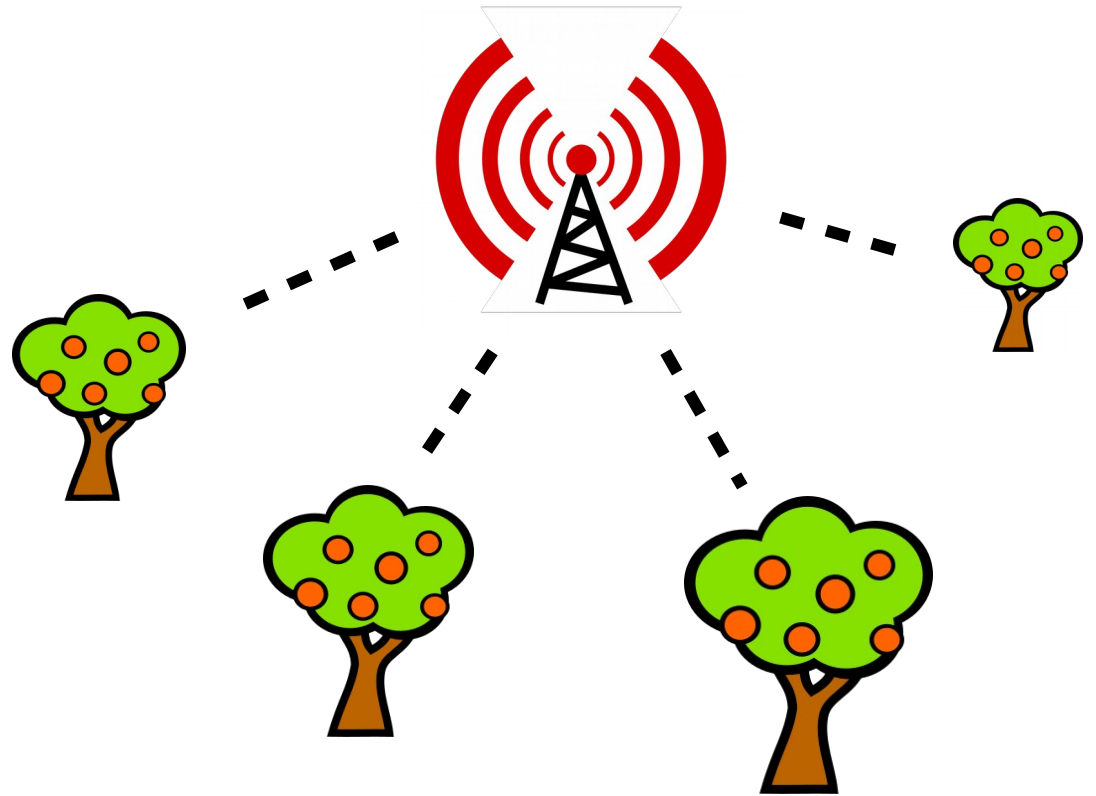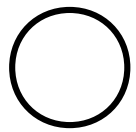# CS 470
Spring 2019

Mike Lam, Professor
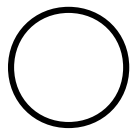
Broadcast Trees
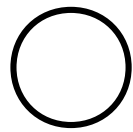
Broadcasting

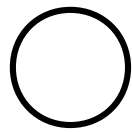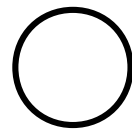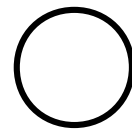0　　1　　2　　3　　4　　5　　6　　7
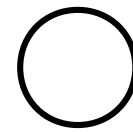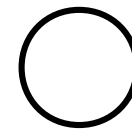
Broadcasting

Broadcasting
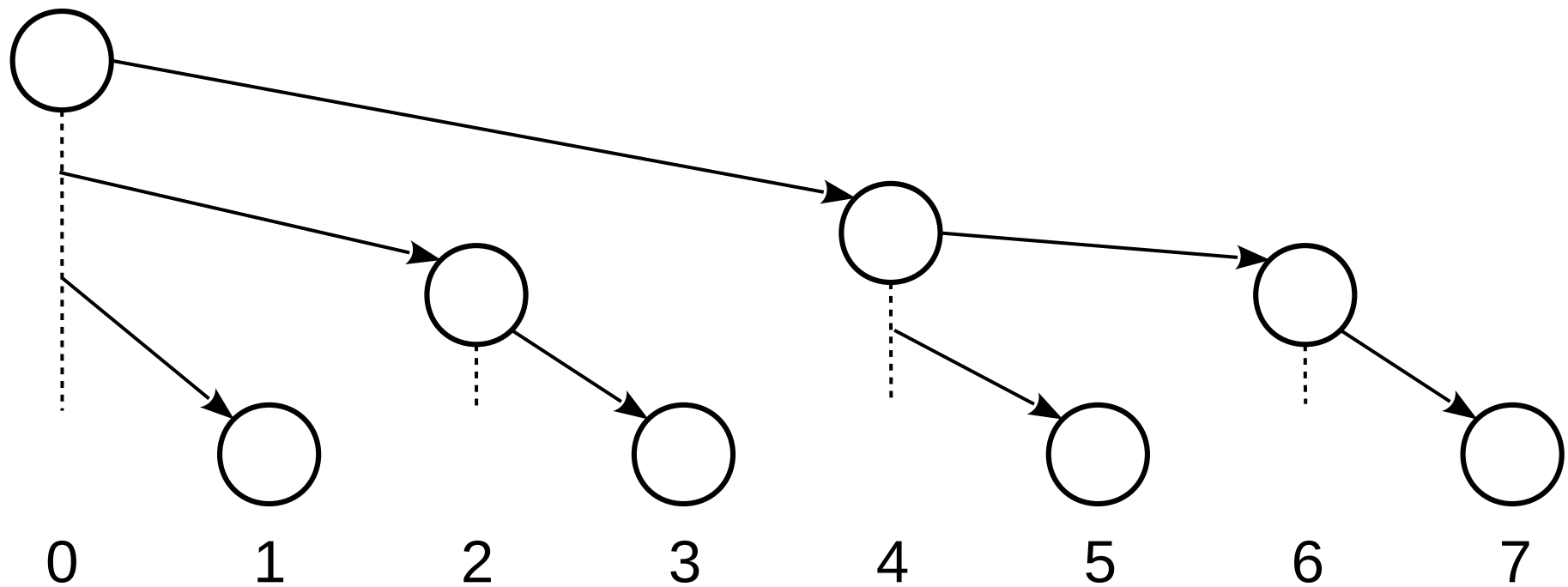
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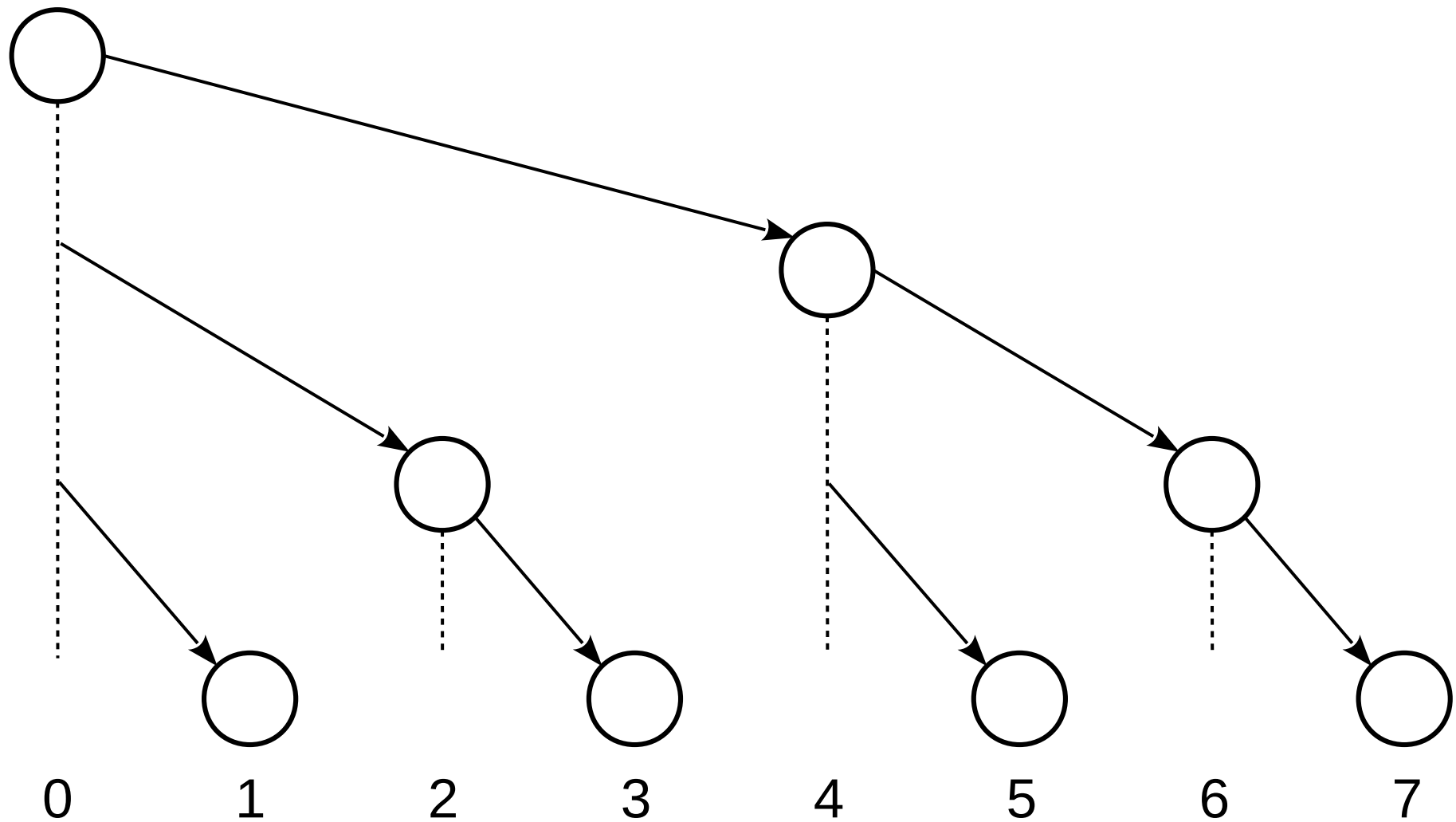
Broadcasting

Broadcasting

Aside: Binomial Trees

Diagram from `https://en.wikipedia.org/wiki/Binomial_heap`
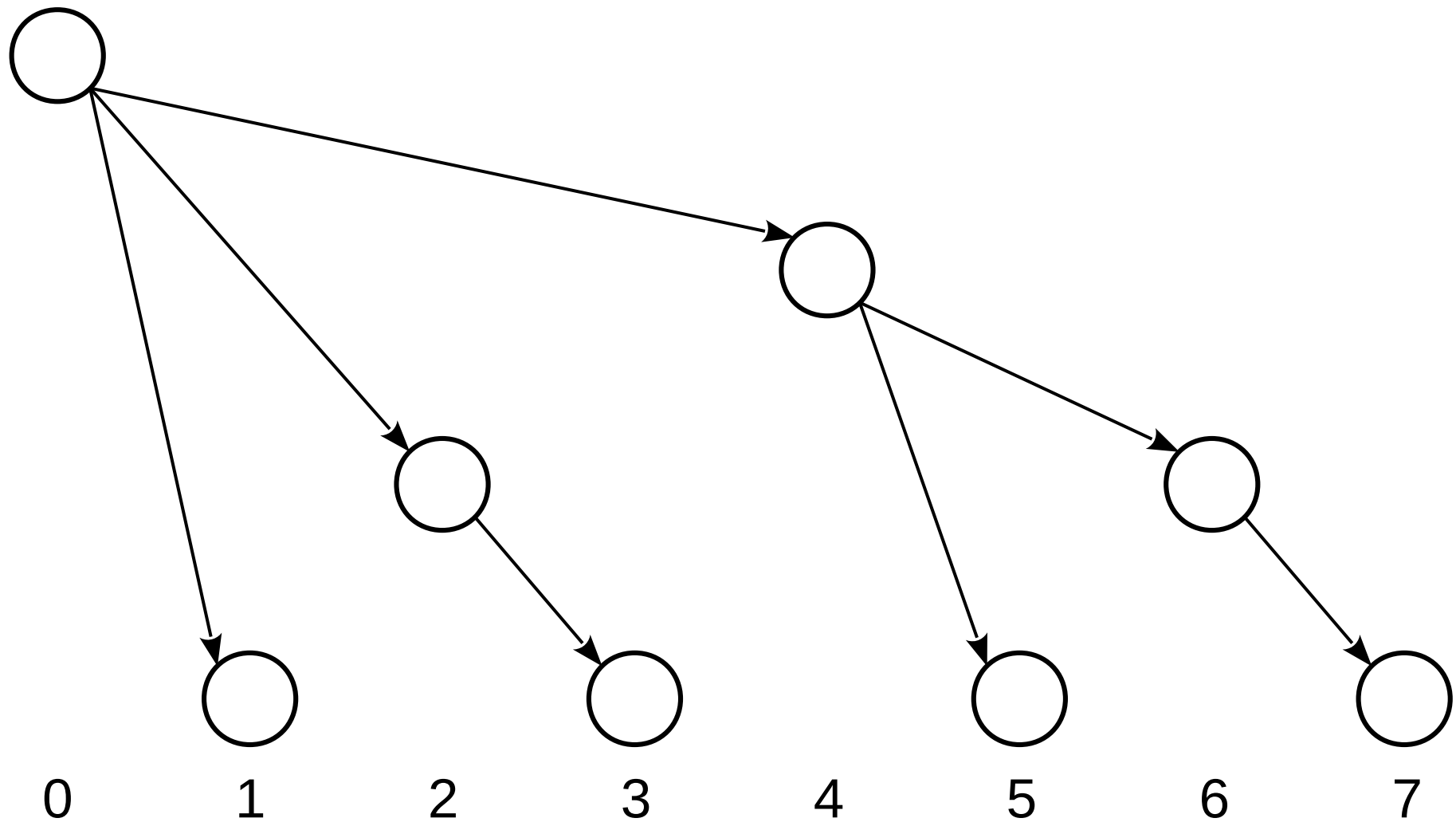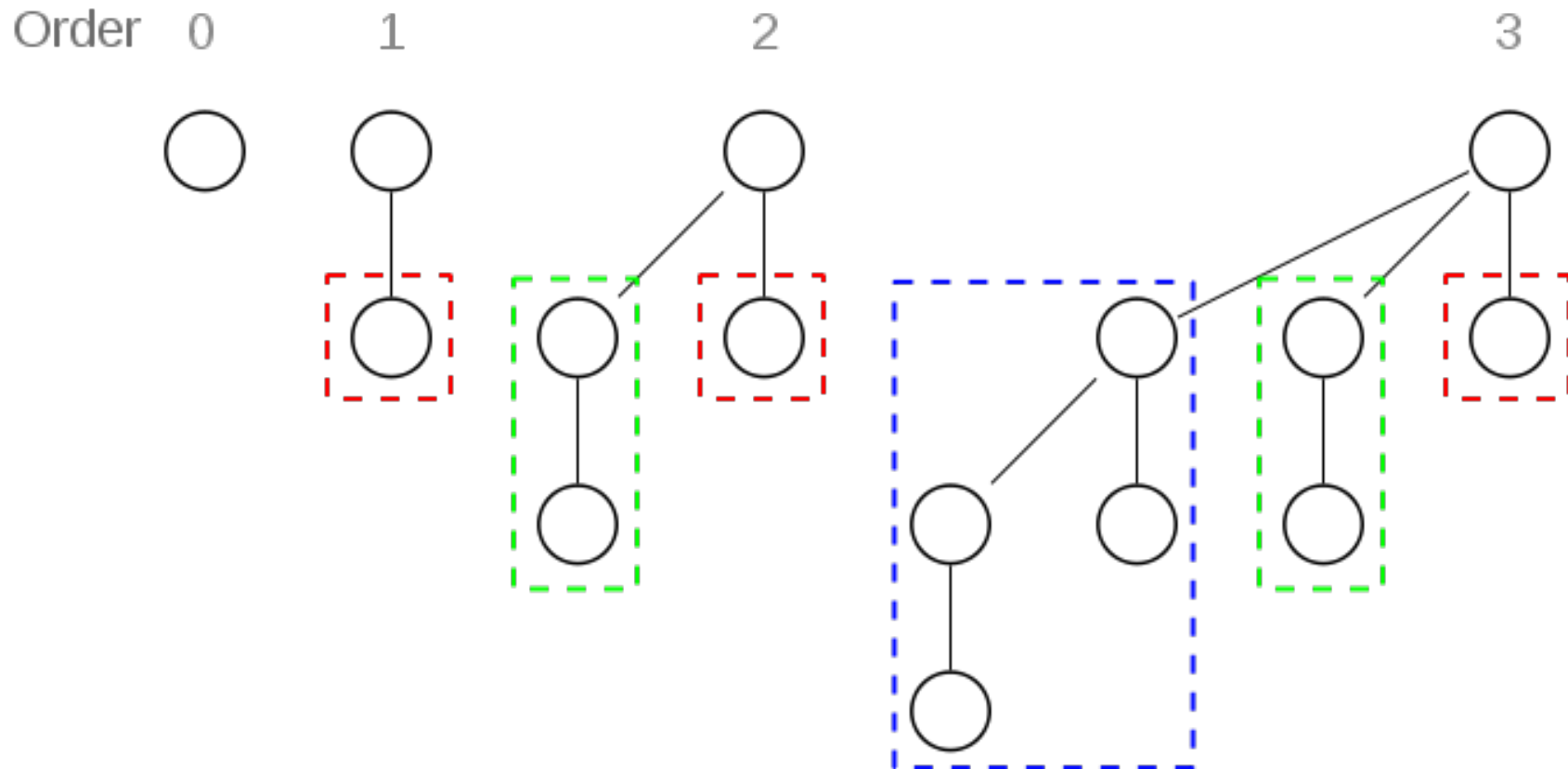
Binomial Trees
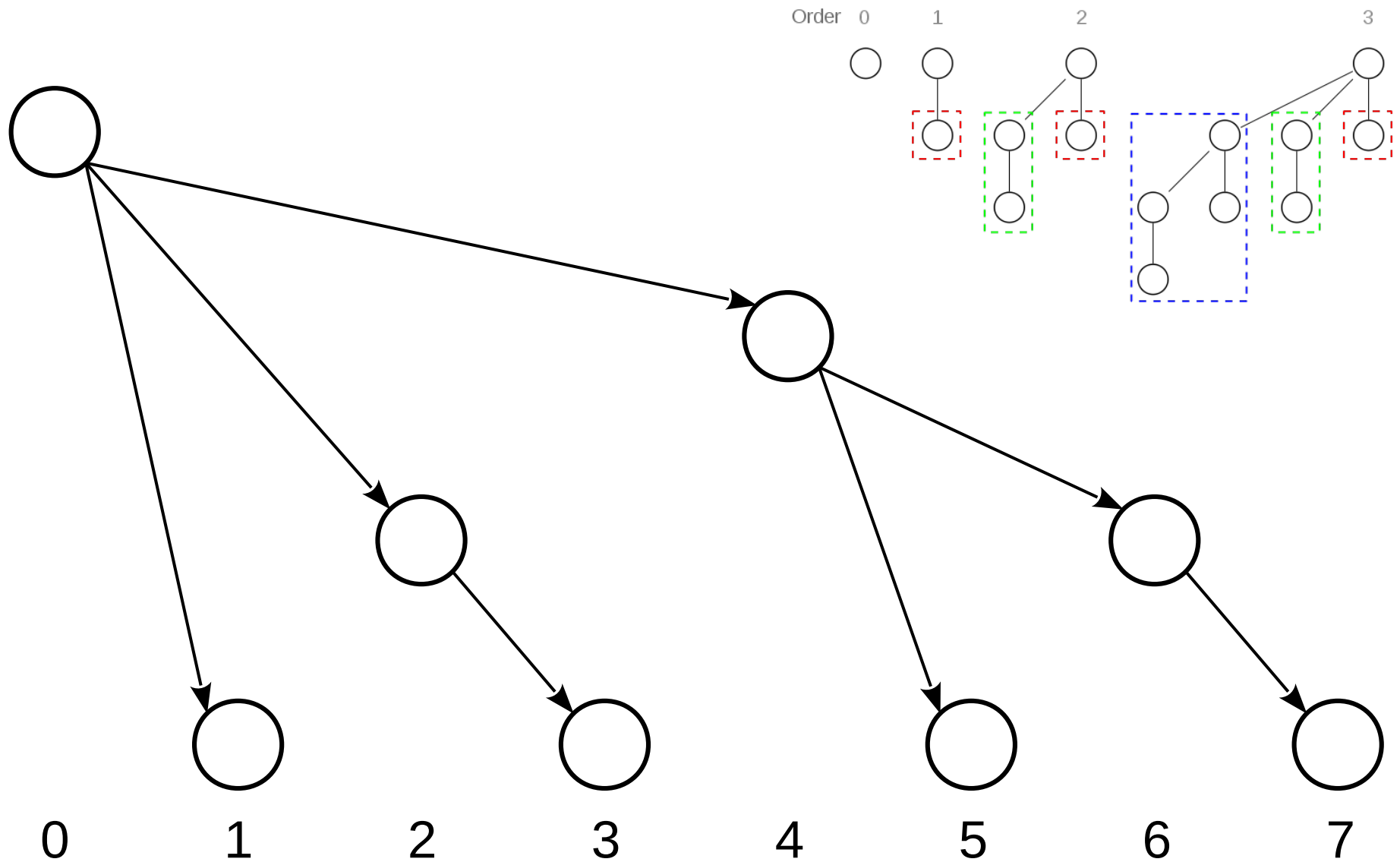
Binomial Trees
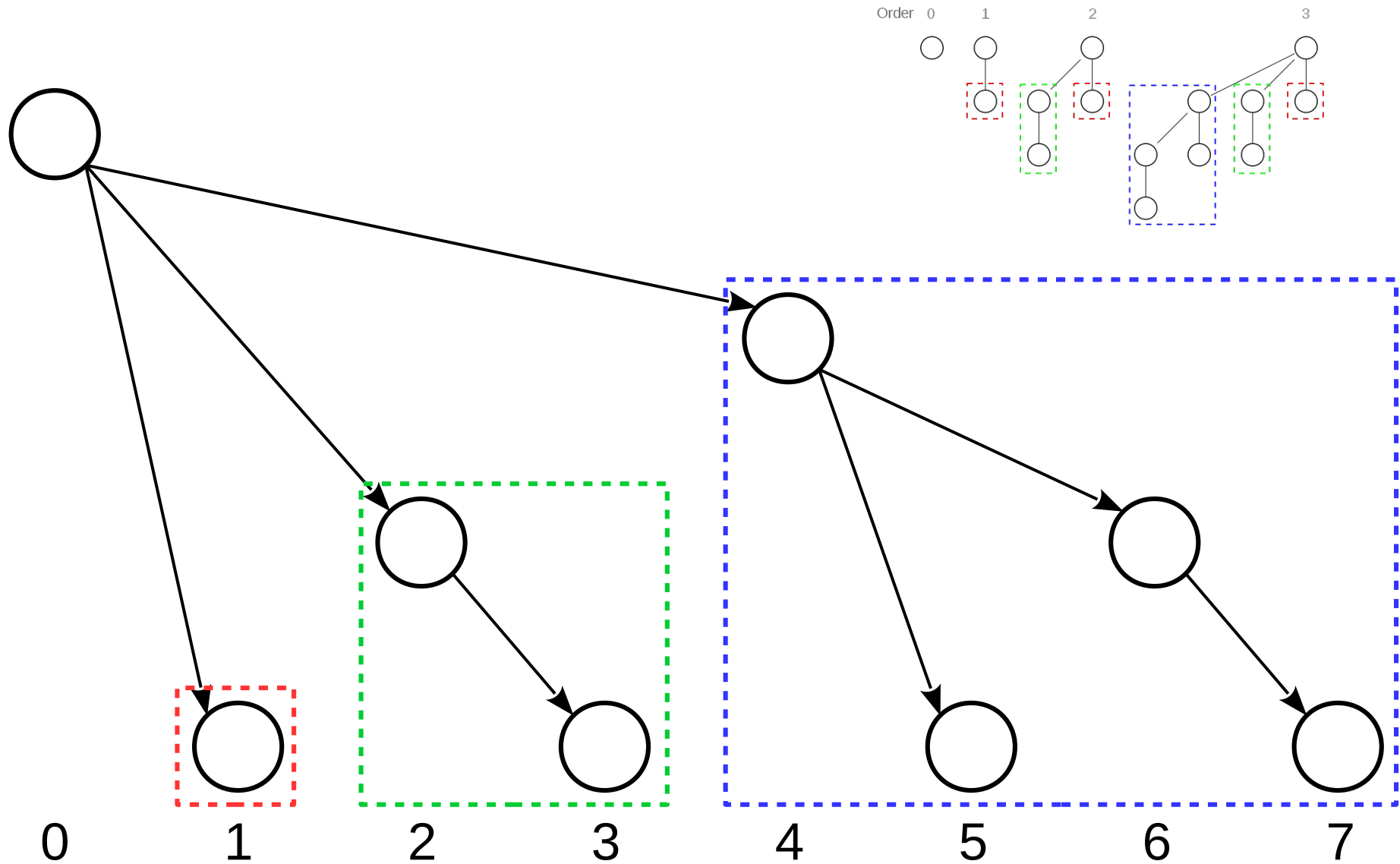
Broadcasting

How do we implement this?

0   1   2   3   4   5   6   7

Broadcasting

Broadcasting

```
000 sends to 100, 010, 001        001 receives from 000
010 sends to 011                  010 receives from 000
100 sends to 110, 101             011 receives from 010
110 sends to 111                  100 receives from 000
                                  101 receives from 100
                                  110 receives from 100
                                  111 receives from 110
```
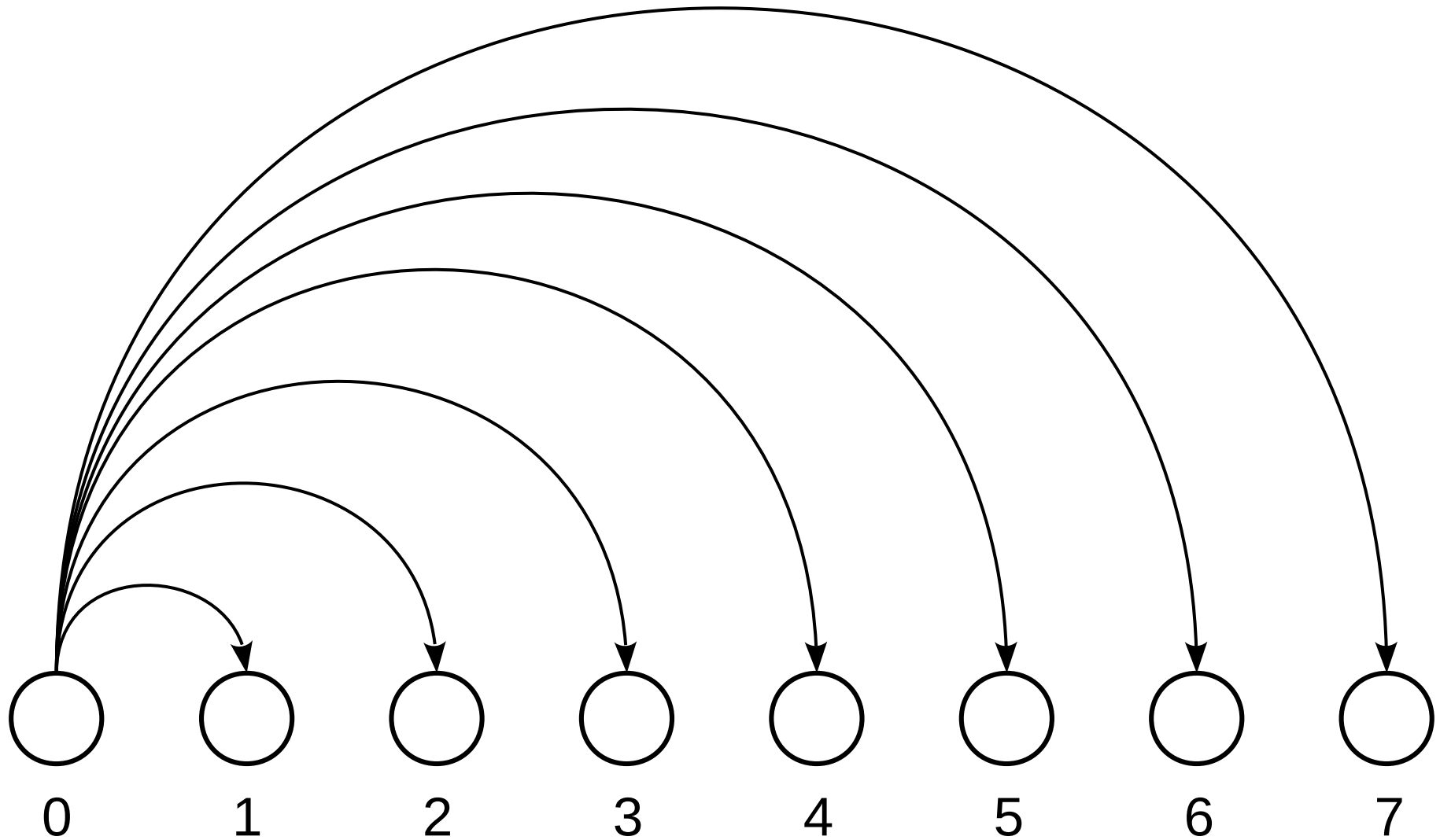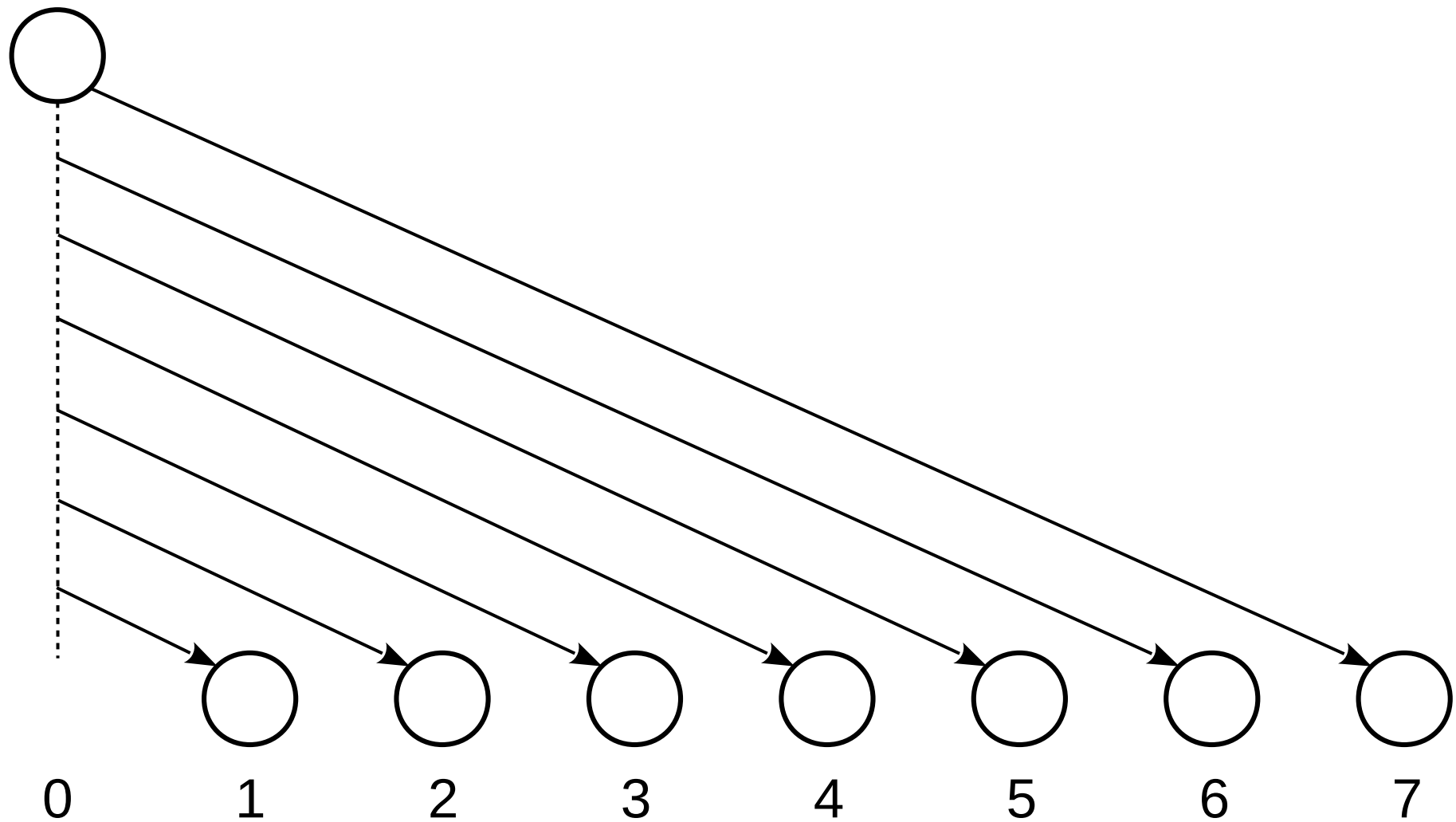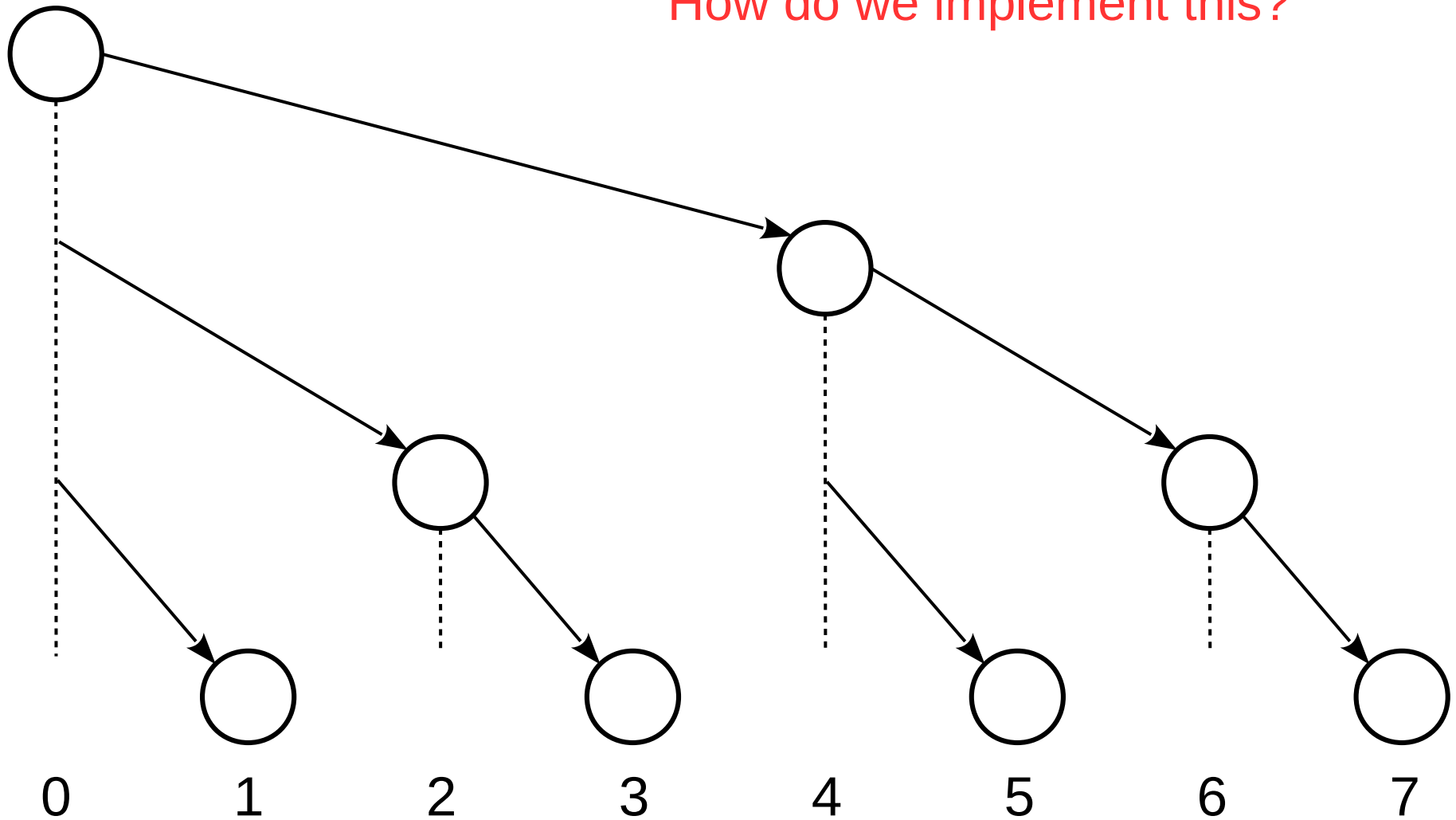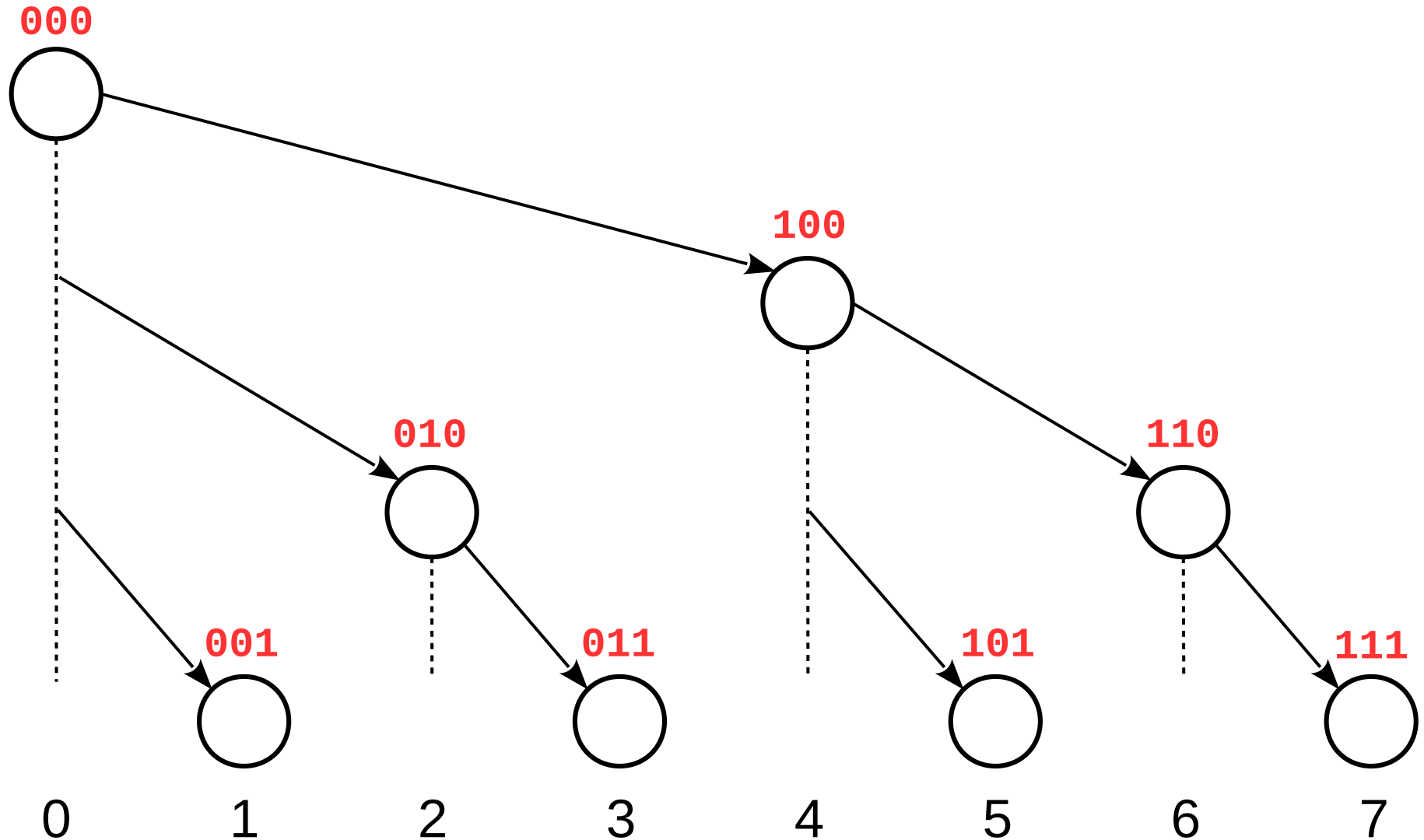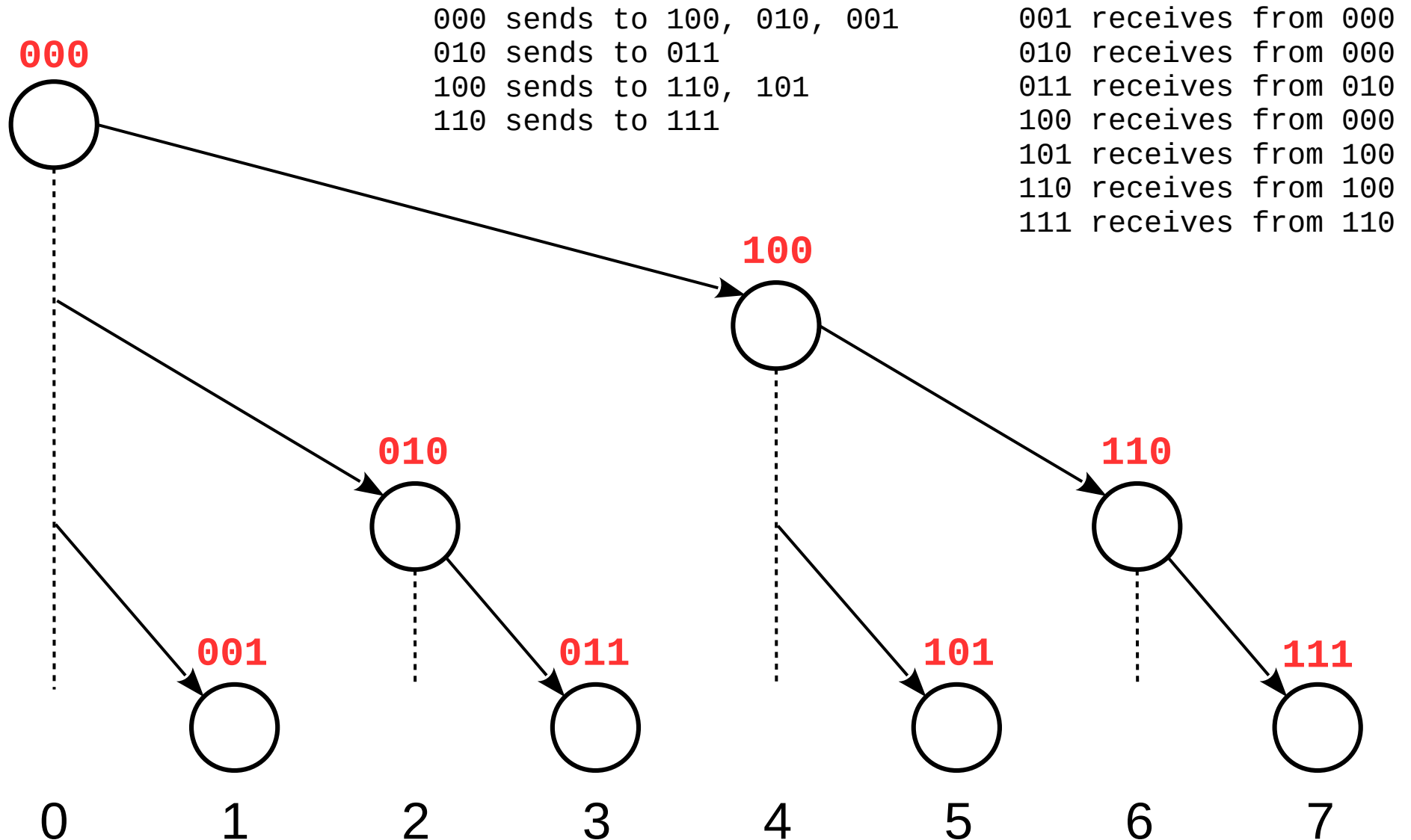
Broadcasting

```
0000 sends to 1000, 0100, 0010, 0001        0001 receives from 0000
0010 sends to 0011                           0010 receives from 0000
0100 sends to 0110, 0101                     0011 receives from 0010
0110 sends to 0111                           0100 receives from 0000
1000 sends to 1100, 1010, 1001               0101 receives from 0100
1010 sends to 1011                           0110 receives from 0100
1100 sends to 1110, 1101                     0111 receives from 0110
1110 sends to 1111                           1000 receives from 0000
                                             1001 receives from 1000
                                             1010 receives from 1000
                                             1011 receives from 1010
                                             1100 receives from 1000
                                             1101 receives from 1100
                                             1110 receives from 1100
                                             1111 receives from 1110
```


0   1   2   3   4   5   6   7   8   9   10   11   12   13   14   15
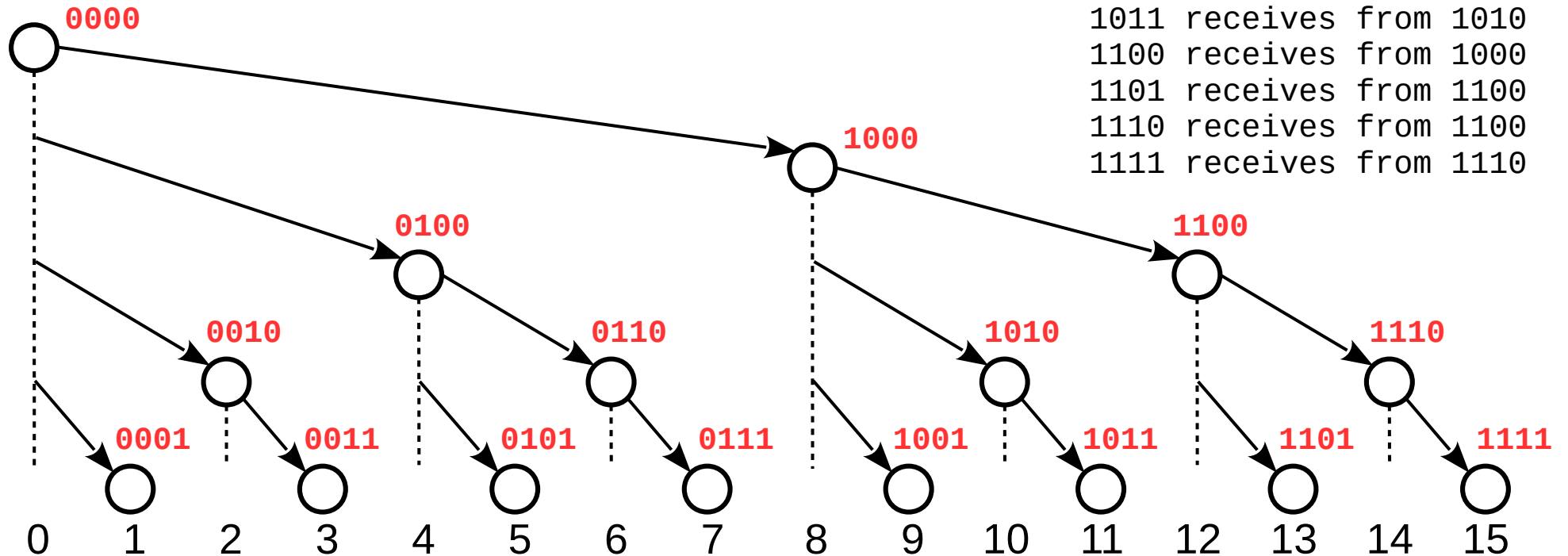
Tree-based broadcast lab

- Source in `/shared/cs470/mpi-tree`

- See comments in `tree.c` for instructions

- Not graded – this is to help you with P2