Branch and bound algorithm for IPs

To solve an LP in which all variables must be integers

1. Solve the problem as an LP (without integer constraints). This LP forms the root of a tree.

2. (BRANCHING) Each time an LP has been solved, make two new LPs by picking a non-integral solution variable ($x_1 = c + \varepsilon$, say) and adding first the constraint $x_1 \leq c$ and then the constraint $x_1 \geq c + 1$. Add these two LPs as branches in the tree off their progenitor.

3. (BOUNDING) If a solved LP has an all-integer solution (with objective value $z^\star$, say) then terminate all branches whose objective value is not as good as $z^\star$.

4. If an LP is infeasible, terminate its branch.

5. Stop when only one branch survives. This solves the IP problem.