Write a proof that all positive integers ≥ 2 are either prime or can be written as the product of primes.

There are two conditions:
1. Assume k is a prime, no further work needs to be done.
2. Assume k is a non-prime $\in N$
a and $b \in N$
$k = ab$ where $1 \leq a, b, < k$

Our Base Case begins at 2.
2 is a prime, and therefore fulfills our first condition.

Thus:

For the purpose of the proof we will assume these statements are true up through n. Using induction we shall prove it holds true for $n + 1$.

If $n + 1$ is a prime it fulfills the first condition, and therefore the theorem holds true.

If $n + 1$ is not a prime it can be written as $(n + 1) = ab$ where $1 \leq a, b, < (n + 1)$

As both $a, b < n$, they fall under the previous proof and the theorm holds true.

Using induction, we can show that $a = p_1 p_2 p_3.......p_h$ and $b = q_1 q_{2q3}.......q_i$ are composed of primes. As $n = ab$, $n = p_1 q_1 p_2 q_2....p_h q_i$