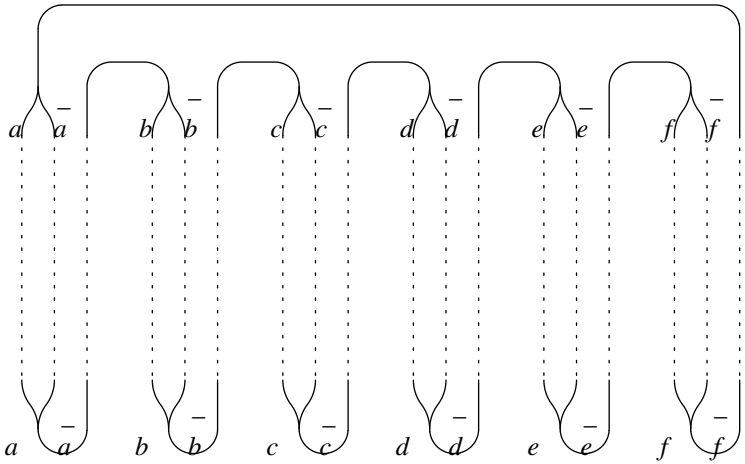
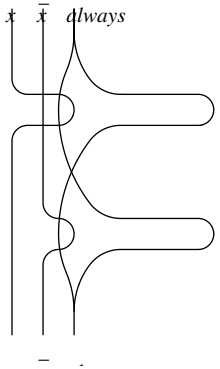
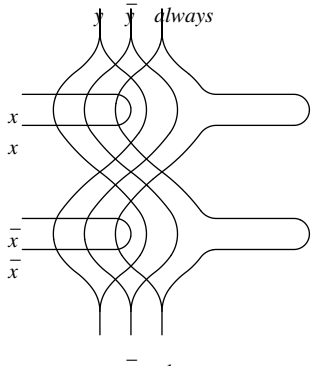


We will construct a Switch−Simple Loop problem corresponding to the CNF Satisfiability problem by creating a switch graph layout whose overall form will be as shown here. The resulting Switch−Simple Loop problem will only be able to have a loop if the loop follows this overall path, effectively picking a value for each variable. We will modify the central dotted portion so as to represent the terms of the CNF expression.

This shows how we can alter the three vertical paths corresponding to a variable in the previous diagram so that the variable's value is pushed out to the right. The third vertical path, which is always used by the loop, must use one of two branches here. If the variable is true, then the loop must use the branch with the upper right protrusion, since the other branch crosses the first path, which is used by the loop when the variable is true. Similarly, if the variable is false, the loop must use the lower protrusion on the right.





This shows how we can keep pushing a variable's value to the right. If the upper protrusion coming from the left is used by the loop, then the vertical paths used here will have to swing out to the right to avoid it, and swing left across the unused protrusion. Since the third vertical path is always used, the upper right protrusion must be used. Similarly, if the lower protrusion from the left is used, then the lower protrusion to the right must be used.