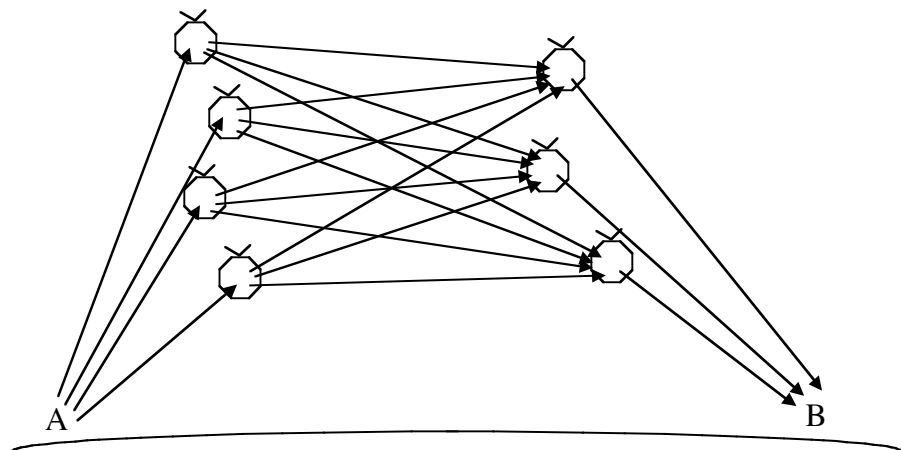


EX: A network of communications satellites is available to transmit a message from country A to country B. The signal first travels from country A to one of 4 satellites. From one of those 4 satellites, the signal may travel to one of 3 satellites, (which are distinct from the first 4). Finally, the signal travels from the second set of satellites to the receiver in country B.

- a) Find the number of different paths a message may take from country A to country B.
- b) If all the paths a message may take are equally likely, and a hacker has disabled one satellite from the first set of 4 and one satellite from the second set of 3, find $P(\text{message doesn't get through})$.

SOL'N: a) The answer is just $4 * 3 = 12$ since there are 4 choices for the first satellite and 3 choices for the second satellite from each of the first satellites. We get this result by counting all the paths from A to B in the diagram, below.



- b) If one satellite from each path is removed, we have $3 * 2 = 6$ paths that are still functional. Since all 12 of the original paths were given to be equally likely, we have $6/12$ or one-half the total probability (equals one) that a message will get through. Thus, the answer is $1/2$.