```
forest
                                  b
                              0 0 0 0 0
     0 0 0 0 0
     0 0 2 0 2 0
                              0 0 1 0 1 0
     0 2 1 0 0 0
                              0 1 0 0 0 0
     0 0 1 2 2 0
                              0 0 0 1 1 0
     0 1 0 1 2 0
                              0 0 0 0 1 0
     0 0 0 0 0 0
                              0 0 0 0 0
# count the number of burning neighbors at each site
nb = np.roll(b, 1, axis=0) + np.roll(b, -1, axis=0) + np.roll(b, 1, axis=1) + np.roll(b, -1, axis=1)
                              0 0 1 0 1 0
                              0 1 0 0 0 0
                              0 0 0 1 1 0
                              0 0 0 0 1 0
                              0 0 0 0 0
                              0 0 0 0 0 0
                                                                                                             Technical note:
                                                                                        nb
                                     axis=1
                                                                               (neighbors burning)
                                                                                                             np.roll does actually wrap
                                                                                                             around the boundaries of
                              0 0 0 0 0 0
           0 0 0 0 0
                                                   0 0 0 0 0
                                                                                    0 0 1 0 1 0
                              0 0 1 0 1 0
           0 1 0 1 0 0
                                                   0 0 0 1 0 1
                                                                                    0 2 0 2 0 1
                                                                                                             the array, but since we
                                                                 add all 4 rolls
                                                   0 0 1 0 0 0
                                                                                   1 0 2 1 2 0
                              0 1 0 0 0 0
           1 0 0 0 0 0
                                                                                                             will zero out the forest
                              0 0 0 1 1 0
                                                   0 0 0 0 1 1
           0 0 1 1 0 0
                                                                                    0 1 1 1 2 1
           0 0 0 1 0 0 axis=0
                                            axis=0
                              0 0 0 0 1 0
                                                  0 0 0 0 0 1
                                                                                    0 0 0 2 1 1
                                                                                                             array on those boundaries
           0 0 0 0 0
                                                   0 0 0 0 0 0
                                                                                    0 0 0 0 1 0
                              0 0 0 0 0
                                                                                                             anyway, it doesn't affect
                                                                                                             the overall calculation
                                     axis=1
                              0 0 0 0 0
```

return an array with a 1 everywhere the forest has a tree and at least 1 neighbor is burning return np.where((forest == 1) * (nb > 0) , 1, 0)

forest	nb	to_burn
0 0 0 0 0	0 0 1 0 1 0	0 0 0 0 0
0 0 2 0 2 0	0 2 0 2 0 1	0 0 0 0 0
0 2 1 0 0 0	1 0 2 1 2 0	001000
0 0 1 2 2 0	0 1 1 1 2 1	0 0 1 0 0 0
0 1 0 1 2 0	0 0 0 2 1 1	0 0 0 1 0 0
0 0 0 0 0 0	0 0 0 0 1 0	0 0 0 0 0

0 0 0 0 0

0 0 1 0 1 0

0 1 0 0 0 0

0 0 0 1 1 0

0 0 0 0 1 0

identify everywhere the forest is burning

b = np.where(forest == 2, 1, 0)