# Example 3:

$L = \{w \mid w$ has an equal number of a's, b's, and c's$\}$

ex: $abaccb \in L$

**Step 1:** $S = a^p b^p c^p$ $\quad |S| = 3p > p$ ✓

$S \in L$

**Step 2:** Case 1: $v$ or $y$ contain 1 or more a's
$v$ and $y$ cannot contain c's since that would require $|vxy| > p$

Case 2: $v$ or $y$ contain 1 or more c's
$v$ and $y$ cannot contain a's since that would require $|vxy| > p$

Case 3: $v$ and $y$ contain just b

note: $v$ and $y$ cannot contain all three letters as that would require $|vxy| > p$

**Step 3:** Case 1: $uv^2xy^2z$ ~~has~~ contains more a's than c's so $uv^2xy^2z \notin L$

Case 2: $uv^2xy^2z$ contains $p$ c's and more than $p$ number of a's so $uv^2xy^2z \notin L$

Case 3: $uv^2xy^2z$ contains $p$ number of a's and c's but the number of b's is larger than $p$ so $uv^2xy^2z \notin L$