Starting Byzantine, ID: 0 Starting Byzantine, ID: 1 Starting Byzantine, ID: 2 Starting Byzantine, ID: 3 ID: 3 | Traitor: true | Type: O Starting Byzantine, ID: 4 <-- RECEIVED: N Value: 1 Round: 1 ID: 0 Ready to broadcast! <-- RECEIVED: N Value: 1 Round: 1 ID: 0 I, byzantine 0 have received: 2 messages ---> BROADCAST: N Value: 1 Round: 1 ID: 0 <-- RECEIVED: N Value: 1 Round: 1 ID: 1 Ready to broadcast! <-- RECEIVED: N Value: 1 Round: 1 ID: 0 I, byzantine 0 have received: 3 messages ---> BROADCAST: N Value: 1 Round: 1 ID: 1 <-- RECEIVED: N Value: 1 Round: 1 ID: 1 I, byzantine 1 have received: 2 messages ---> BROADCAST: N Value: 1 Round: 1 ID: 1 <-- RECEIVED: N Value: 1 Round: 1 ID: 2 Ready to broadcast! <-- RECEIVED: N Value: 1 Round: 1 ID: 0 I, byzantine 0 have received: 4 messages ---> BROADCAST: N Value: 1 Round: 1 ID: 2 <-- RECEIVED: N Value: 1 Round: 1 ID: 1 I, byzantine 1 have received: 3 messages ---> BROADCAST: N Value: 1 Round: 1 ID: 2 <-- RECEIVED: N Value: 1 Round: 1 ID: 2 I, byzantine 2 have received: 2 messages ---> BROADCAST: N Value: 1 Round: 1 ID: 2 <-- RECEIVED: N Value: 1 Round: 1 ID: 3 Ready to broadcast! <-- RECEIVED: N Value: 0 Round: 1 ID: 0 I, byzantine 0 have received: 5 messages <-- RECEIVED: P Value: 1 Round: 1 ID: 0 ---> BROADCAST: P Value: 1 Round: 1 ID: 0 <-- RECEIVED: P Value: 1 Round: 1 ID: 1 ---> BROADCAST: P Value: 1 Round: 1 ID: 0 <-- RECEIVED: P Value: 1 Round: 1 ID: 2 ---> BROADCAST: P Value: 1 Round: 1 ID: 0 <-- RECEIVED: P Value: 1 Round: 1 ID: 3 ---> BROADCAST: P Value: 1 Round: 1 ID: 0 <-- RECEIVED: P Value: 1 Round: 1 ID: 4 ---> BROADCAST: P Value: 1 Round: 1 ID: 0 ---> BROADCAST: N Value: 0 Round: 1 ID: 3 <-- RECEIVED: N Value: 0 Round: 1 ID: 1 I, byzantine 1 have received: 4 messages ---> BROADCAST: N Value: 0 Round: 1 ID: 3 <-- RECEIVED: N Value: 0 Round: 1 ID: 2 I, byzantine 2 have received: 3 messages ---> BROADCAST: N Value: 0 Round: 1 ID: 3 <-- RECEIVED: N Value: 0 Round: 1 ID: 3 I, byzantine 3 have received: 2 messages

---> BROADCAST: N Value: 0 Round: 1 ID: 3

<-- RECEIVED: N Value: 0 Round: 1 ID: 0 I, byzantine 0 have received: 6 messages <-- RECEIVED: P Value: 1 Round: 1 ID: 0 ---> BROADCAST: P Value: 1 Round: 1 ID: 0 <-- RECEIVED: P Value: 1 Round: 1 ID: 1 ---> BROADCAST: P Value: 1 Round: 1 ID: 0 <-- RECEIVED: P Value: 1 Round: 1 ID: 2 ---> BROADCAST: P Value: 1 Round: 1 ID: 0 <-- RECEIVED: P Value: 1 Round: 1 ID: 3 ---> BROADCAST: P Value: 1 Round: 1 ID: 0 <-- RECEIVED: P Value: 1 Round: 1 ID: 4 ---> BROADCAST: P Value: 1 Round: 1 ID: 0 ---> BROADCAST: N Value: 0 Round: 1 ID: 4 <-- RECEIVED: N Value: 0 Round: 1 ID: 1 I, byzantine 1 have received: 5 messages <-- RECEIVED: P Value: -1 Round: 1 ID: 0 ---> BROADCAST: P Value: -1 Round: 1 ID: 1 <-- RECEIVED: P Value: -1 Round: 1 ID: 1 ---> BROADCAST: P Value: -1 Round: 1 ID: 1 <-- RECEIVED: P Value: -1 Round: 1 ID: 2 ---> BROADCAST: P Value: -1 Round: 1 ID: 1 <-- RECEIVED: P Value: -1 Round: 1 ID: 3 ---> BROADCAST: P Value: -1 Round: 1 ID: 1 <-- RECEIVED: P Value: -1 Round: 1 ID: 4 ---> BROADCAST: P Value: -1 Round: 1 ID: 1 ---> BROADCAST: N Value: 0 Round: 1 ID: 4 <-- RECEIVED: N Value: 0 Round: 1 ID: 2 I, byzantine 2 have received: 4 messages ---> BROADCAST: N Value: 0 Round: 1 ID: 4 <-- RECEIVED: N Value: 0 Round: 1 ID: 3 I, byzantine 3 have received: 3 messages ---> BROADCAST: N Value: 0 Round: 1 ID: 4 <-- RECEIVED: N Value: 0 Round: 1 ID: 4 I, byzantine 4 have received: 2 messages ---> BROADCAST: N Value: 0 Round: 1 ID: 4 I, byzantine 4 have received: 2 messages ---> BROADCAST: N Value: 0 Round: 1 ID: 3 I, byzantine 3 have received: 3 messages ---> BROADCAST: N Value: 1 Round: 1 ID: 2 <-- RECEIVED: N Value: 1 Round: 1 ID: 4 I, byzantine 4 have received: 3 messages ---> BROADCAST: N Value: 1 Round: 1 ID: 2 I, byzantine 2 have received: 4 messages ---> BROADCAST: N Value: 1 Round: 1 ID: 1 <-- RECEIVED: N Value: 1 Round: 1 ID: 3 I, byzantine 3 have received: 4 messages ---> BROADCAST: N Value: 1 Round: 1 ID: 1 <-- RECEIVED: N Value: 1 Round: 1 ID: 4 I, byzantine 4 have received: 4 messages ---> BROADCAST: N Value: 1 Round: 1 ID: 1 I, byzantine 1 have received: 5 messages <-- RECEIVED: P Value: -1 Round: 1 ID: 0 ---> BROADCAST: P Value: -1 Round: 1 ID: 1 <-- RECEIVED: P Value: -1 Round: 1 ID: 1 ---> BROADCAST: P Value: -1 Round: 1 ID: 1

<-- RECEIVED: N Value: 0 Round: 1 ID: 4

Ready to broadcast!

```
<-- RECEIVED: P Value: -1 Round: 1 ID: 2
                                                                      << DECIDED >> byzantine 4, value: 0
---> BROADCAST: P Value: -1 Round: 1 ID: 1
                                                                      ---> BROADCAST: P Value: -1 Round: 1 ID: 4
<-- RECEIVED: P Value: -1 Round: 1 ID: 3
                                                                      ---> BROADCAST: N Value: 1 Round: 1 ID: 0
---> BROADCAST: P Value: -1 Round: 1 ID: 1
                                                                      I, byzantine 0 have received: 6 messages
<-- RECEIVED: P Value: -1 Round: 1 ID: 4
                                                                      <-- RECEIVED: P Value: 1 Round: 1 ID: 0
---> BROADCAST: P Value: -1 Round: 1 ID: 1
                                                                      << DECIDED >> byzantine 0, value: 0
---> BROADCAST: N Value: 1 Round: 1 ID: 0
                                                                      ---> BROADCAST: P Value: 1 Round: 1 ID: 0
<-- RECEIVED: N Value: 1 Round: 1 ID: 2
                                                                      <-- RECEIVED: P Value: 1 Round: 1 ID: 1
I, byzantine 2 have received: 5 messages
                                                                      << DECIDED >> byzantine 1, value: 0
<-- RECEIVED: P Value: -1 Round: 1 ID: 0
                                                                      ---> BROADCAST: P Value: 1 Round: 1 ID: 0
                                                                      <-- RECEIVED: P Value: 1 Round: 1 ID: 2
<< DECIDED >> byzantine 0, value: 0
---> BROADCAST: P Value: -1 Round: 1 ID: 2
                                                                      << DECIDED >> byzantine 2, value: 0
<-- RECEIVED: P Value: -1 Round: 1 ID: 1
                                                                      ---> BROADCAST: P Value: 1 Round: 1 ID: 0
<< DECIDED >> byzantine 1, value: 0
                                                                      <-- RECEIVED: P Value: 1 Round: 1 ID: 3
---> BROADCAST: P Value: -1 Round: 1 ID: 2
                                                                      << DECIDED >> byzantine 3, value: 0
<-- RECEIVED: P Value: -1 Round: 1 ID: 2
                                                                      ---> BROADCAST: P Value: 1 Round: 1 ID: 0
<< DECIDED >> byzantine 2, value: 0
                                                                      <-- RECEIVED: P Value: 1 Round: 1 ID: 4
---> BROADCAST: P Value: -1 Round: 1 ID: 2
                                                                      << DECIDED >> byzantine 4, value: 0
<-- RECEIVED: P Value: -1 Round: 1 ID: 3
                                                                      ---> BROADCAST: P Value: 1 Round: 1 ID: 0
                                                                      ---> BROADCAST: N Value: 1 Round: 1 ID: 0
<< DECIDED >> byzantine 3, value: 0
---> BROADCAST: P Value: -1 Round: 1 ID: 2
                                                                      <-- RECEIVED: N Value: 1 Round: 1 ID: 1
<-- RECEIVED: P Value: -1 Round: 1 ID: 4
                                                                      I, byzantine 1 have received: 6 messages
<< DECIDED >> byzantine 4, value: 0
                                                                      <-- RECEIVED: P Value: 1 Round: 1 ID: 0
---> BROADCAST: P Value: -1 Round: 1 ID: 2
                                                                      << DECIDED >> byzantine 0, value: 1
---> BROADCAST: N Value: 1 Round: 1 ID: 0
                                                                      ---> BROADCAST: P Value: 1 Round: 1 ID: 1
<-- RECEIVED: N Value: 1 Round: 1 ID: 3
                                                                      <-- RECEIVED: P Value: 1 Round: 1 ID: 1
I, byzantine 3 have received: 5 messages
                                                                      << DECIDED >> byzantine 1, value: 1
<-- RECEIVED: P Value: -1 Round: 1 ID: 0
                                                                      ---> BROADCAST: P Value: 1 Round: 1 ID: 1
<< DECIDED >> byzantine 0, value: 0
                                                                      <-- RECEIVED: P Value: 1 Round: 1 ID: 2
---> BROADCAST: P Value: -1 Round: 1 ID: 3
                                                                      << DECIDED >> byzantine 2, value: 1
<-- RECEIVED: P Value: -1 Round: 1 ID: 1
                                                                      ---> BROADCAST: P Value: 1 Round: 1 ID: 1
<< DECIDED >> byzantine 1, value: 0
                                                                      <-- RECEIVED: P Value: 1 Round: 1 ID: 3
---> BROADCAST: P Value: -1 Round: 1 ID: 3
                                                                      << DECIDED >> byzantine 3, value: 1
<-- RECEIVED: P Value: -1 Round: 1 ID: 2
                                                                      ---> BROADCAST: P Value: 1 Round: 1 ID: 1
<< DECIDED >> byzantine 2, value: 0
                                                                      <-- RECEIVED: P Value: 1 Round: 1 ID: 4
---> BROADCAST: P Value: -1 Round: 1 ID: 3
                                                                      << DECIDED >> byzantine 4, value: 1
<-- RECEIVED: P Value: -1 Round: 1 ID: 3
                                                                      ---> BROADCAST: P Value: 1 Round: 1 ID: 1
<< DECIDED >> byzantine 3, value: 0
                                                                      ---> BROADCAST: N Value: 1 Round: 1 ID: 0
---> BROADCAST: P Value: -1 Round: 1 ID: 3
                                                                      <-- RECEIVED: N Value: 1 Round: 1 ID: 2
<-- RECEIVED: P Value: -1 Round: 1 ID: 4
                                                                      I, byzantine 2 have received: 6 messages
<< DECIDED >> byzantine 4, value: 0
                                                                      <-- RECEIVED: P Value: 1 Round: 1 ID: 0
---> BROADCAST: P Value: -1 Round: 1 ID: 3
                                                                      << DECIDED >> byzantine 0, value: 1
---> BROADCAST: N Value: 1 Round: 1 ID: 0
                                                                      ---> BROADCAST: P Value: 1 Round: 1 ID: 2
<-- RECEIVED: N Value: 1 Round: 1 ID: 4
                                                                      <-- RECEIVED: P Value: 1 Round: 1 ID: 1
I, byzantine 4 have received: 5 messages
                                                                      << DECIDED >> byzantine 1, value: 1
<-- RECEIVED: P Value: -1 Round: 1 ID: 0
                                                                      ---> BROADCAST: P Value: 1 Round: 1 ID: 2
<< DECIDED >> byzantine 0, value: 0
                                                                      <-- RECEIVED: P Value: 1 Round: 1 ID: 2
---> BROADCAST: P Value: -1 Round: 1 ID: 4
                                                                      << DECIDED >> byzantine 2, value: 1
<-- RECEIVED: P Value: -1 Round: 1 ID: 1
                                                                      ---> BROADCAST: P Value: 1 Round: 1 ID: 2
<< DECIDED >> byzantine 1, value: 0
                                                                      <-- RECEIVED: P Value: 1 Round: 1 ID: 3
---> BROADCAST: P Value: -1 Round: 1 ID: 4
                                                                      << DECIDED >> byzantine 3, value: 1
<-- RECEIVED: P Value: -1 Round: 1 ID: 2
                                                                      ---> BROADCAST: P Value: 1 Round: 1 ID: 2
<< DECIDED >> byzantine 2, value: 0
                                                                      <-- RECEIVED: P Value: 1 Round: 1 ID: 4
---> BROADCAST: P Value: -1 Round: 1 ID: 4
                                                                      << DECIDED >> byzantine 4, value: 1
<-- RECEIVED: P Value: -1 Round: 1 ID: 3
                                                                      ---> BROADCAST: P Value: 1 Round: 1 ID: 2
<< DECIDED >> byzantine 3, value: 0
                                                                      ---> BROADCAST: N Value: 1 Round: 1 ID: 0
---> BROADCAST: P Value: -1 Round: 1 ID: 4
                                                                      <-- RECEIVED: N Value: 1 Round: 1 ID: 3
<-- RECEIVED: P Value: -1 Round: 1 ID: 4
                                                                      I, byzantine 3 have received: 6 messages
```

- <-- RECEIVED: P Value: 0 Round: 1 ID: 0
- << DECIDED >> byzantine 0, value: 1
- ---> BROADCAST: P Value: 0 Round: 1 ID: 3
- <-- RECEIVED: P Value: 0 Round: 1 ID: 1
- << DECIDED >> byzantine 1, value: 1
- ---> BROADCAST: P Value: 0 Round: 1 ID: 3
- <-- RECEIVED: P Value: 0 Round: 1 ID: 2
- << DECIDED >> byzantine 2, value: 1
- ---> BROADCAST: P Value: 0 Round: 1 ID: 3
- <-- RECEIVED: P Value: 0 Round: 1 ID: 3
- << DECIDED >> byzantine 3, value: 1
- ---> BROADCAST: P Value: 0 Round: 1 ID: 3
- <-- RECEIVED: P Value: 0 Round: 1 ID: 4
- << DECIDED >> byzantine 4, value: 1
- ---> BROADCAST: P Value: 0 Round: 1 ID: 3
- ---> BROADCAST: N Value: 1 Round: 1 ID: 0
- <-- RECEIVED: N Value: 1 Round: 1 ID: 4
- I, byzantine 4 have received: 6 messages
- <-- RECEIVED: P Value: 1 Round: 1 ID: 0
- << DECIDED >> byzantine 0, value: 1
- ---> BROADCAST: P Value: 1 Round: 1 ID: 4
- <-- RECEIVED: P Value: 1 Round: 1 ID: 1
- << DECIDED >> byzantine 1, value: 1
- ---> BROADCAST: P Value: 1 Round: 1 ID: 4
- <-- RECEIVED: P Value: 1 Round: 1 ID: 2
- << DECIDED >> byzantine 2, value: 1
- ---> BROADCAST: P Value: 1 Round: 1 ID: 4
- <-- RECEIVED: P Value: 1 Round: 1 ID: 3
- << DECIDED >> byzantine 3, value: 1
- ---> BROADCAST: P Value: 1 Round: 1 ID: 4
- <-- RECEIVED: P Value: 1 Round: 1 ID: 4
- << DECIDED >> byzantine 4, value: 1
- ---> BROADCAST: P Value: 1 Round: 1 ID: 4
- ---> BROADCAST: N Value: 1 Round: 1 ID: 0