SAT Reduces to 3-Coloring

Is there an assignment of T’s and F’s to the inputs that yields output T?

OR gate & gadget

a

\(\text{a OR b}\)

\(\text{a OR b}\)

NOT gate & gadget

a

\(\text{NOT(a)}\)

\(\text{NOT(a)}\)
Circuit SAT

Truth Colors

force $P$ to be truth-colored

NOT

force $P$ to be truth-colored

NOT($P$)
Circuit SAT

graph is 3-colorable iff circuit is in SAT

force output T