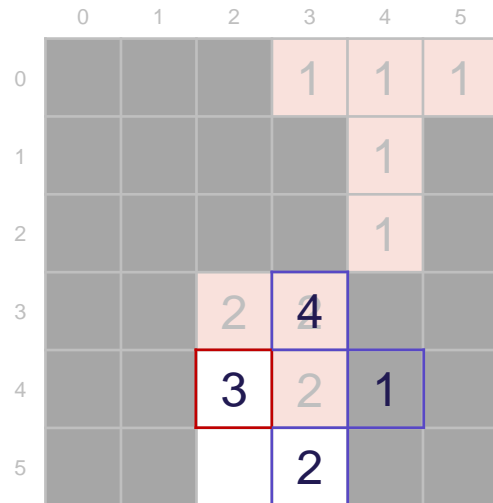


```
current_id = 2
```

```
burn_queue = [  
    (2, 4)  
]
```



Implementing grassfire using a queue

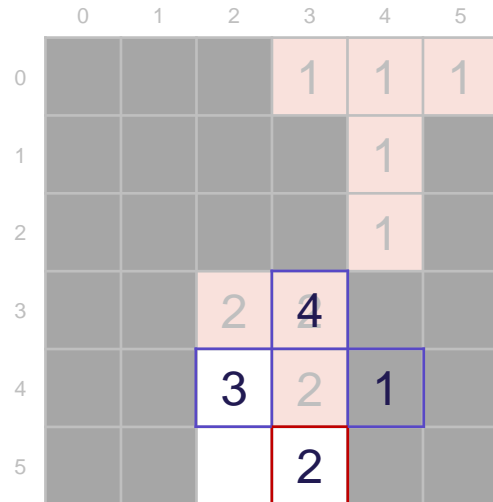


```
current_id = 2
```

```
burn_queue = [
    (2, 4)
    (2, 4)
]
```



Implementing grassfire using a queue

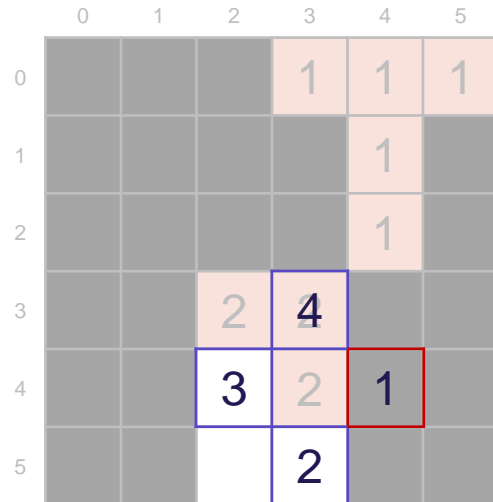


```
current_id = 2
```

```
burn_queue = [
    (2, 4)
    (2, 4)
    (3, 5)
]
```



Implementing grassfire using a queue

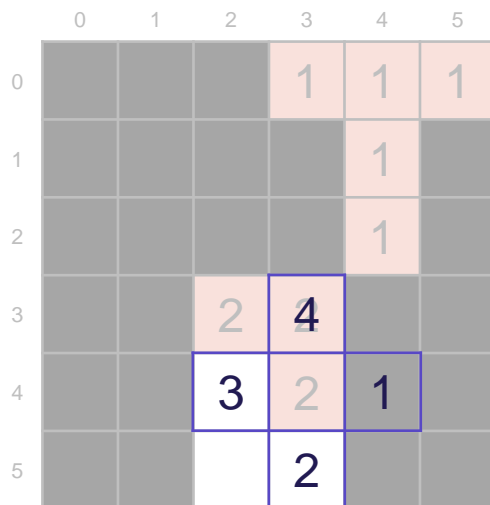


```
current_id = 2
```

```
burn_queue = [
    (2, 4)
    (2, 4)
    (3, 5)
]
```



Implementing grassfire using a queue

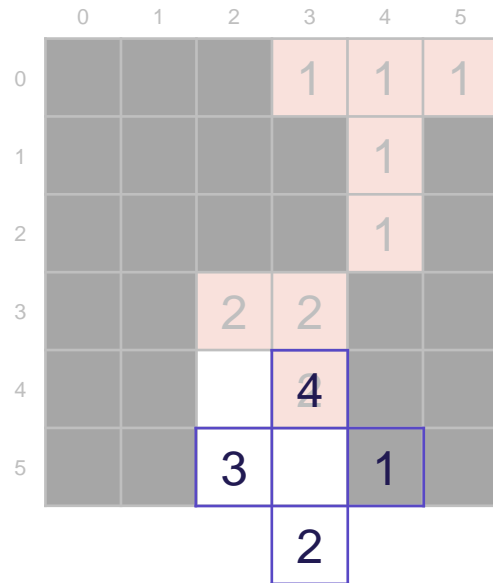


```
current_id = 2
```

```
burn_queue = [
    (2, 4)
    (2, 4)
    (3, 5)
]
```



Implementing grassfire using a queue

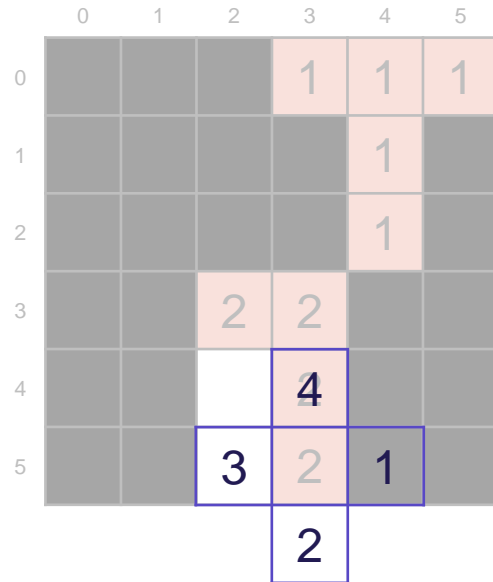


```
current_id = 2
```

```
burn_queue = [
    (2, 4)
    (2, 4)
]
```



Implementing grassfire using a queue

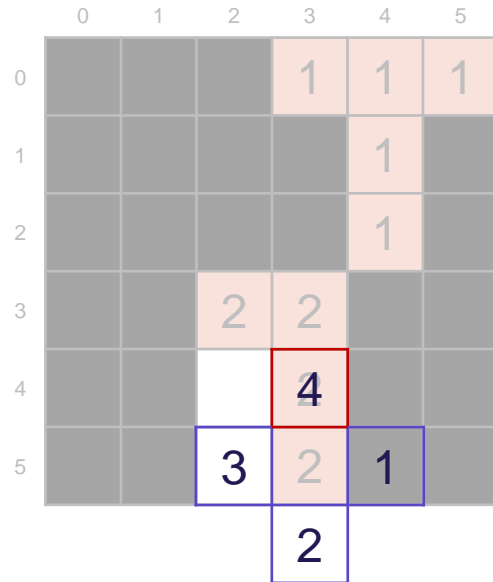


```
current_id = 2
```

```
burn_queue = [
    (2, 4)
    (2, 4)
]
```



Implementing grassfire using a queue

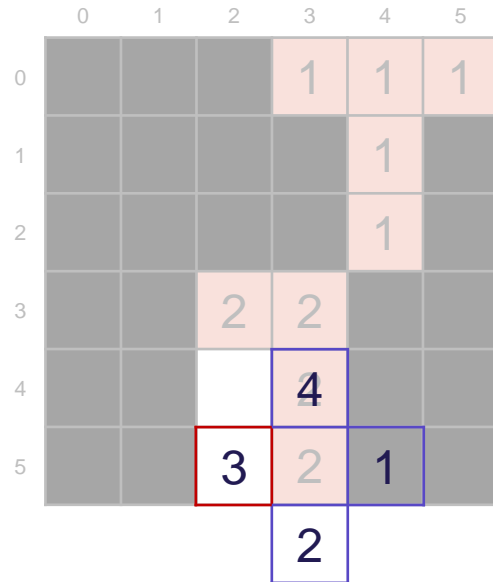


```
current_id = 2
```

```
burn_queue = [  
    (2, 4)  
    (2, 4)  
]
```



Implementing grassfire using a queue

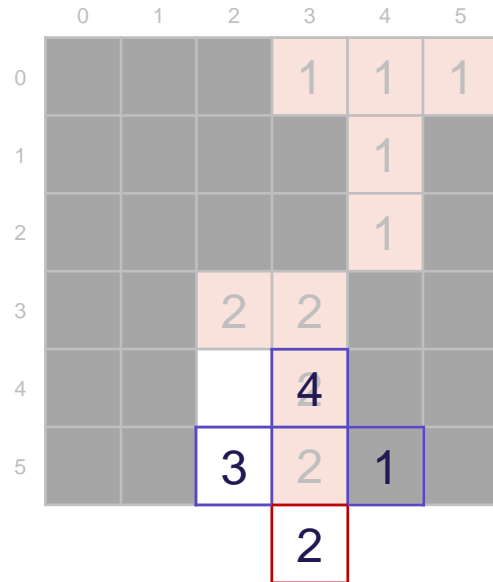


```
current_id = 2
```

```
burn_queue = [
    (2, 4)
    (2, 4)
    (2, 5)
]
```



Implementing grassfire using a queue

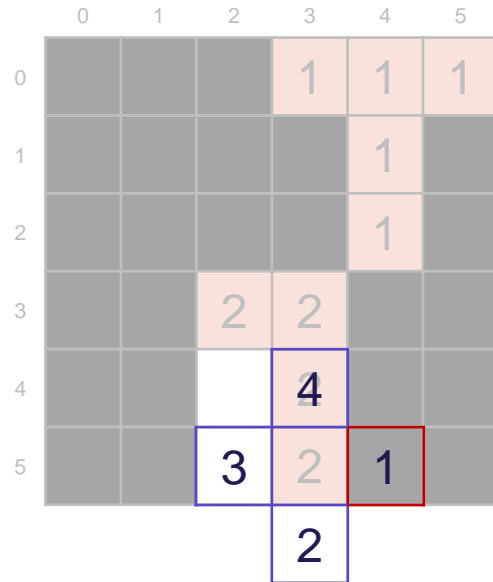


```
current_id = 2
```

```
burn_queue = [
    (2, 4)
    (2, 4)
    (2, 5)
]
```



Implementing grassfire using a queue

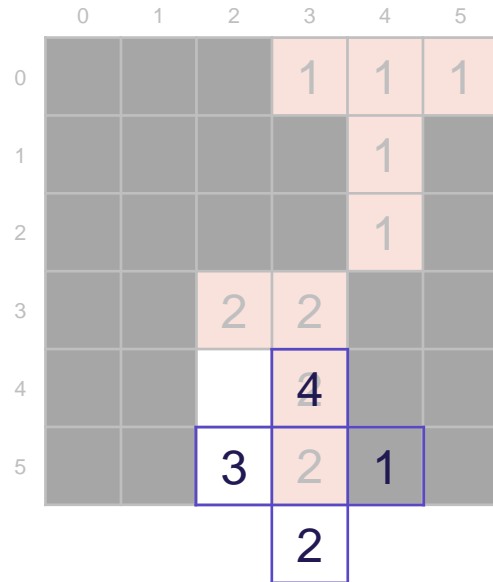


```
current_id = 2
```

```
burn_queue = [
    (2, 4)
    (2, 4)
    (2, 5)
]
```



Implementing grassfire using a queue

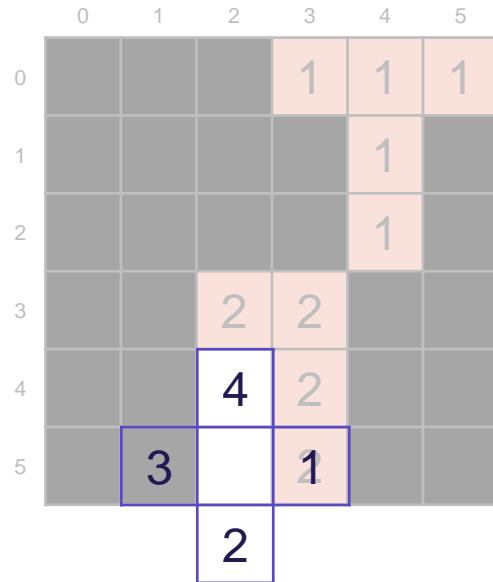


```
current_id = 2
```

```
burn_queue = [
    (2, 4)
    (2, 4)
    (2, 5)
]
```



Implementing grassfire using a queue

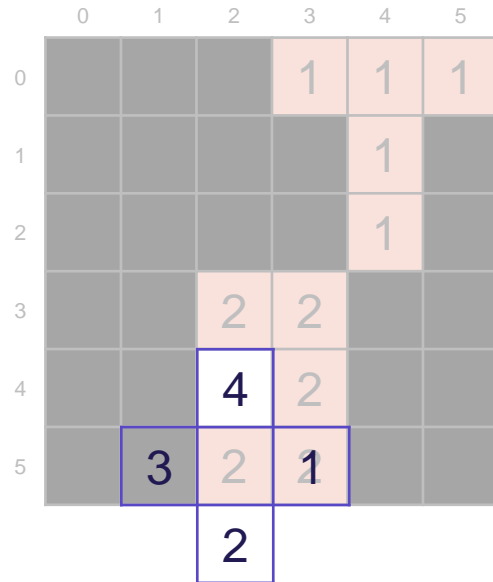


```
current_id = 2
```

```
burn_queue = [
    (2, 4)
    (2, 4)
]
```



Implementing grassfire using a queue

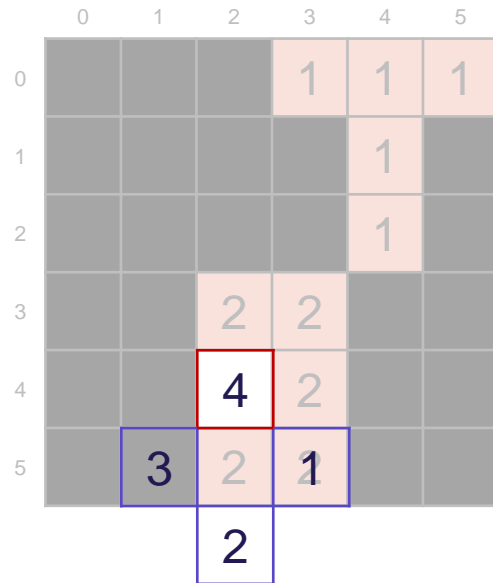


```
current_id = 2
```

```
burn_queue = [
    (2, 4)
    (2, 4)
]
```



Implementing grassfire using a queue

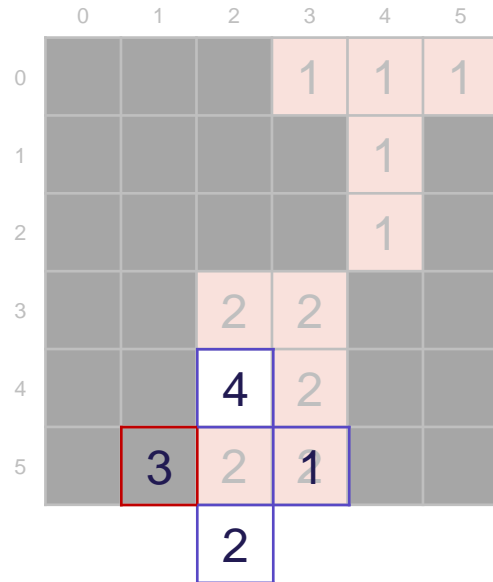


```
current_id = 2
```

```
burn_queue = [
    (2, 4)
    (2, 4)
    (2, 4)
]
```



Implementing grassfire using a queue

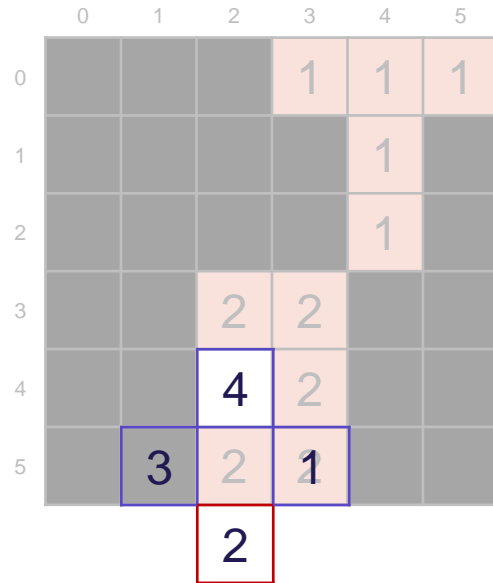


```
current_id = 2
```

```
burn_queue = [
    (2, 4)
    (2, 4)
    (2, 4)
]
```



Implementing grassfire using a queue

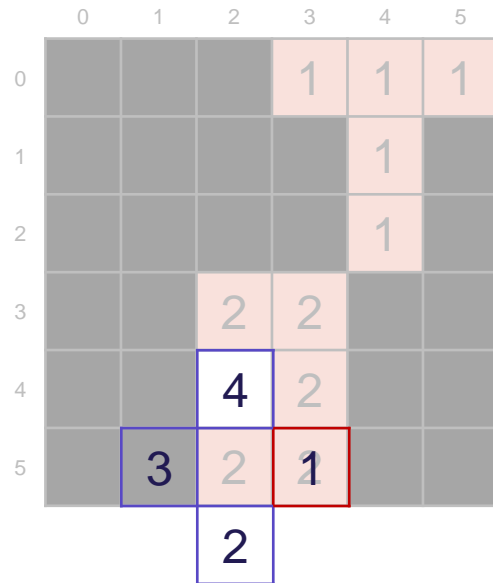


```
current_id = 2
```

```
burn_queue = [
    (2, 4)
    (2, 4)
    (2, 4)
]
```



Implementing grassfire using a queue

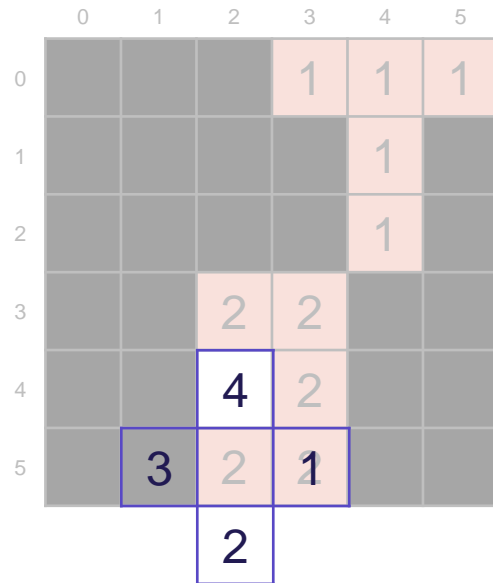


```
current_id = 2
```

```
burn_queue = [
    (2, 4)
    (2, 4)
    (2, 4)
]
```



Implementing grassfire using a queue

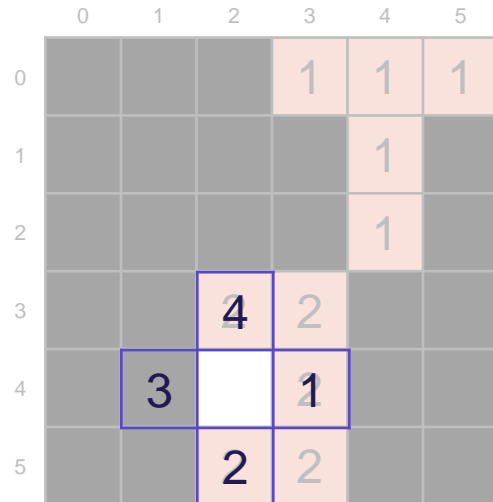


```
current_id = 2
```

```
burn_queue = [
    (2, 4)
    (2, 4)
    (2, 4)
]
```



Implementing grassfire using a queue

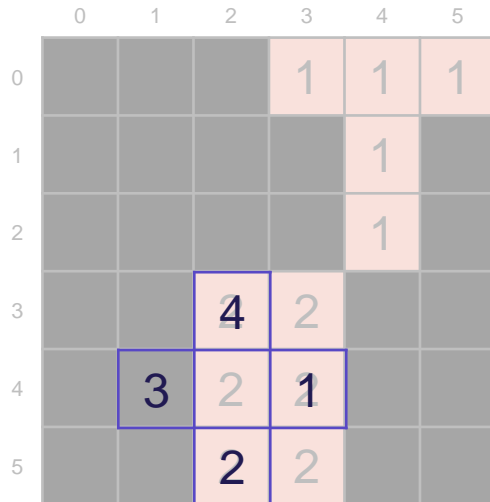


```
current_id = 2
```

```
burn_queue = [
    (2, 4)
    (2, 4)
]
```



Implementing grassfire using a queue

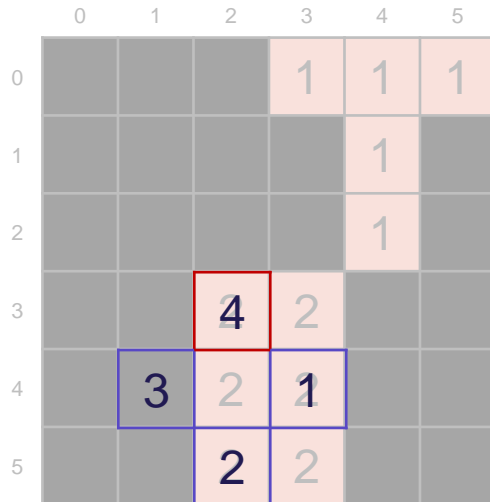


```
current_id = 2
```

```
burn_queue = [  
    (2, 4)  
    (2, 4)  
]
```



Implementing grassfire using a queue

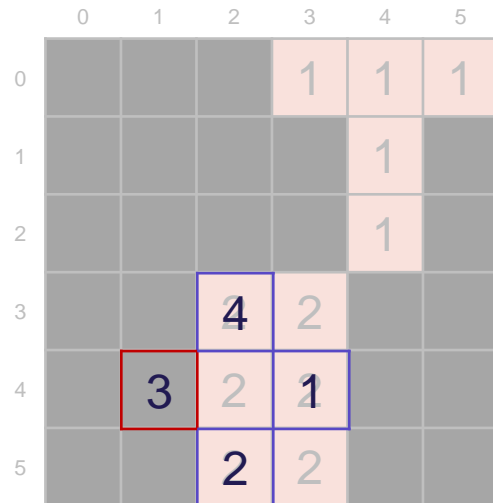


```
current_id = 2
```

```
burn_queue = [  
    (2, 4)  
    (2, 4)  
]
```



Implementing grassfire using a queue

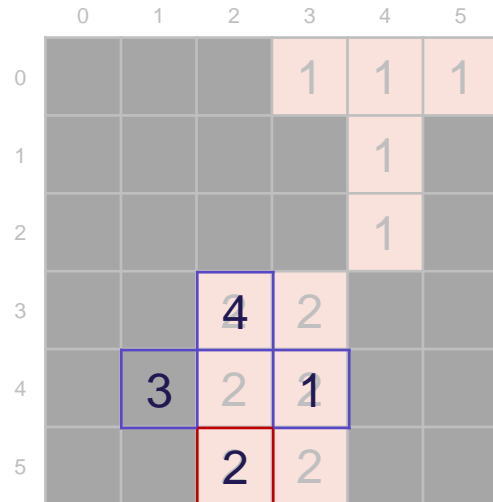


```
current_id = 2
```

```
burn_queue = [
    (2, 4)
    (2, 4)
]
```



Implementing grassfire using a queue

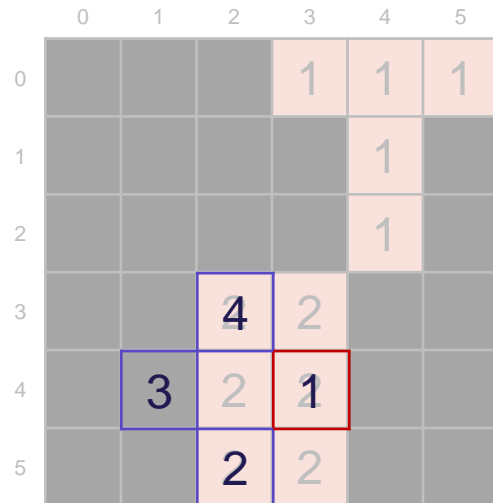


```
current_id = 2
```

```
burn_queue = [  
    (2, 4)  
    (2, 4)  
]
```



Implementing grassfire using a queue

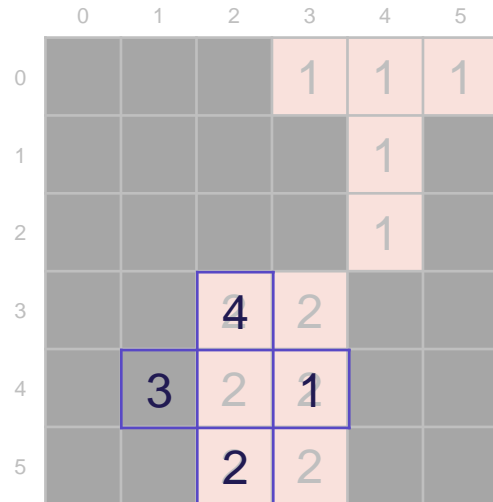


```
current_id = 2
```

```
burn_queue = [
    (2, 4)
    (2, 4)
]
```



Implementing grassfire using a queue

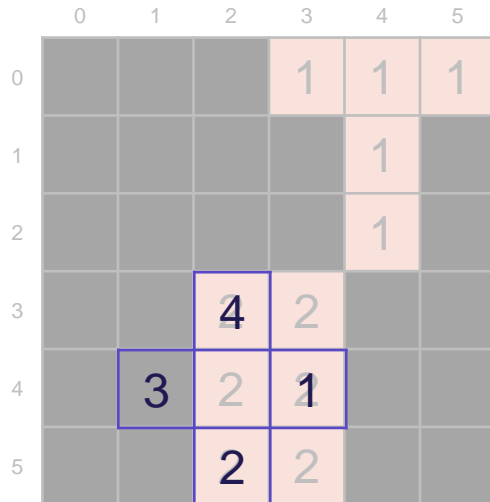


```
current_id = 2
```

```
burn_queue = [
    (2, 4)
    (2, 4)
]
```



Implementing grassfire using a queue

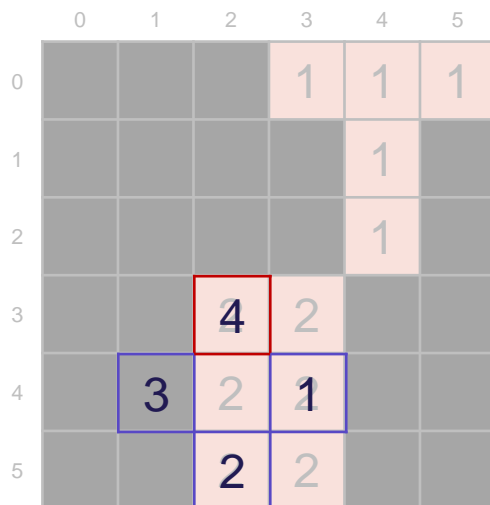


```
current_id = 2
```

```
burn_queue = [  
    (2, 4)  
]
```



Implementing grassfire using a queue

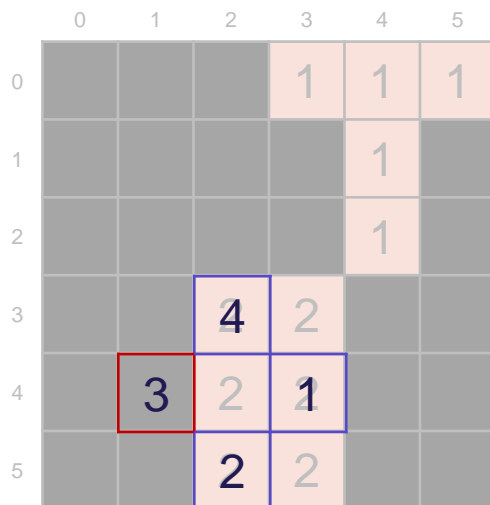


```
current_id = 2
```

```
burn_queue = [  
    (2, 4)  
]
```



Implementing grassfire using a queue

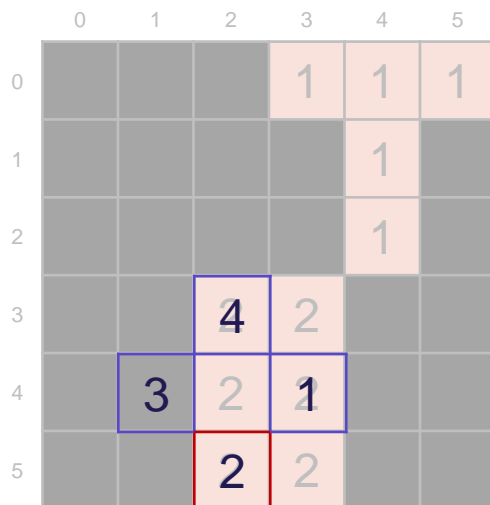


```
current_id = 2
```

```
burn_queue = [  
    (2, 4)  
]
```



Implementing grassfire using a queue

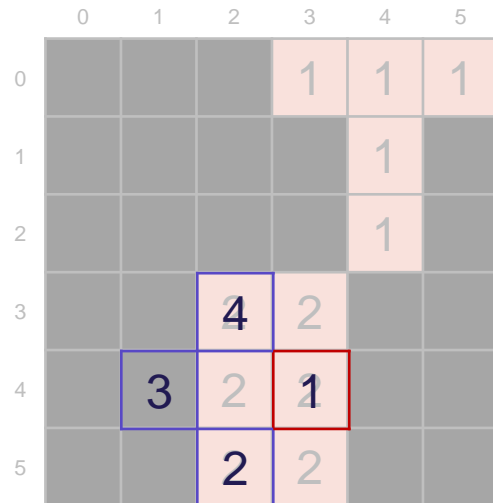


```
current_id = 2
```

```
burn_queue = [  
    (2, 4)  
]
```



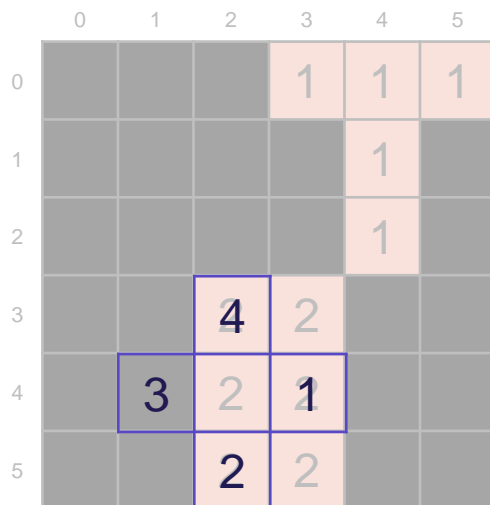
Implementing grassfire using a queue



```
current_id = 2
```

```
burn_queue = [
    (2, 4)
]
```

Implementing grassfire using a queue

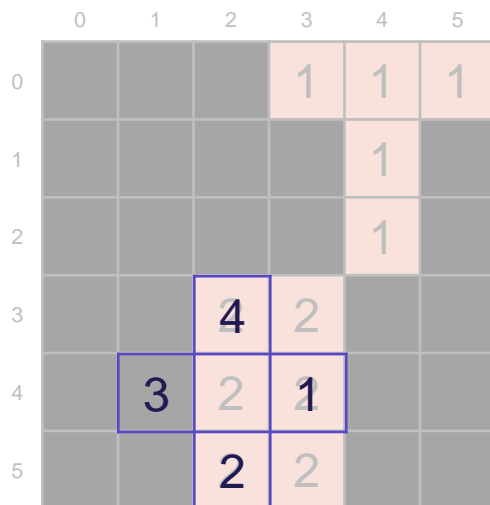


```
current_id = 2
```

```
burn_queue = [  
    (2, 4)  
]
```



Implementing grassfire using a queue

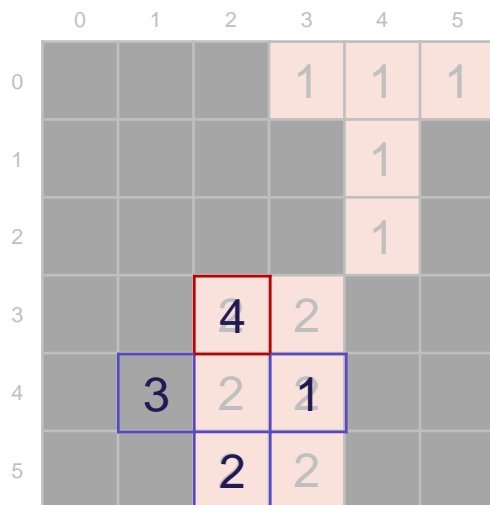


```
current_id = 2
```

```
burn_queue = [  
  
]
```



Implementing grassfire using a queue

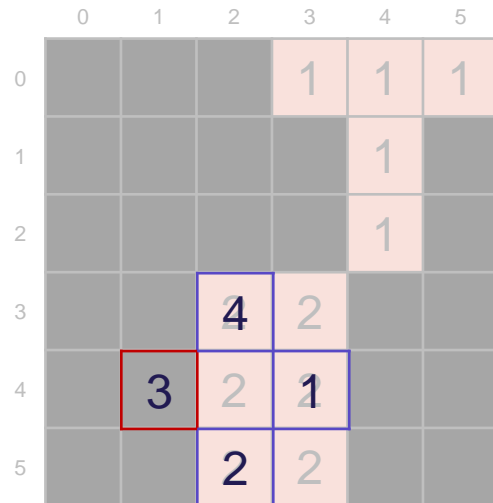


```
current_id = 2
```

```
burn_queue = [  
  
]
```



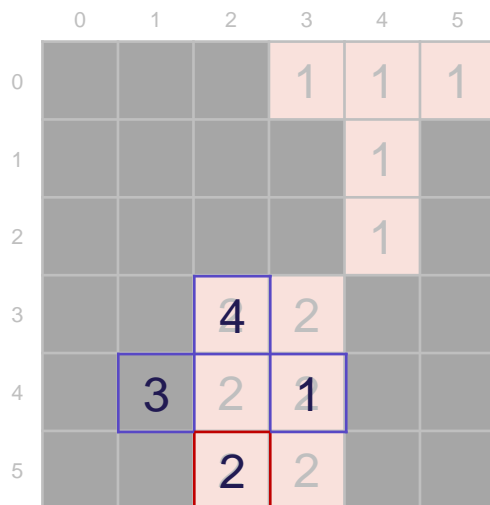
Implementing grassfire using a queue



```
current_id = 2
```

```
burn_queue = [
]
```

Implementing grassfire using a queue

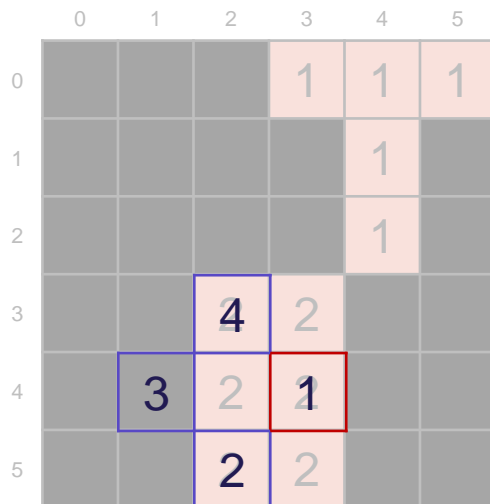


```
current_id = 2
```

```
burn_queue = [  
  
]
```



Implementing grassfire using a queue

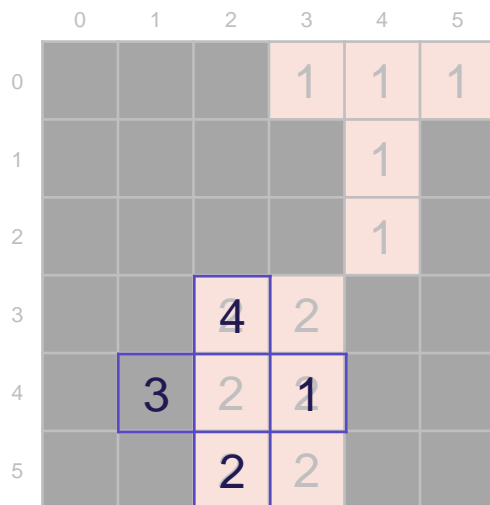


```
current_id = 2
```

```
burn_queue = [  
  
]
```



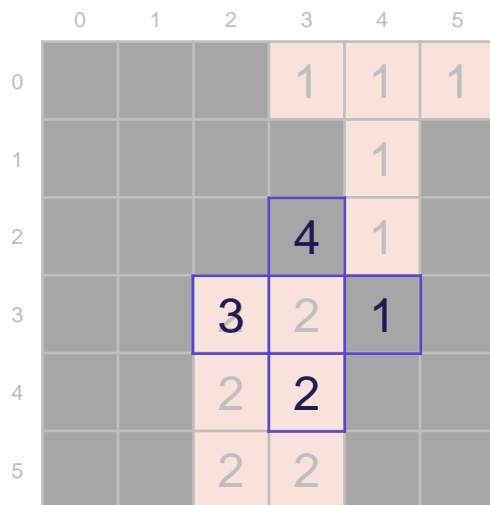
Implementing grassfire using a queue



current_id = 2
 burn_queue = []
 Empty!
 Jump back!



Implementing grassfire using a queue

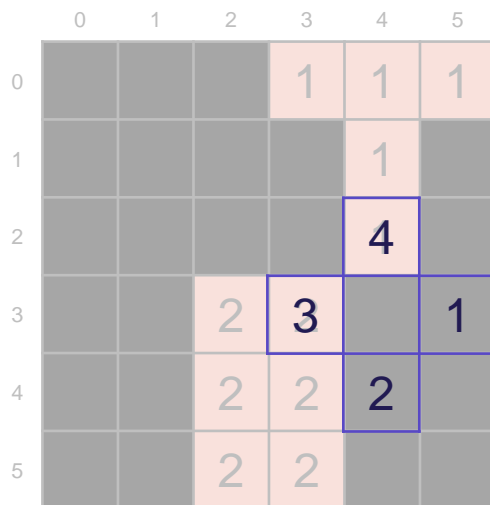


```
current_id = 3
```

```
burn_queue = [  
  
]
```



Implementing grassfire using a queue

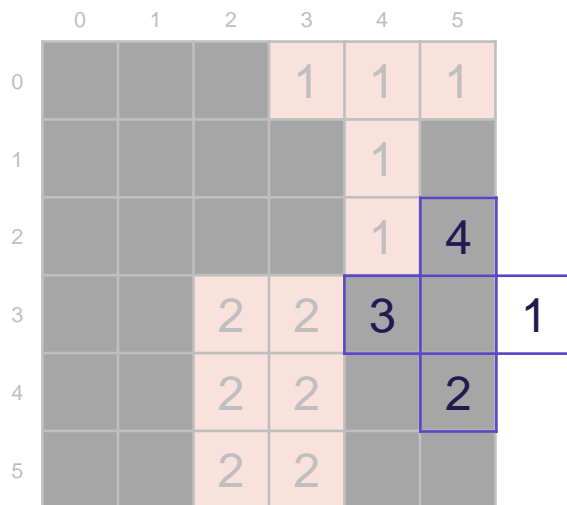


```
current_id = 3
```

```
burn_queue = [  
  
]
```



Implementing grassfire using a queue

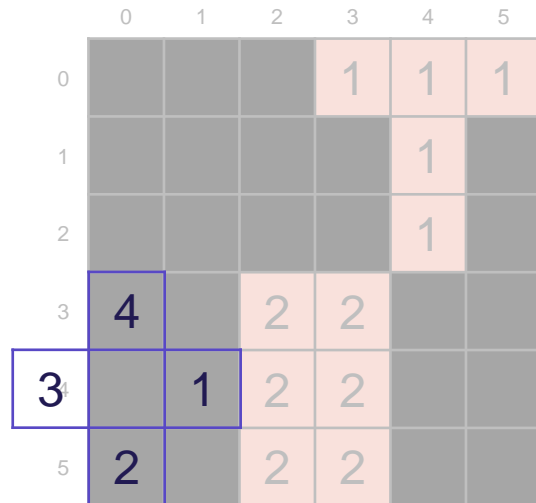


```
current_id = 3
```

```
burn_queue = [  
  
]
```



Implementing grassfire using a queue

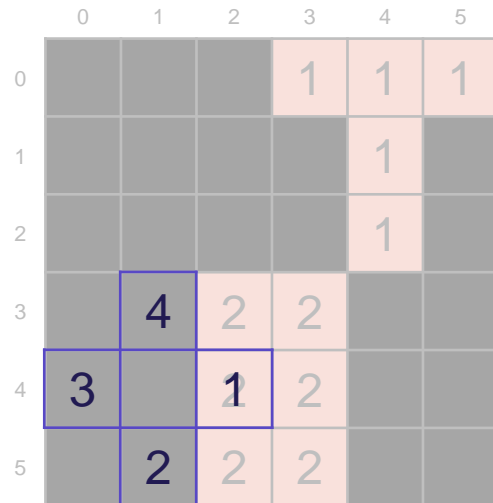


```
current_id = 3
```

```
burn_queue = [
]
```



Implementing grassfire using a queue

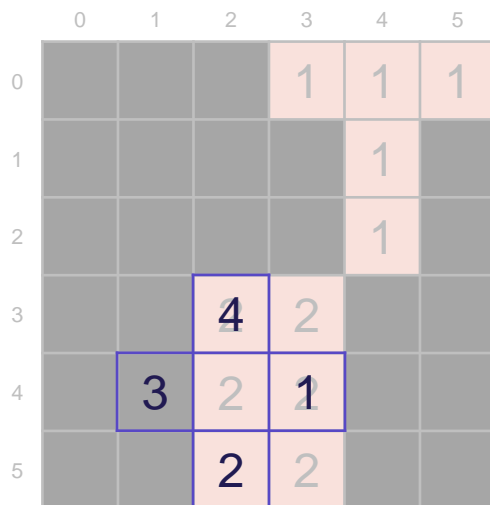


```
current_id = 3
```

```
burn_queue = [  
  
]
```



Implementing grassfire using a queue

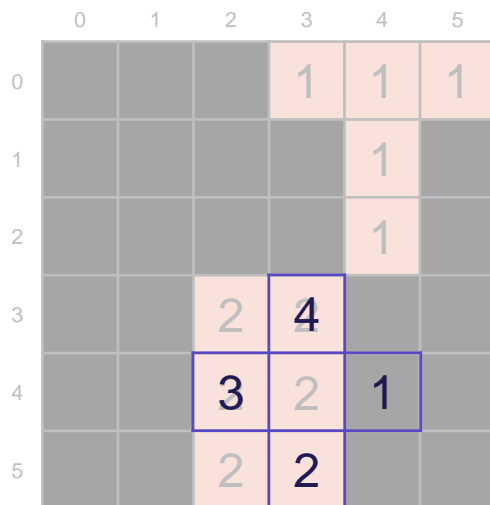


```
current_id = 3
```

```
burn_queue = [  
  
]
```



Implementing grassfire using a queue



```
current_id = 3
```

```
burn_queue = [  
  
]
```



Implementing grassfire using a queue

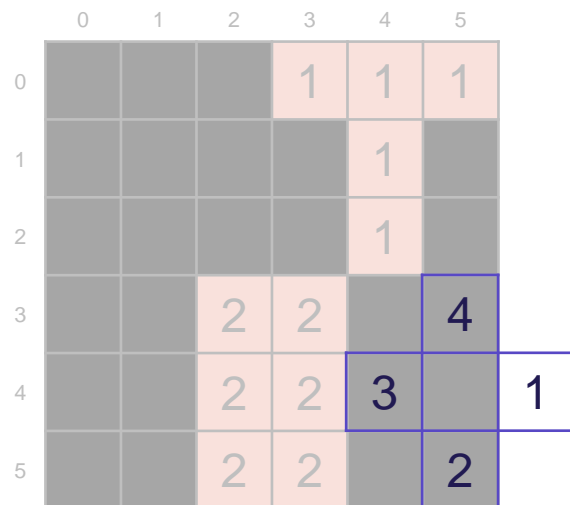
	0	1	2	3	4	5
0				1	1	1
1					1	
2					1	
3			2	2	4	
4			2	3		1
5			2	2	2	

```
current_id = 3
```

```
burn_queue = [  
  
]
```



Implementing grassfire using a queue

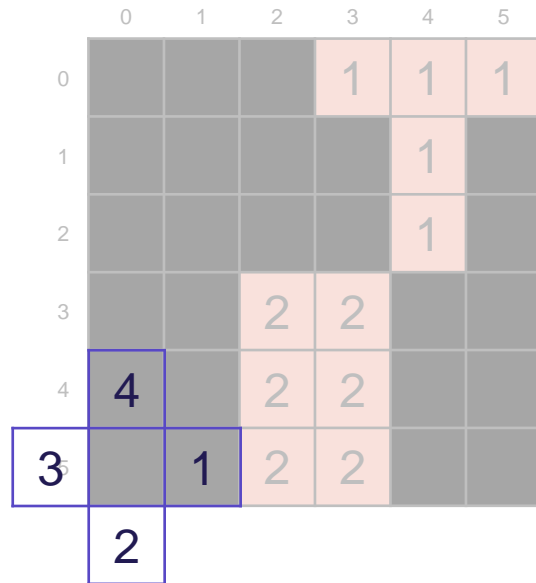


```
current_id = 3
```

```
burn_queue = [  
  
]
```



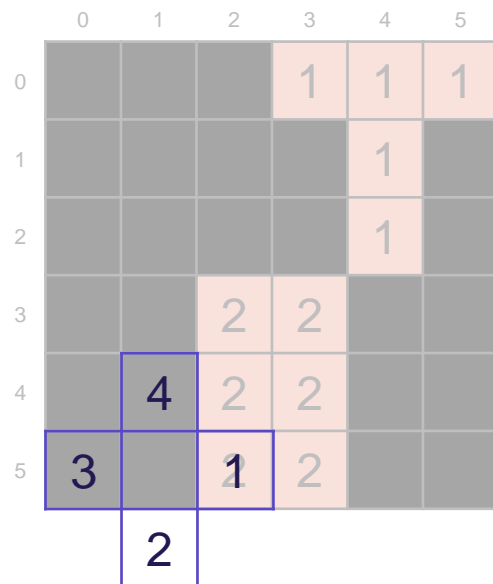
Implementing grassfire using a queue



```
current_id = 3
```

```
burn_queue = [
]
```

Implementing grassfire using a queue

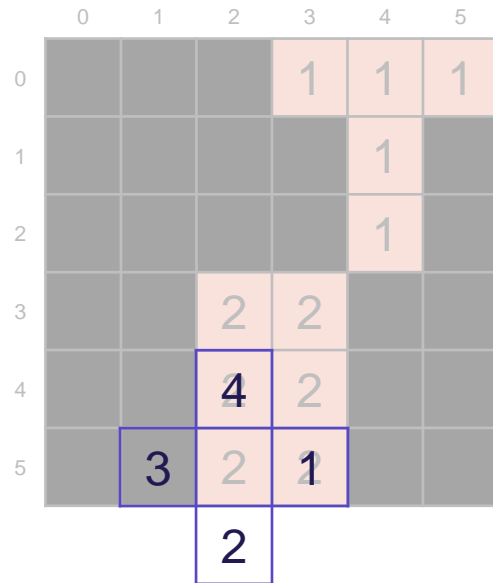


```
current_id = 3
```

```
burn_queue = [
]
```



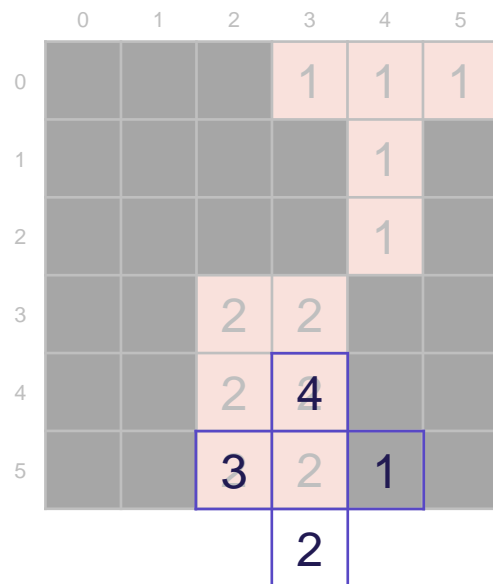
Implementing grassfire using a queue



```
current_id = 3
```

```
burn_queue = [
]
```

Implementing grassfire using a queue



```
current_id = 3
```

```
burn_queue = [  
  
]
```



Implementing grassfire using a queue

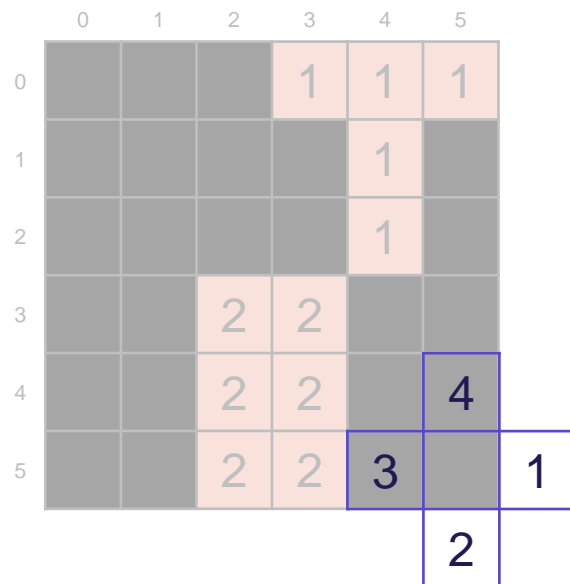


```
current_id = 3
```

```
burn_queue = [
]
```



Implementing grassfire using a queue

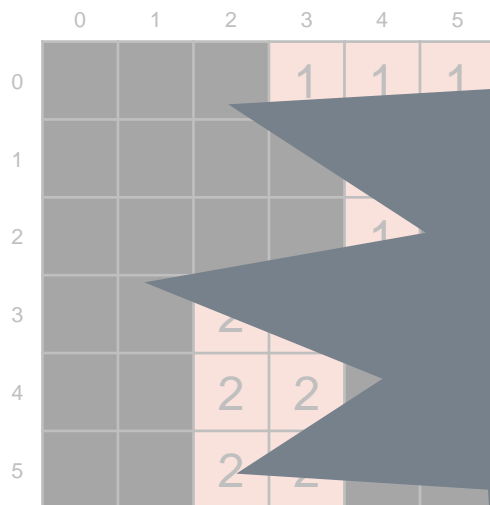


```
current_id = 3
```

```
burn_queue = [  
  
]
```



Implementing grassfire using a queue



Done!





Implementing grassfire using a queue

```
# Loop over pixels
    # For each pixel call ignite_fire(...)

def ignite_fire(...):
    # Create burn_queue deque to keep track of positions to burn
    # If object pixel, add starting point to deque
    while len(burn_queue) > 0:
        current_pos = burn_queue.pop()
        # Burn current_pos with current id
        # Add connections to burn_queue
```

