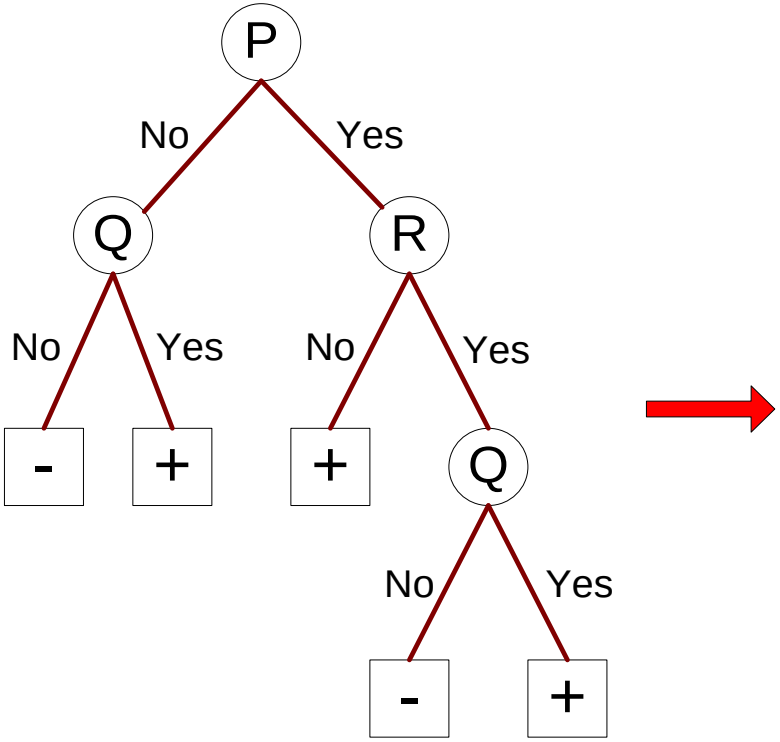
Indirect Methods



Rule Set

r1: (P=No,Q=No) ==> -
r2: (P=No,Q=Yes) ==> +
r3: (P=Yes,R=No) ==> +
r4: (P=Yes,R=Yes,Q=No) ==> -
r5: (P=Yes,R=Yes,Q=Yes) ==> +

Indirect Method: C4.5rules

- Extract rules from an unpruned decision tree
- For each rule, r: A $\rightarrow$ y,
  - consider an alternative rule r′: A′ $\rightarrow$ y where A′ is obtained by removing one of the conjuncts in A
  - Compare the pessimistic error rate for r against all r's
  - Prune if one of the alternative rules has lower pessimistic error rate
  - Repeat until we can no longer improve generalization error

Indirect Method: C4.5rules

- Instead of ordering the rules, order subsets of rules (class ordering)
  - Each subset is a collection of rules with the same rule consequent (class)
  - Compute description length of each subset
    - Description length = L(error) + g L(model)
    - g is a parameter that takes into account the presence of redundant attributes in a rule set (default value = 0.5)