Algorithm I: This is a straightforward (but slow) algorithm based directly on the definition of structural balance for a labeled clique.

**Input:** A clique $G$ with $n$ nodes where each edge has a ‘+’ or ‘-’ label.

**Output:** “Yes” if $G$ is balanced and “No” otherwise.

**Outline of the Algorithm:**

1. **for** each triple of nodes $x$, $y$ and $z$ **do**
   - if (triangle $\{x, y, z\}$ is not balanced)
     - Output “No” and **stop**.
2. Output “Yes”.

**Running time:** $O(n^3)$ (since there are $\binom{n}{3} = O(n^3)$ triangles in a clique with $n$ nodes).

Algorithm II: This algorithm is based on the Cartwright-Harary Theorem and is asymptotically faster. The description of the algorithm below ignores the trivial cases (where all edges have the ‘+’ label or the ‘-’ label).

**Input:** A clique $G$ with $n$ nodes where each edge has a ‘+’ or ‘-’ label.

**Output:** “Yes” if $G$ is balanced and “No” otherwise.

**Outline of the Algorithm:**

1. Choose an arbitrary node $a$ of $G$.
2. Construct set $X$ consisting of $a$ and all friends of $a$.
3. Let $Y$ be the remaining set of nodes.
4. if (X has a pair of nodes p and q such that the label of edge $\{p, q\}$ is ‘-’)
   - Output “No” and **stop**.
5. if (Y has a pair of nodes p and q such that the label of edge $\{p, q\}$ is ‘-’)
   - Output “No” and **stop**.
6. if (X has a node p and Y has a node q such that the label of edge $\{p, q\}$ is ‘+’)
   - Output “No” and **stop**.
7. Output “Yes”.

**Running time:** $O(n^2)$ (since each of the seven steps runs in $O(n^2)$ time). Since the graph has $\Omega(n^2)$ edges, the running time of this algorithm is linear in the size of the input.