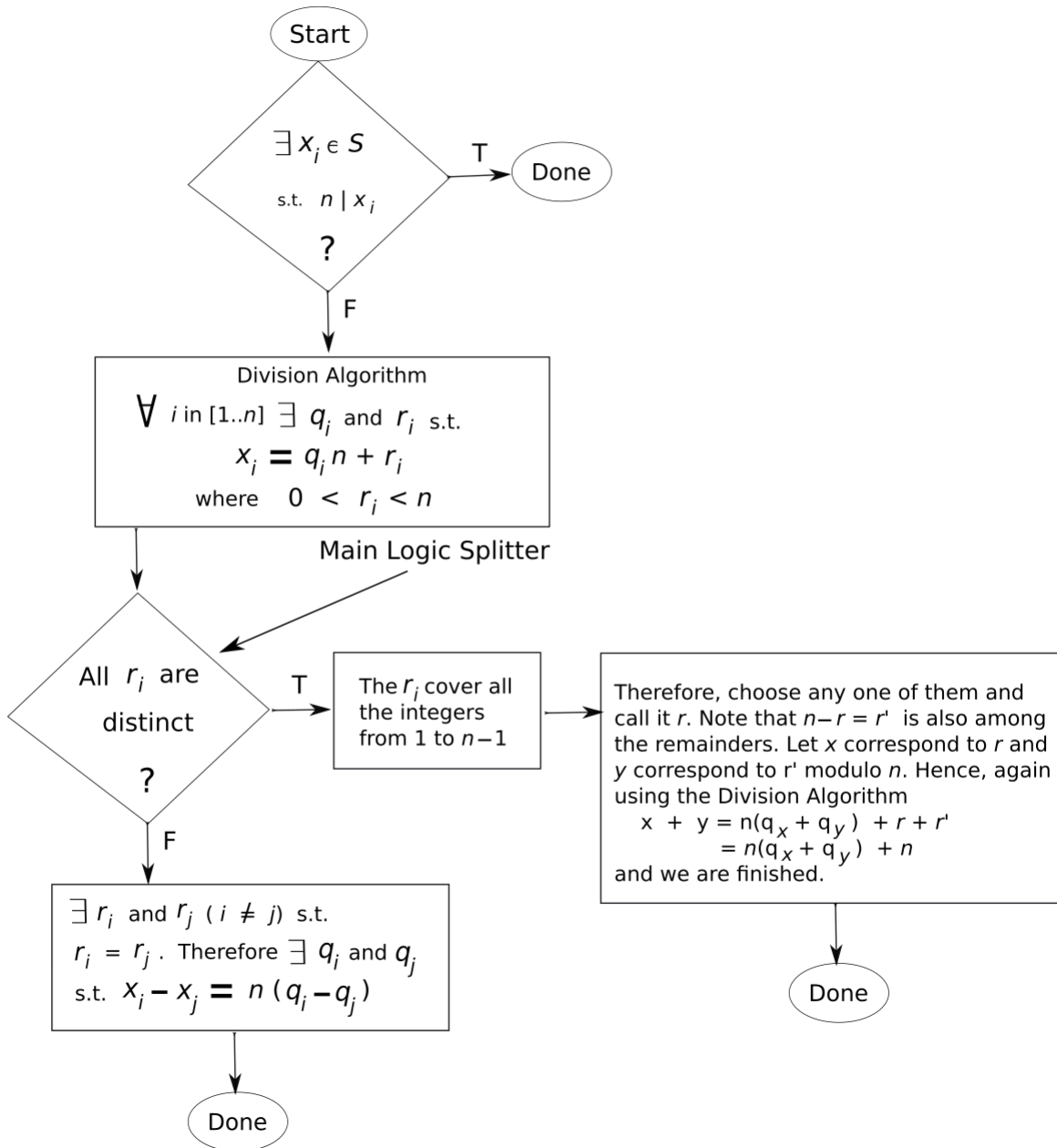


This is a short proof within a flowchart of a lemma that uses the Division Algorithm and modular arithmetic.

Let  $S = \{x_1, x_2, \dots, x_n\}$  be a set of  $n$  distinct positive integers. Show that either  $n$  divides one of the integers, or  $n$  divides the sum or difference of two of the numbers



On the left, we showed that there is a difference that is divided by  $n$ . On the right, we showed that there is a sum that is divided by  $n$ . A logic splitter (or divider) (my terminology) is a decision node that splits the flow of logic in two or more separate paths. This proof uses two logic splitters. Which of them, if any of them, is the 'Main' logic splitter is a matter of opinion. The proposition within a logic splitter is likely to contain either a 'there exists' or a 'for all' token (or something close in meaning to it).