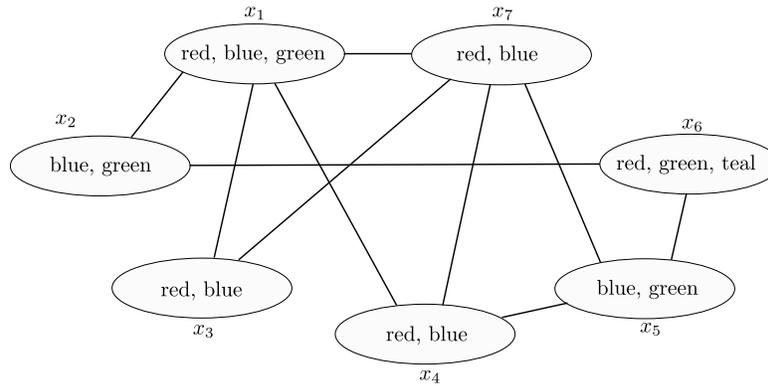


16.410-13 Recitation 4 Problems

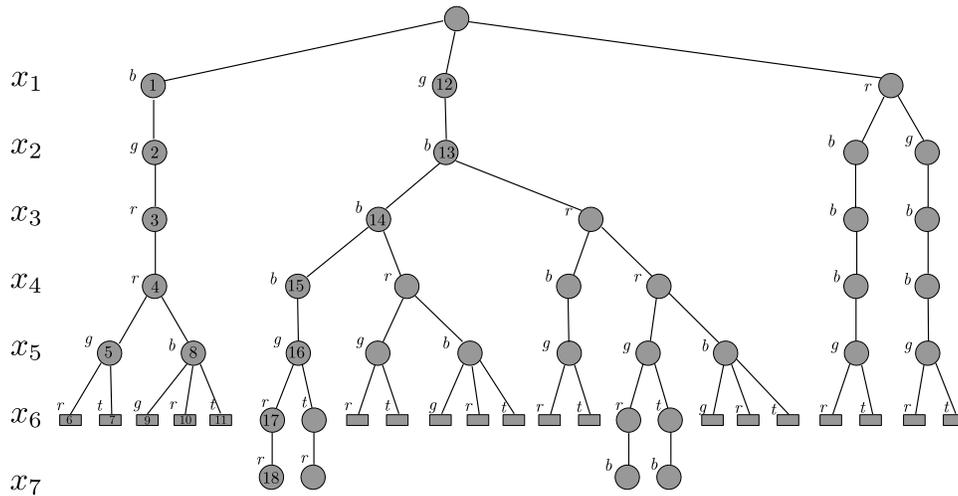
Problem 1: Backtracking and Forward-checking

Consider the following coloring problem.



Draw the search tree of the backtracking algorithm and number the nodes according to their order of expansion until the algorithm finds a feasible assignment that solves the constraint satisfaction problem. The algorithm picks the colors according to the following order: blue, green, red, teal. Assume that the algorithm traces the variables according to the following order: $x_1, x_2, x_3, x_4, x_5, x_6, x_7$.

Solution: The tree that backtracking would explore is given in the following figure. The tracing order until a solution is found is indicated with numbers on the nodes. The square nodes indicate the case when the algorithm gets stuck, circle nodes indicate the cases when the algorithm can continue search or has found a solution (the leaves).



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