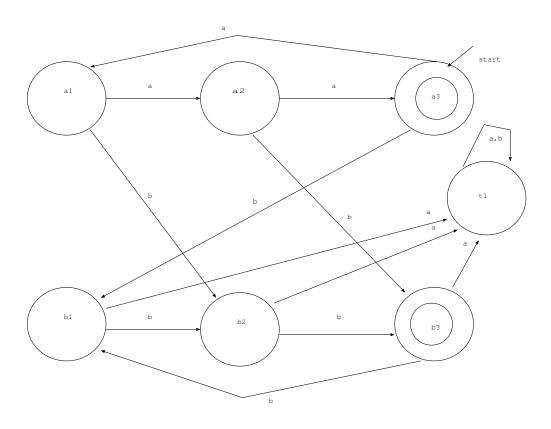
## HW1

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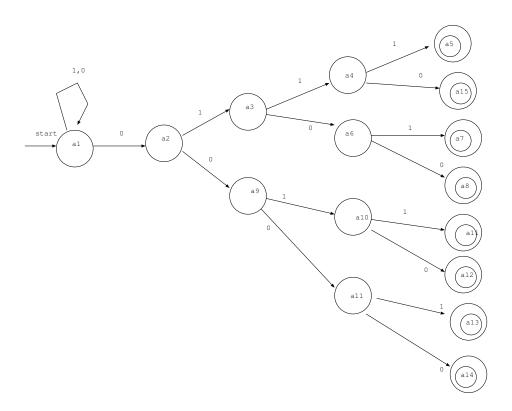
1. Define a DFA, simplified to the best of your abilities, to recognize the language L = {  $a^ib^i$  : (i + j) mod 3 = 0 }



2. Describe in a short English sentence the language accepted by the following DFA, and give a regular expression for it (hint: the names of the states reflect their meaning). Then, define a 5-state NFA that accepts the same language.

This DFA takes in characters from a alphabet of  $\Sigma = \{1,0\}$ . From left to right they are concatentated into binary numbers. The string must end with 4 binary numbers that are inclusive values between 0-7 after converting the last 4 binary numbers into decimal values.

Regular expression: (0+1)\*0(0+1)(0+1)(0+1)



3. Define a DFA equivalent to the following NFA.

