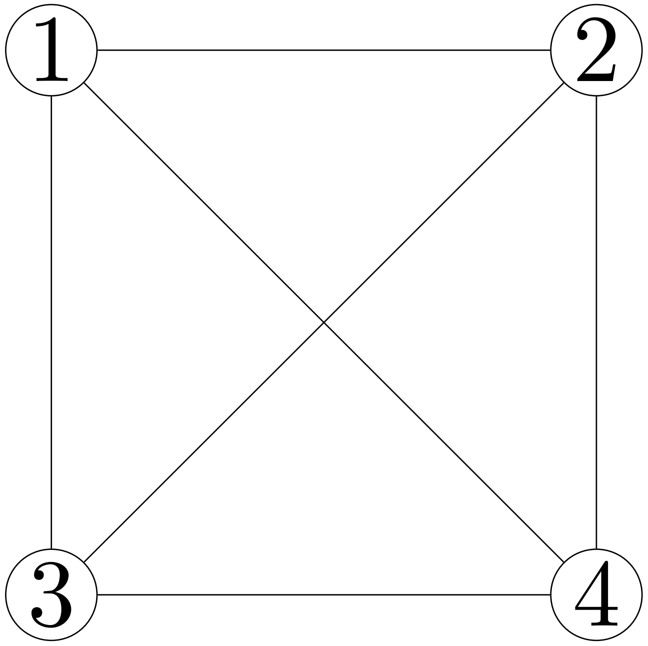
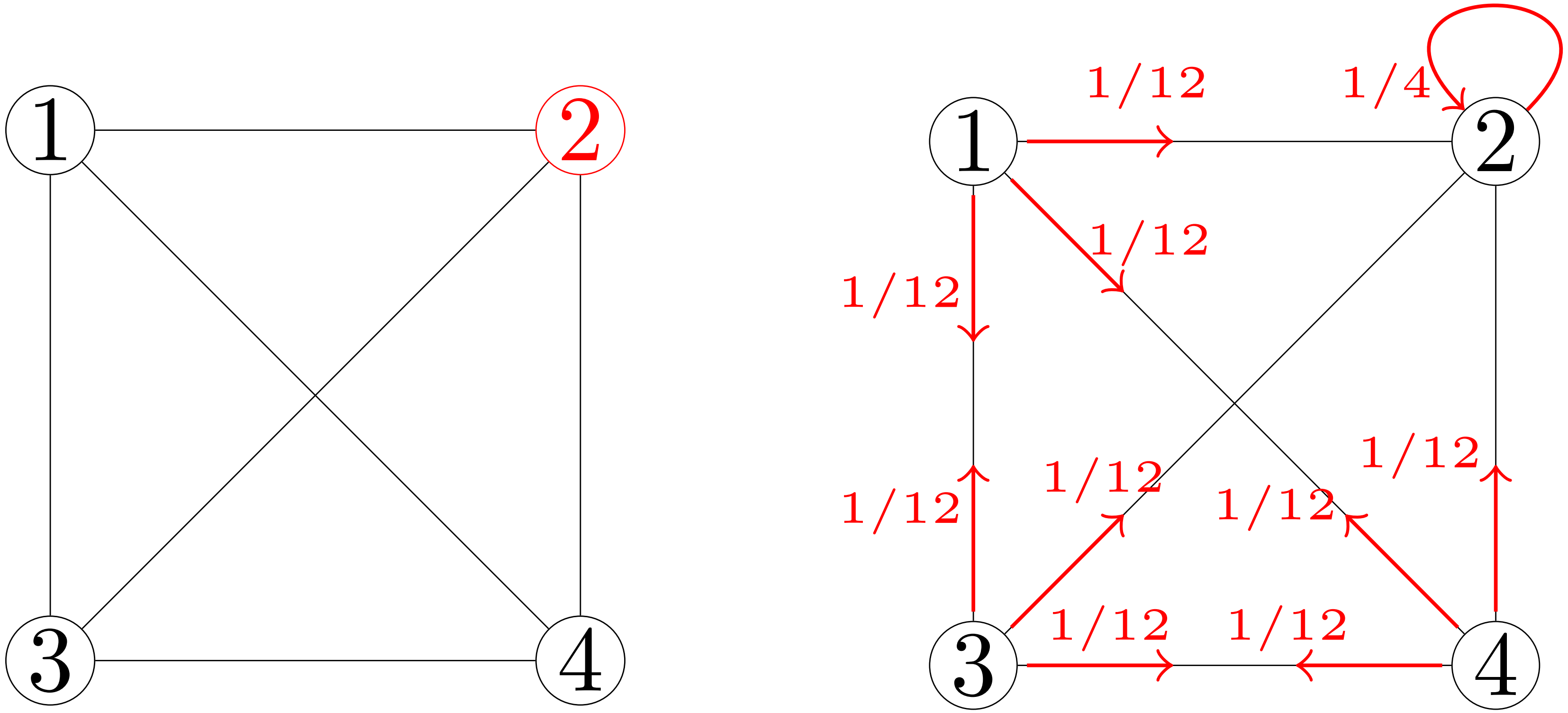
Classical Random Walk on a complete symmetric graph G = (4,6)

Assume that 2 is the marked state. Of course this is not known a priori and we aim to figure it out.

A walker then has ¼ probability to be at any of the four vertices.




1
2
3
4
1/12
1/4
1/12
1/12
1/12
1/12
1/12
1/12
1/12
1/12
1
2
3
4

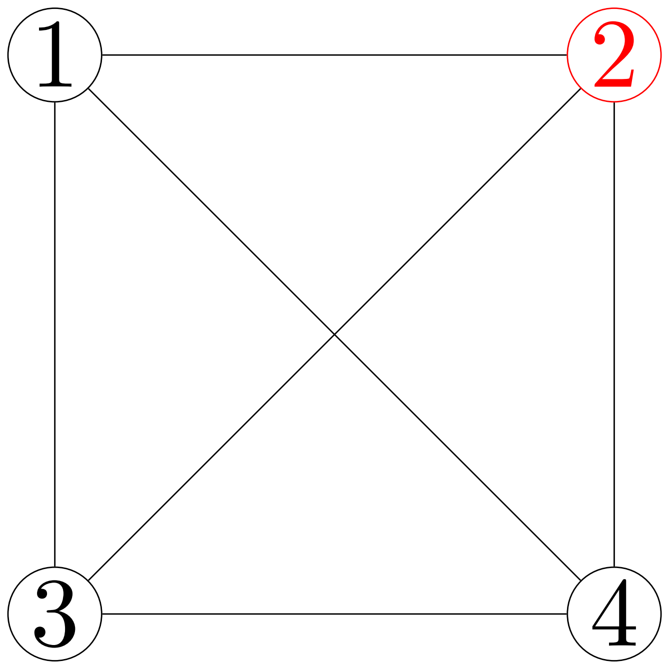
Classical Random Walk on a complete symmetric graph G = (4,6)

<u>Step 1</u>

The probability to find the walker at the given vertex is 1/4.

Why?

Trivial.



Classical Random Walk on a complete symmetric graph G = (4,6)

<u>Step 2</u>

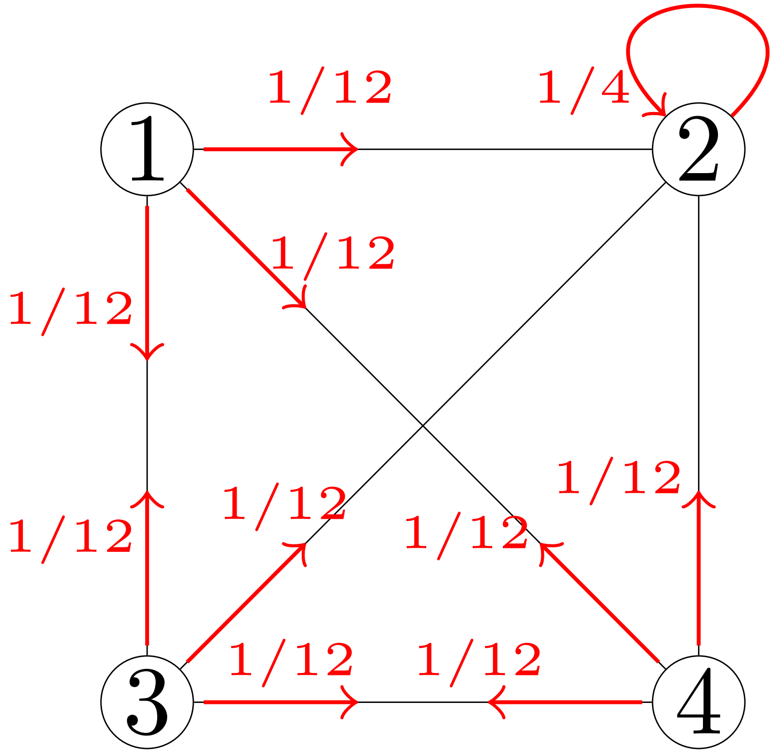
The walker will move away from any given vertex with the probabilities given in red.

Why?

Assume the walker is at V=1. Then the probability to move to V=3 is given as ¼ x 1/3 = 1/12.

What is the probability to find the walker at 2?

It is ½.



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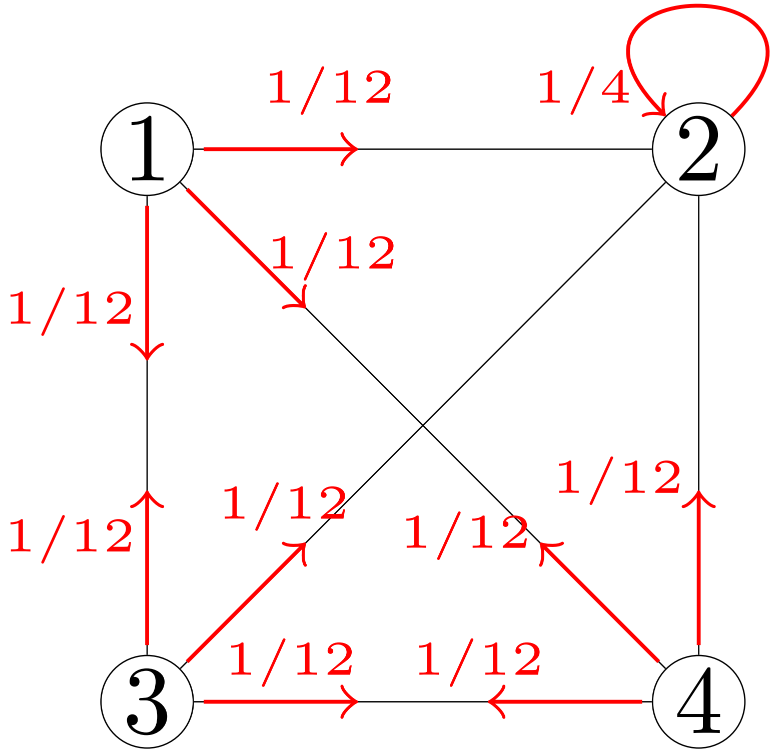

Classical Random Walk on a complete symmetric graph G = (4,6)

<u>Step N</u>

The success probability of 1-ε is achieved after N log(1/ε) steps, ~ O(N) (for large N).