CprE/SE/ComS 412, ComS 512 Homework 3

Reminder: present your own work and properly cite any sources used. Solutions should be presented satisfying the *other student viewpoint*. If you need clarification, contact the instructor: `asminer@iastate.edu`.

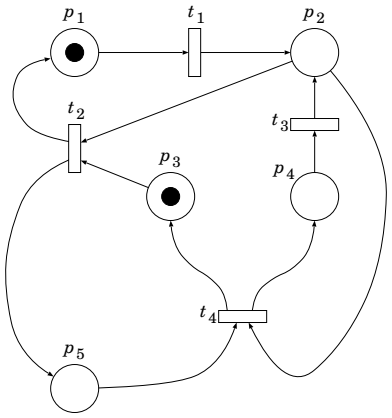
Question 1

Draw (or define) a Petri net that contains places p and b_3, b_2, b_1, b_0, and transitions as necessary, with an initial marking of $N \leq 15$ tokens in place p and zero tokens in $b_3, \ldots, b_0$. You may create additional places if necessary; if you do so, clearly indicate how they are initially marked. The behavior of the net should be such that all transition firing sequences lead to a "final" marking where all transitions are disabled, and in the final marking, the tokens in places b_3, b_2, b_1, b_0 are the binary encoding of N. Formally: in the final marking f, for each b_i, the number of tokens is either zero or one, and

$$\sum_{i=0}^{3} 2^i \cdot f(b_i) = N.$$

Optional for 412: For an arbitrary $B > 1$, explain how to draw the Petri net that uses places $b_{B-1}, \ldots, b_0$ for the binary encoding and allows $N \leq 2^B - 1$ tokens initially in place p.

Question 2



For the Petri net and initial marking shown above, list all reachable markings and draw the reachability graph (or list its edges).