

Byzantine Preferential Voting

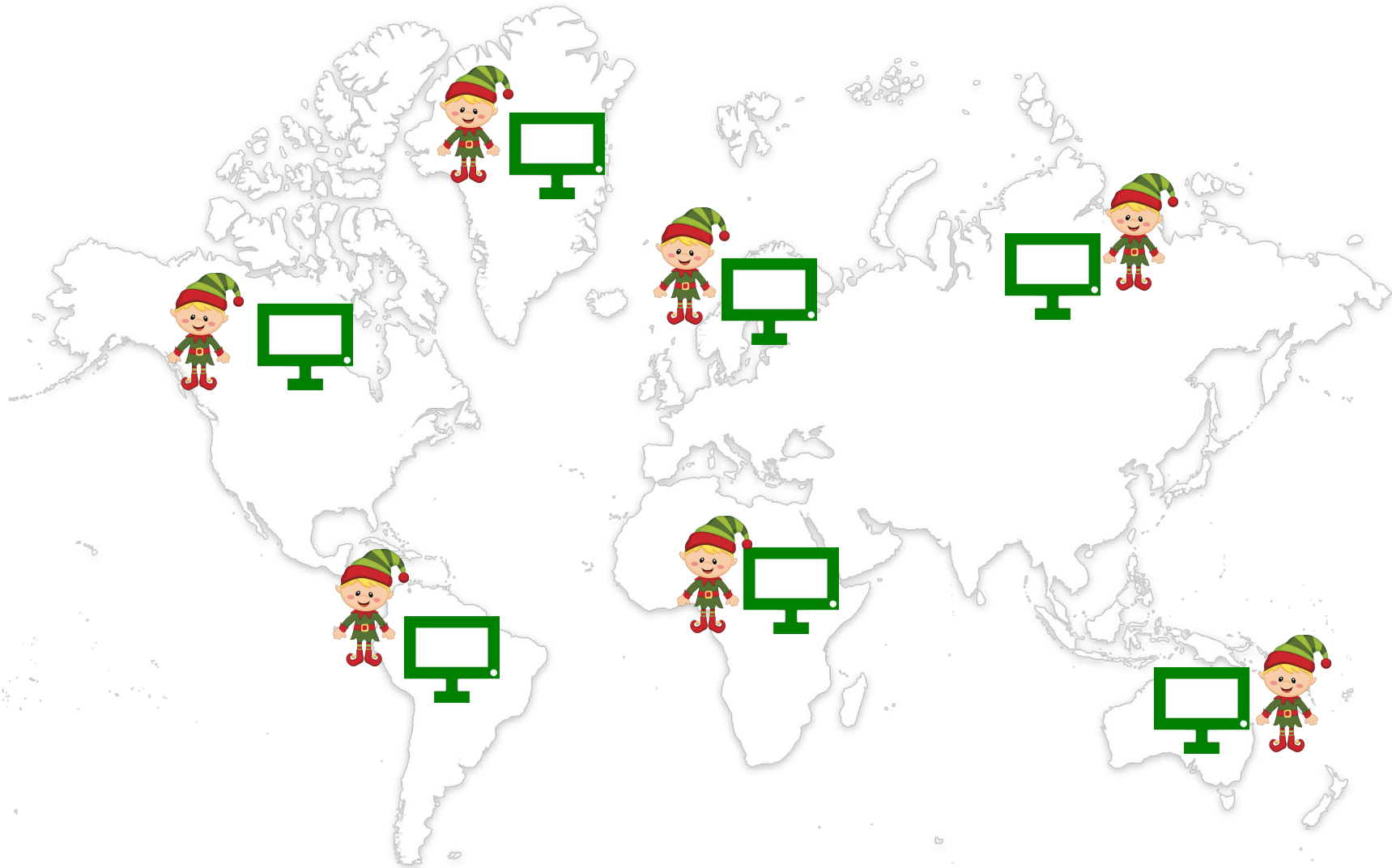


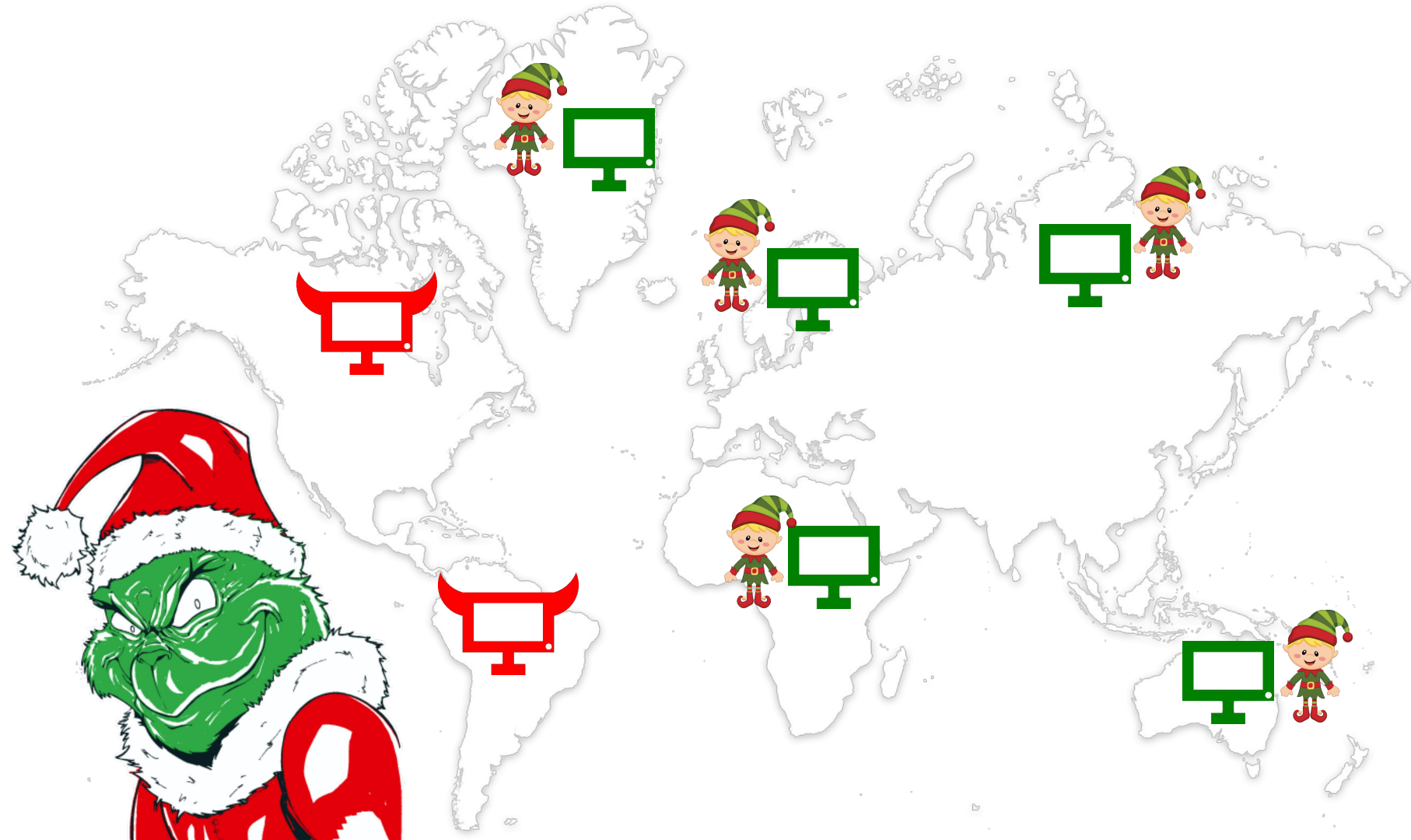
Wishlist for Christmas



Help from Elves

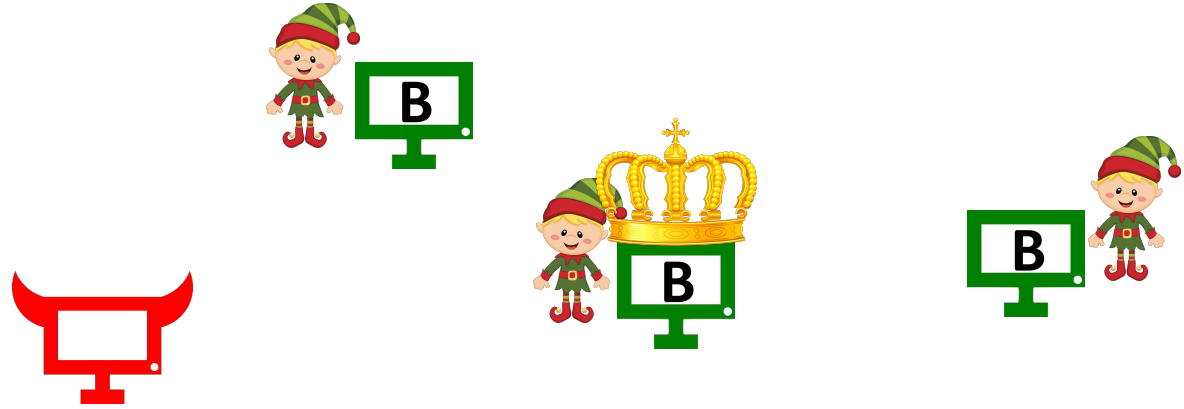




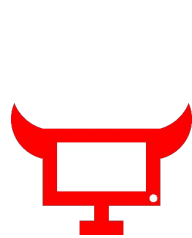


Synchronous Byzantine Agreement with Rankings as Input

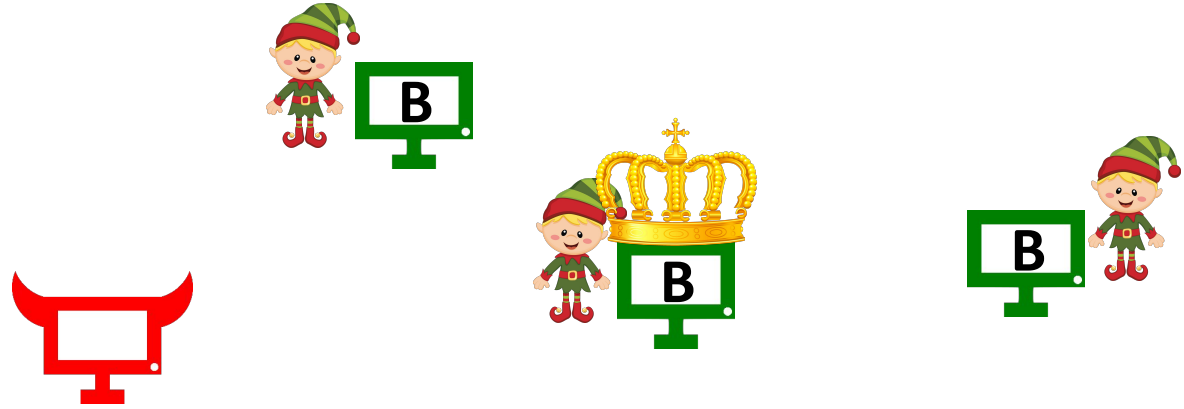
King-Algorithm - Phase #1



- pick $f+1$ kings
- check all-same validity

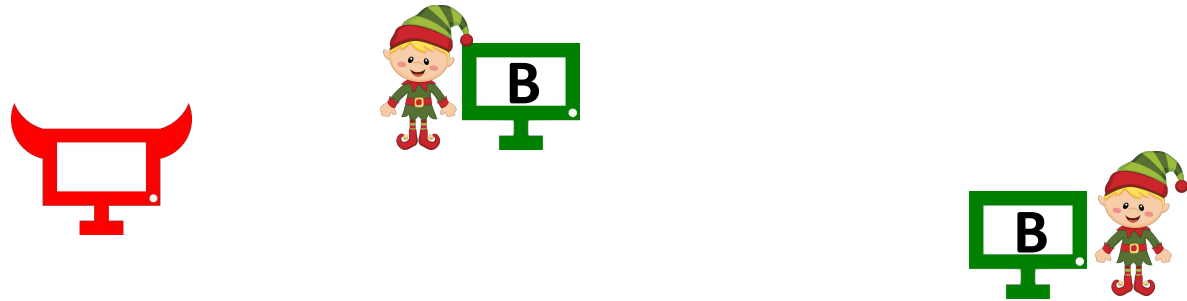


King-Algorithm - Phase #1

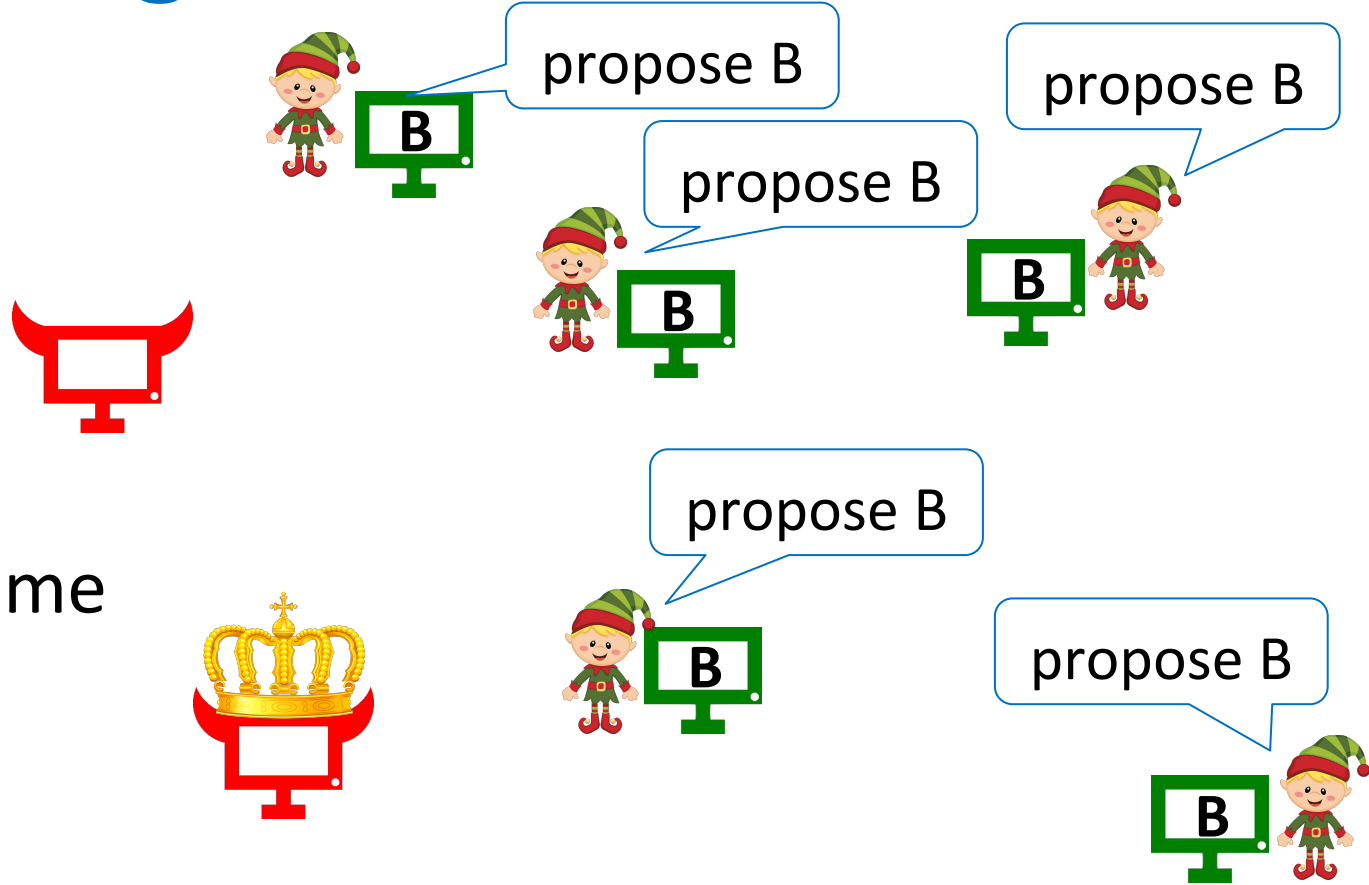


King round:

- adapt input



King-Algorithm - Phase #2



- check all-same validity

Can we do better?



1.

A

B

A

C

2.

B

A

C

B

3.

C

C

B

A



1.

A

B

A

C

2.

B

A

C

B

3.

C

C

B

A

Pareto-Validity



1.

A

B

A

C

2.

B

A

C

B

3.

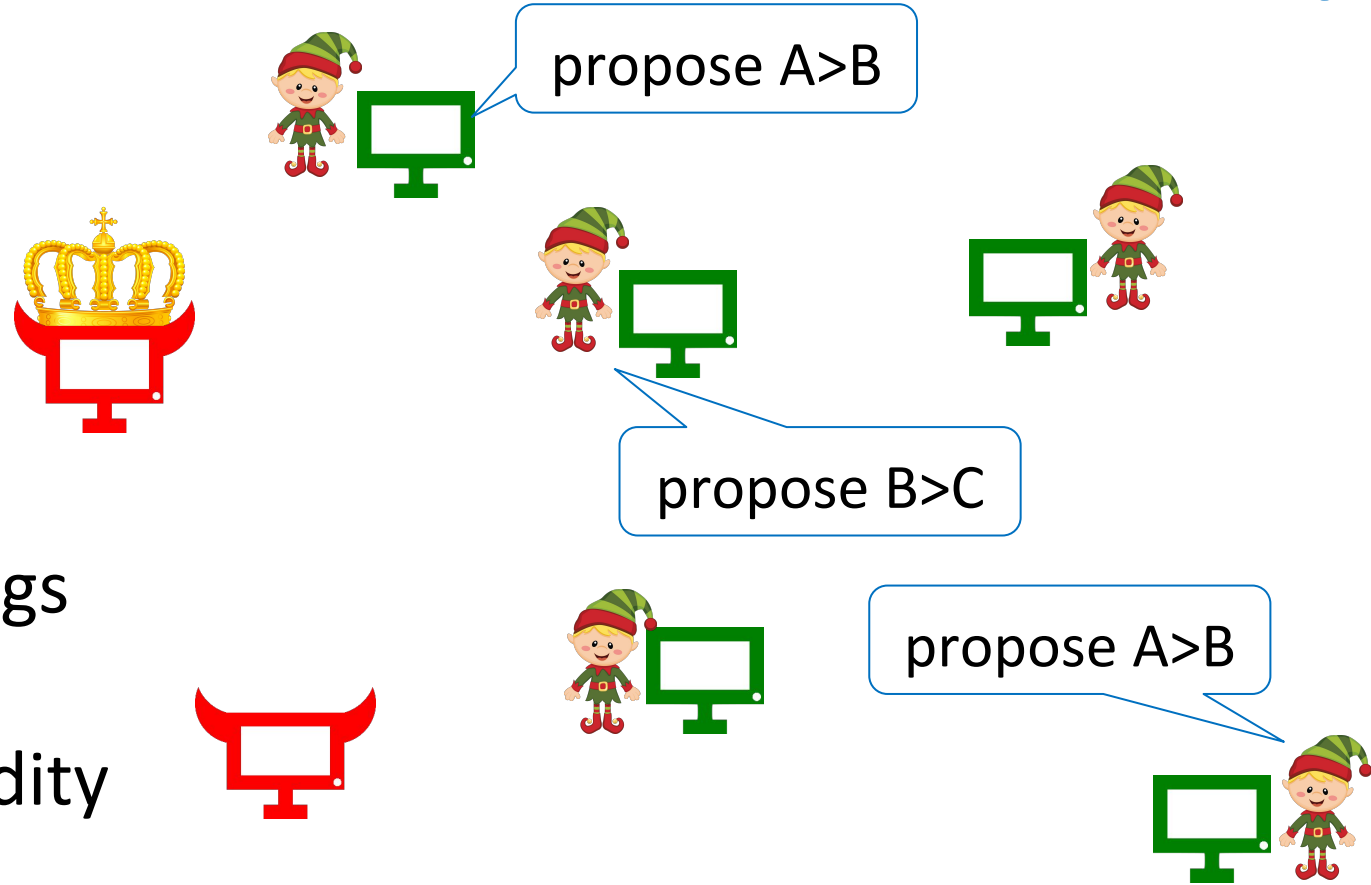
C

C

B

A

King-Algorithm with Pareto-Validity



- pick $f+1$ kings
- check
pareto-validity

Voting Theory





1.

A

A

C

C

2.

B

B

B

B

3.

C

C

A

A

Bubble Sort Distance

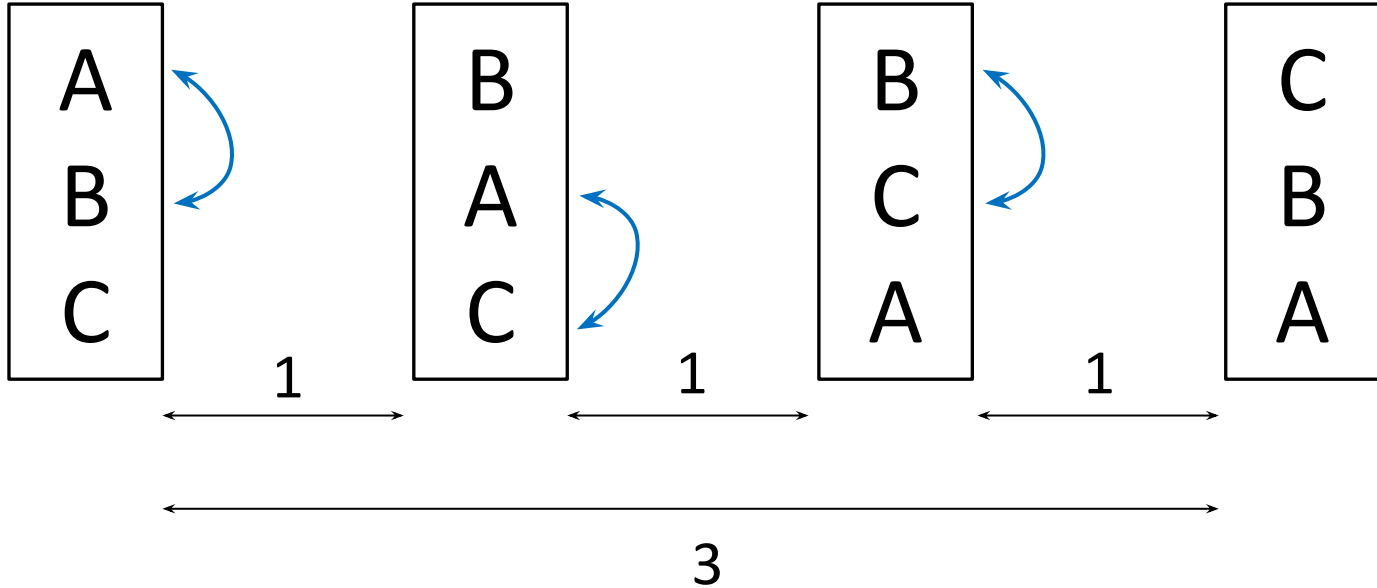
A
B
C

B
A
C

B
C
A

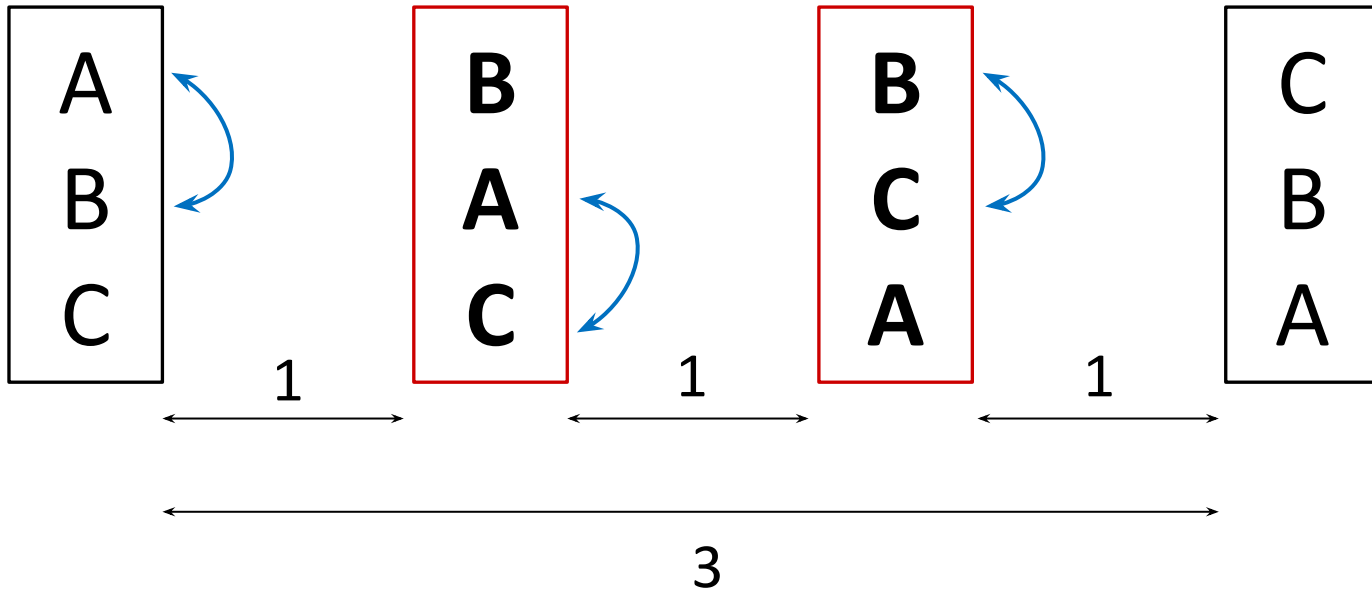
C
B
A

Bubble Sort Distance



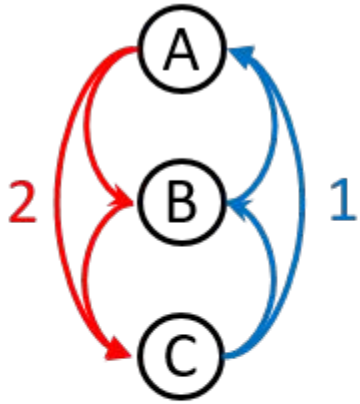
Bubble Sort Distance

Kemeny median = Smallest total distance

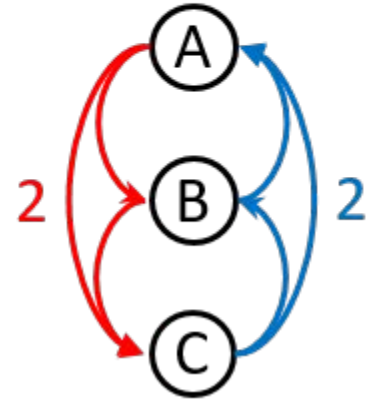
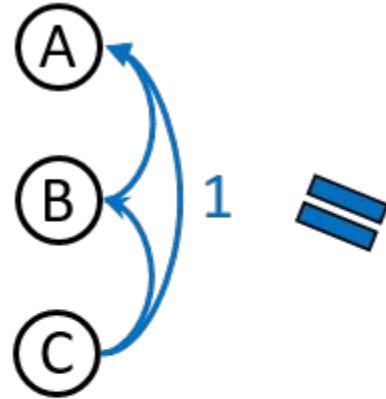


Best Possible Approximation of the Kemeny-Median

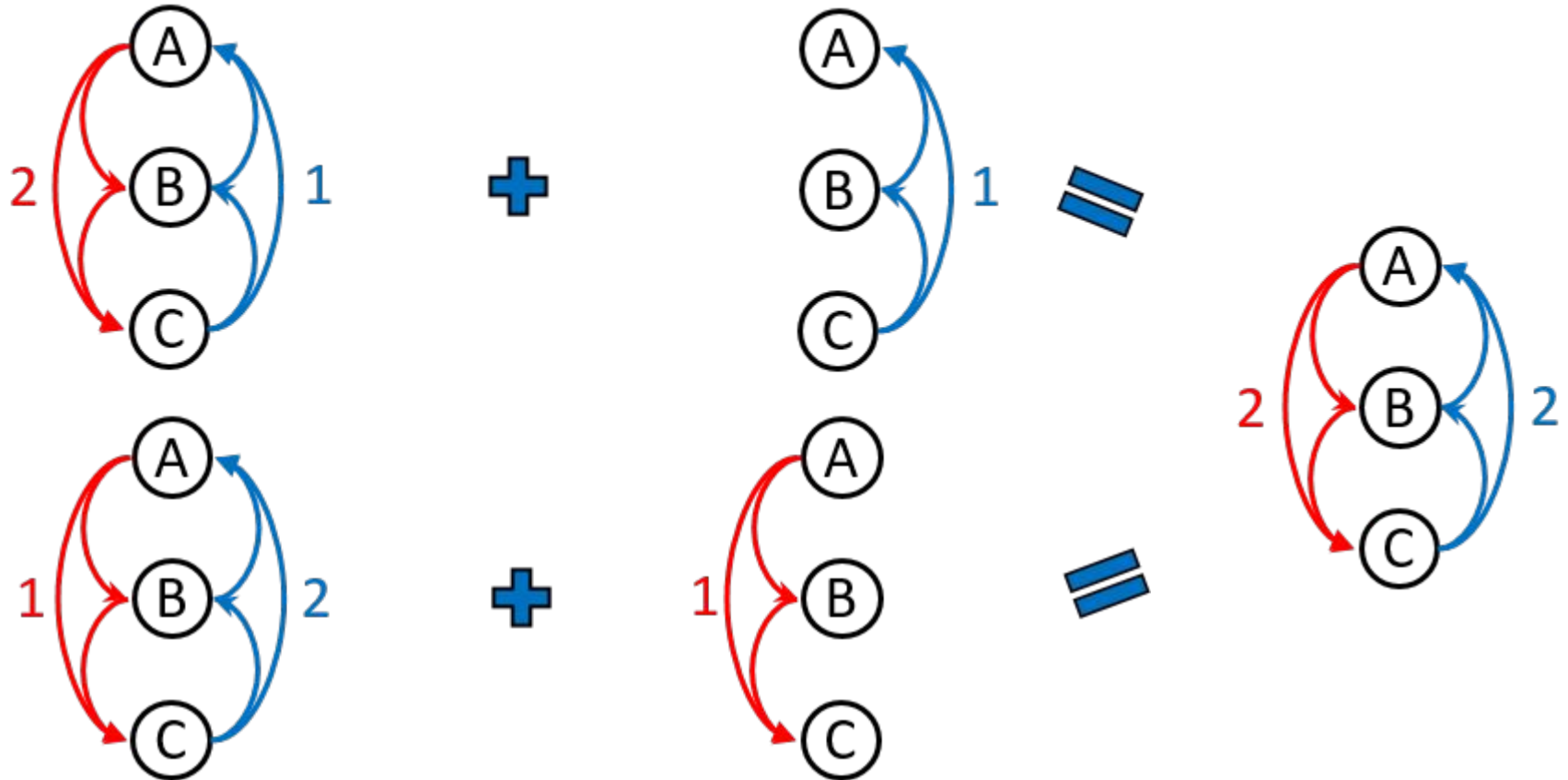
Tournament Graphs



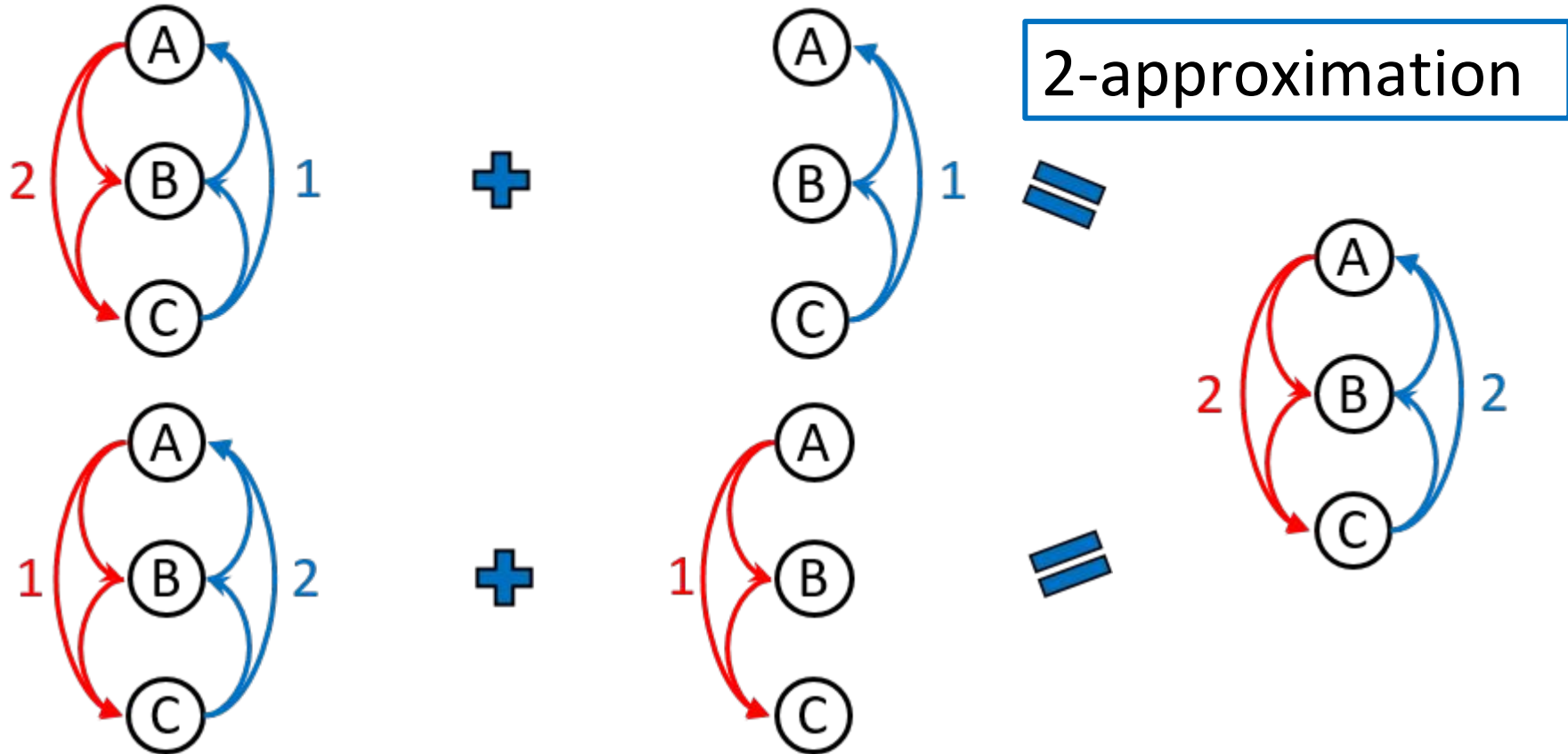
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Tournament Graphs



Tournament Graphs



General Profiles



1.

A

B

A

C

2.

B

A

C

B

3.

C

C

B

A



1.

A

B

A

C

2.

B

A

C

B

3.

C

C

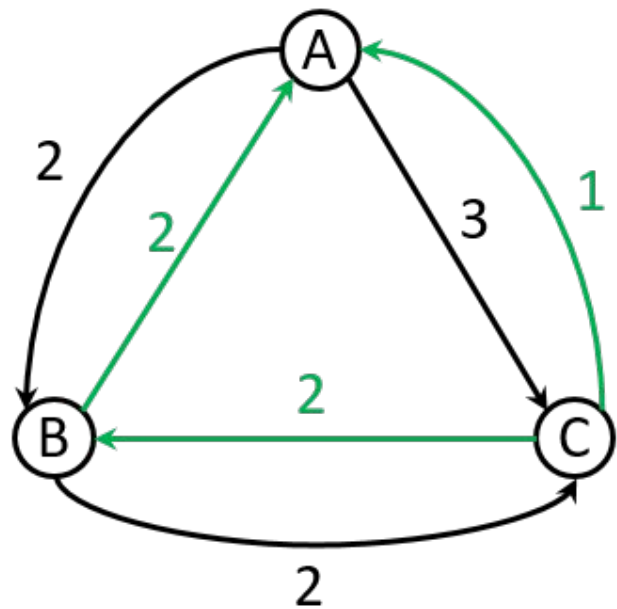
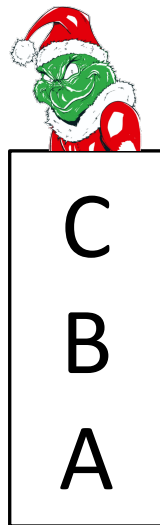
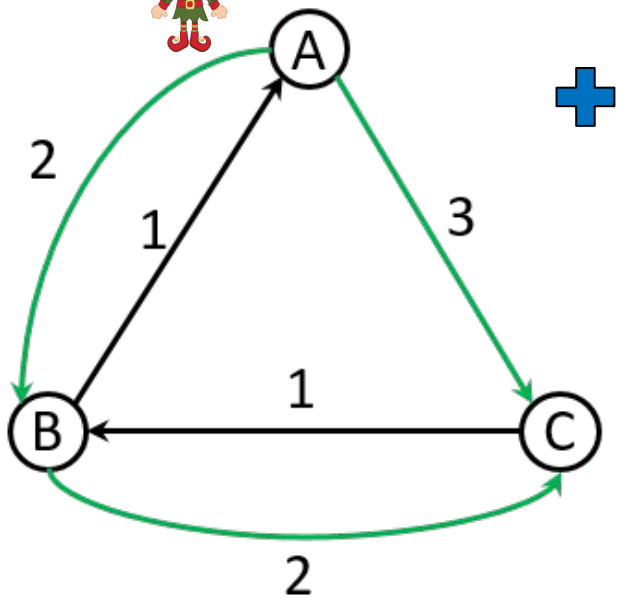
B

A

A

B

C





1.

A

B

A

C

2.

B

A

C

B

3.

C

C

B

A

A

B

C

B

A

C

A

B

C

A

C

B

, ,

Algorithm for Kemeny-Median

- Broadcast own ranking
- Choose Kemeny-Median locally
- Run King-Algorithm with Pareto-Validity

Happy Holidays!

