```
public boolean degreeOfSeparation(Set<Person> people,
                                  Person p1, Person p2, int n)
{
  if (n == 1)                 // Base case
  {
    return p1.knows(p2);
  }
  else                        // Recursive case
  {
    for (Person p : people)
    {
      if (p1.knows(p) && degreeOfSeparation(people, p, p2, n-1))
        return true;
    }
    return false;
  }
}
```

Let $K(n)$ be the number of times `knows` is called for the parameter *n*. Then, for $n = 1$, $K(1) = 1$, and the formula gives $\dfrac{3N^1 - N^0 - 2N}{N-1} = \dfrac{3N - 1 - 2N}{N-1} = 1$.

For $n > 1$, `knows` is called once for each `Person p` in the group of N people who know `p1` (due to the short-circuit evaluation) and $1 + K(n-1)$ times for each `Person p` in the group of N people who do not know `p1`. Therefore,

$K(n) = N + N(1 + K(n-1)) = 2N + N \cdot K(n-1)$. From the induction hypothesis,

$K(n-1) = \dfrac{3N^{n-1} - N^{n-2} - 2N}{N-1}$. So

$K(n) = 2N + N \cdot K(n-1) = 2N + N\dfrac{3N^{n-1} - N^{n-2} - 2N}{N-1} =$

$\dfrac{2N^2 - 2N + (3N^n - N^{n-1} - 2N^2)}{N-1} = \dfrac{3N^n - N^{n-1} - 2N}{N-1}$, q.e.d.