Crossing the Bridge

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I came across a version of this puzzle from Ted. Since I had viewed the video, I remembered the strategy to use the slowest two together. But, this strategy doesn't work always. There are situations when using the fastest runner to cross the bridge with the lantern is much faster.

Assuming that A is the fastest, B is fast, C is slow and D is the slowest, we can list the total time for both the strategies and compare.

Strategy 1:

Who is crossing and direction	Time taken (slowest)
(Right) A and B	B
(Left) A	A
(Right) A and C	C
(Left) A	A
(Right) A and D	D

$$2A + B + C + D$$

Strategy 2:

Who is crossing and direction	Time taken (slowest)
(Right) A and B	B
(Left) A	A
(Right) C and D	D
(Left) B	B
(Right) A and B	B

$$A + 3B + D$$

Hence, we can add the total time in both and find out which strategy gives a faster time. Interestingly, notice that the time taken by C is independent in the second strategy.

Question: Can you find sets of speeds for which both strategies give the same crossing time?

$$2A + B + C + D = A + 3B + D$$

$$A + C = 2B$$