ETH zürich

Byzantine Agreement with Unknown Participants and Failures

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Byzantine Agreement

Required: Agreement, Termination, Validity

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Assumption: Participants know *n* and *f*

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BA with Unknown *n* & *f*

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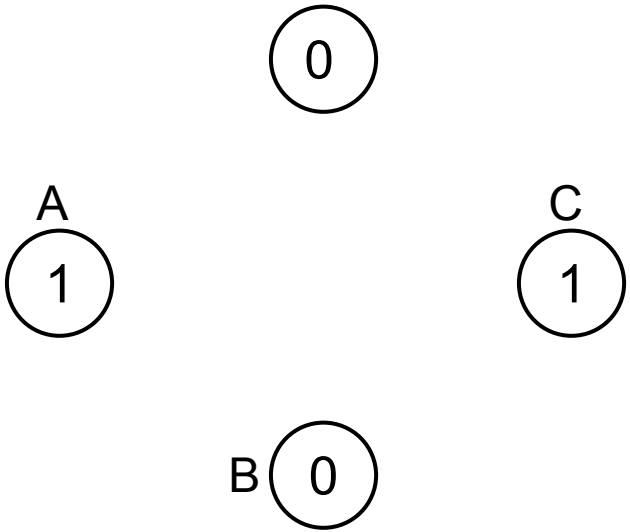

Synchronous

BA with Unknown *n* & *f*

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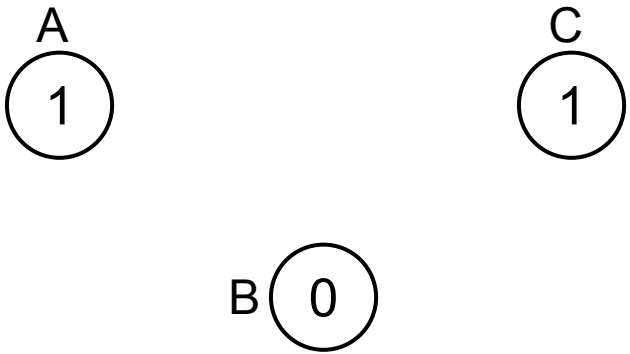

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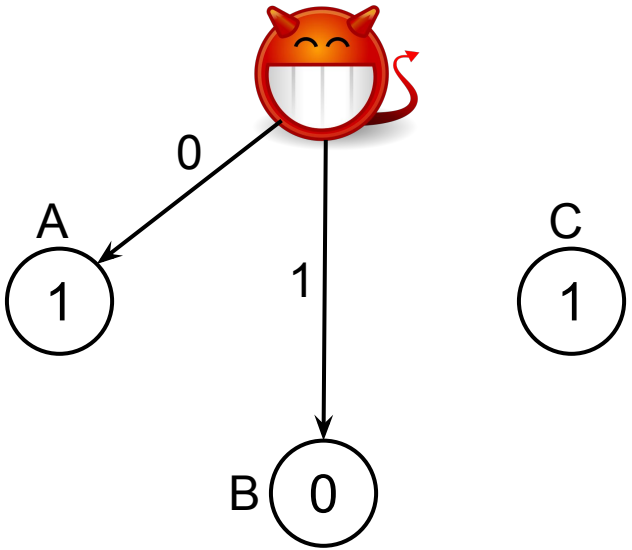
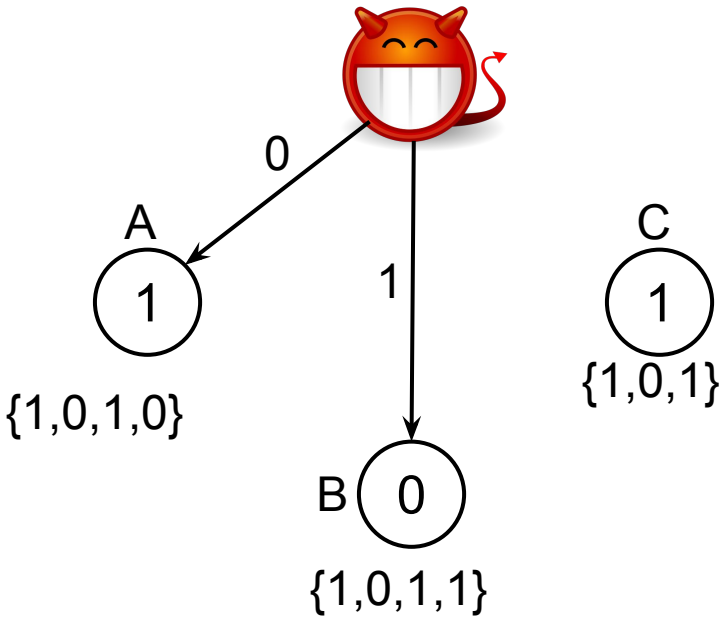


Synchronous
Broadcast

BA with Unknown *n* & *f*



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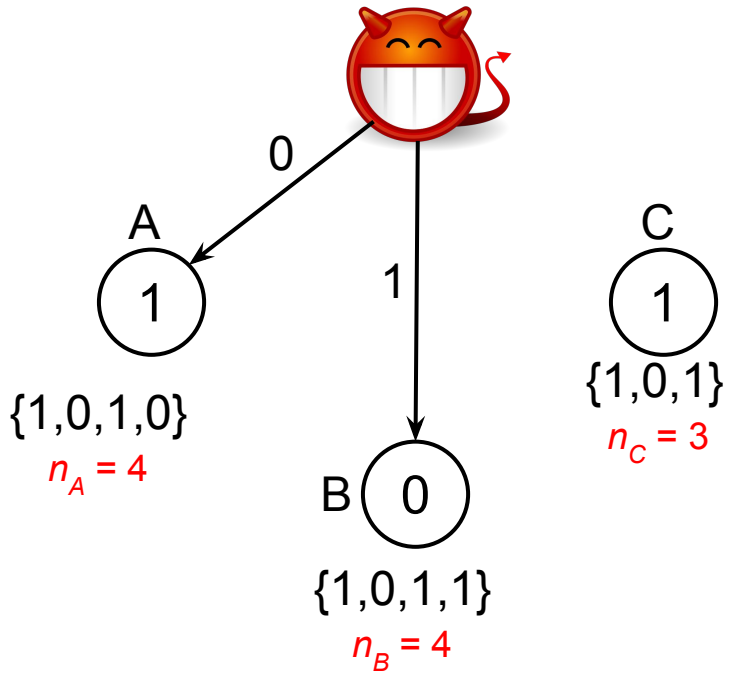

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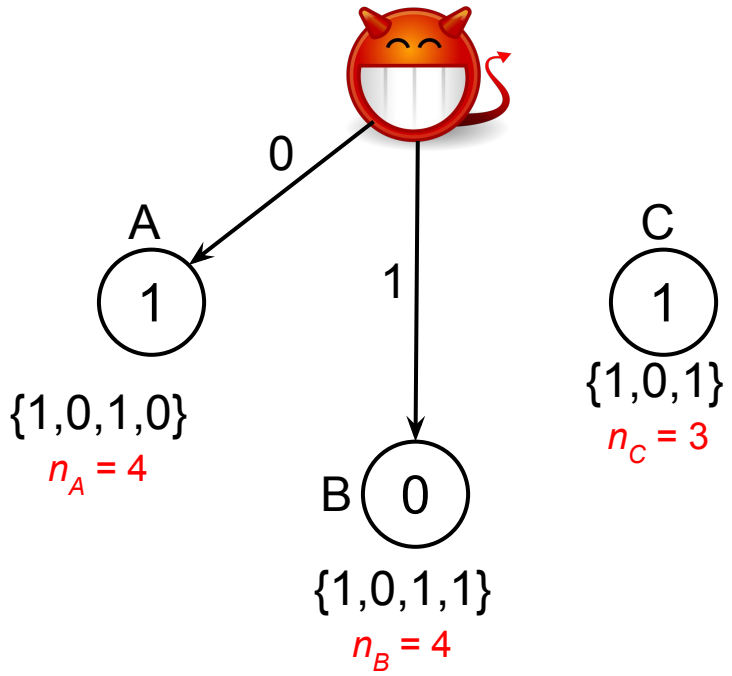

Synchronous Broadcast

Is $n > 3f$ enough?

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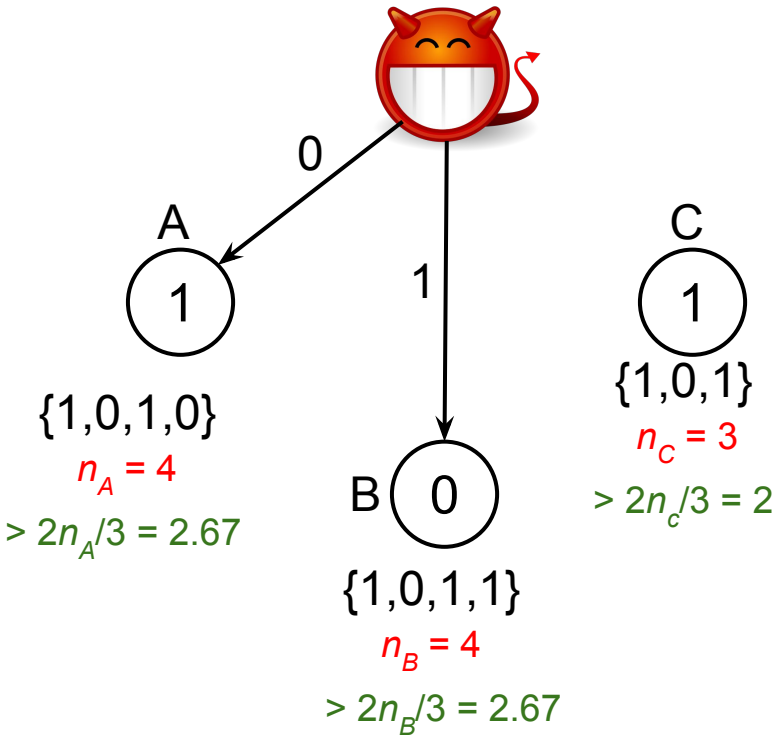

Synchronous Broadcast
Is $n > 3f$ enough?

Equivalent Thresholds

$n - f \Rightarrow 2n_v/3$

$n - 2f \Rightarrow n_v/3$

n_v = number of nodes that v heard from

Agreement without Termination

In each round

Broadcast **m** if received $n_v/3$ copies of **m**.

Accept **m** if received $2n_v/3$ copies of **m**.

Termination when *n* & *f* are known

Electing a correct leader (king)

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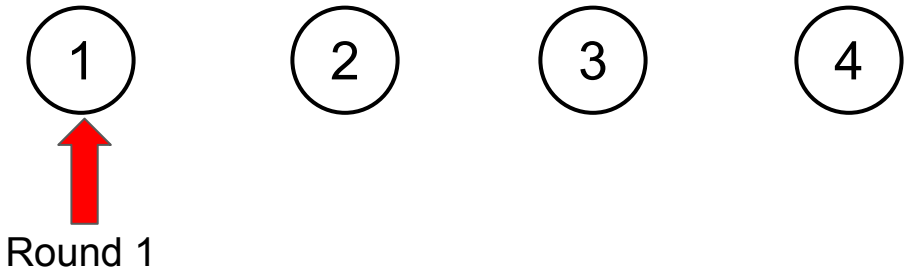

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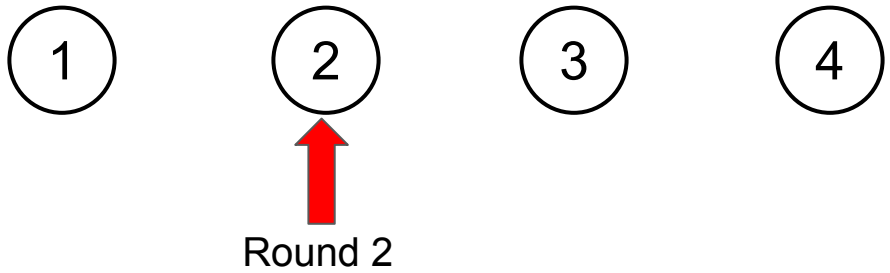

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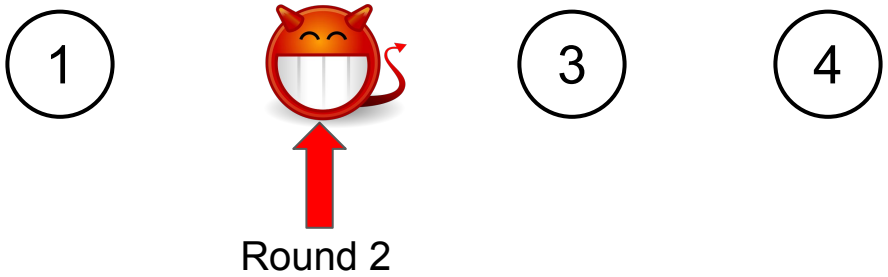

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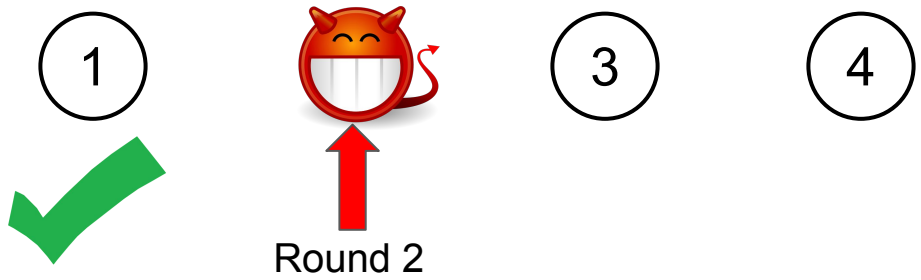

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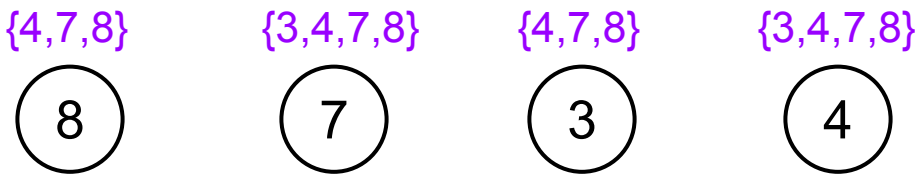

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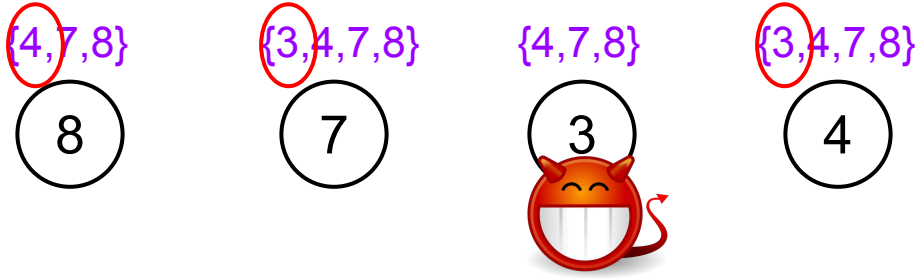

IDs not consecutive

Round 1: select smallest ID as leader

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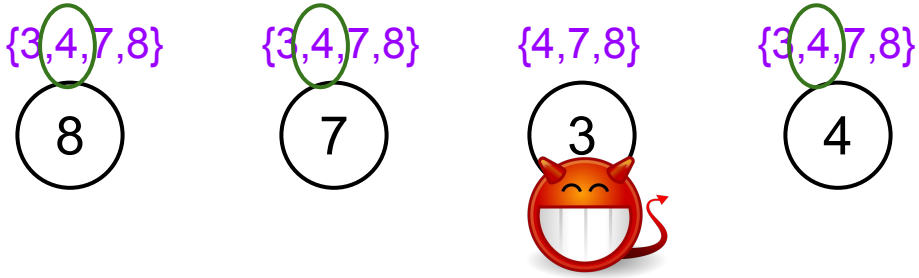

IDs not consecutive

Round 2: select 2nd smallest ID as leader

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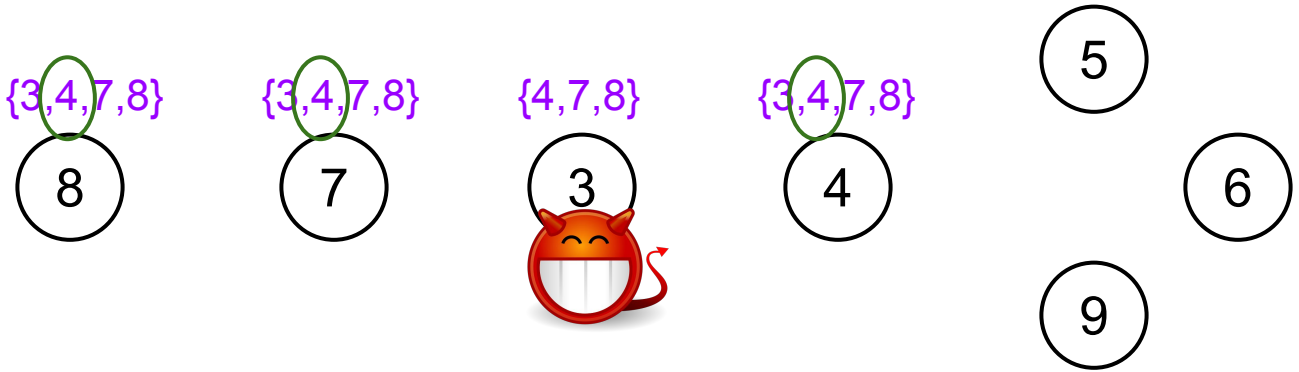

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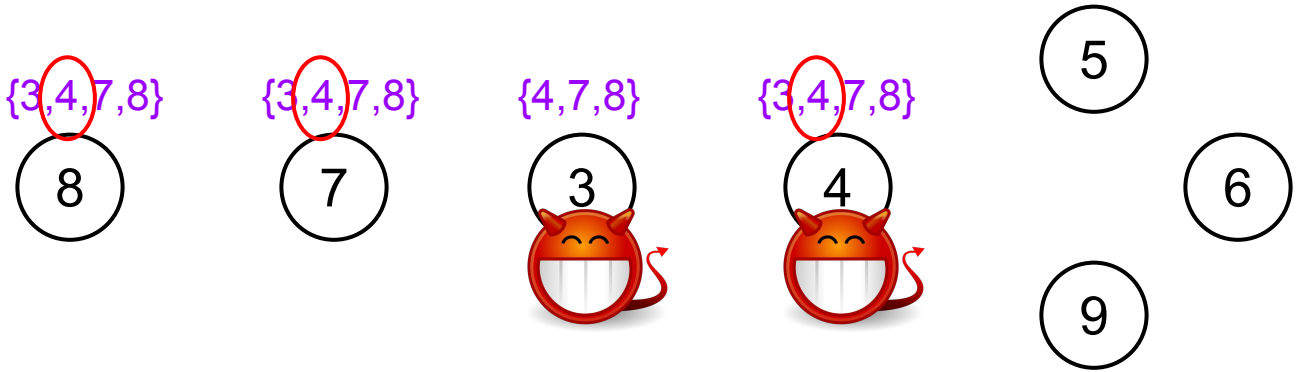

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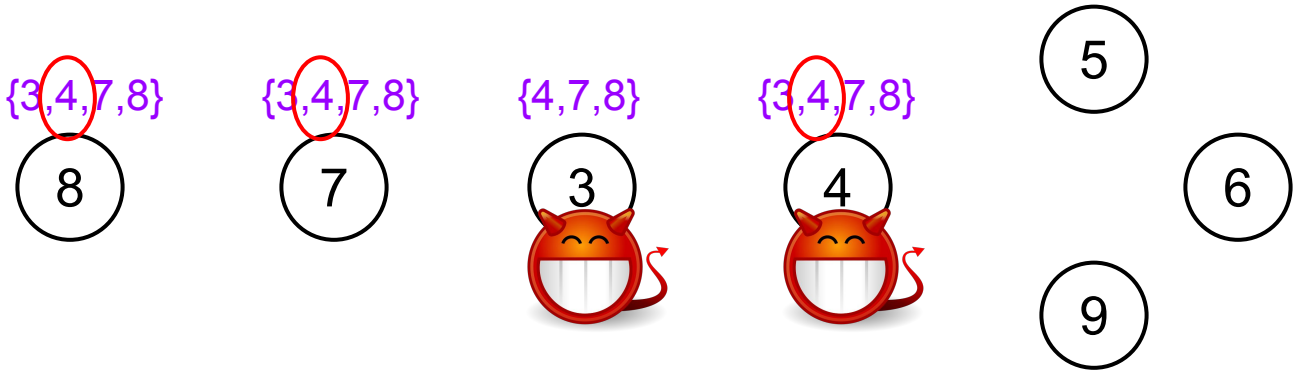

IDs not consecutive

Round *i*: select i^{th} smallest ID as leader

Summary

Optimal resiliency of BA $n > 3f$ even w/o knowledge of n & f

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Semi-synchrony ? Dynamics ?