HW1

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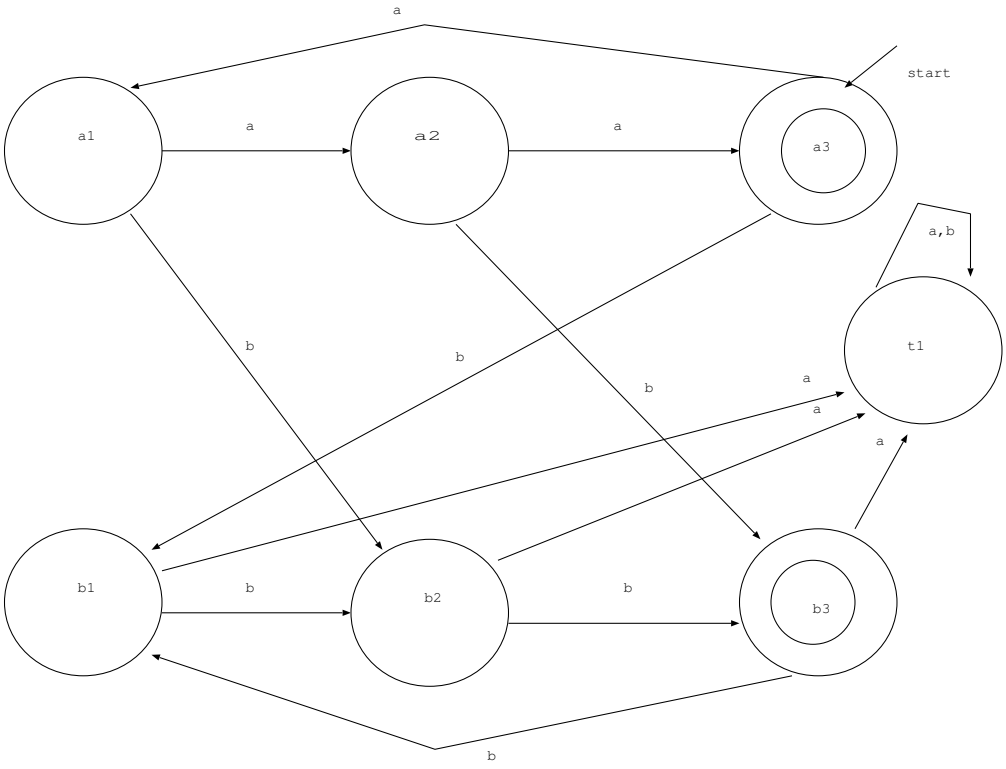
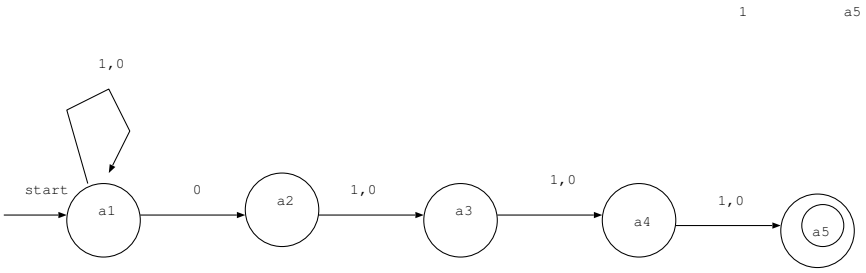
1. Define a DFA, simplified to the best of your abilities, to recognize the language L = { $a^i b^i$: (i + j) mod 3 = 0 }



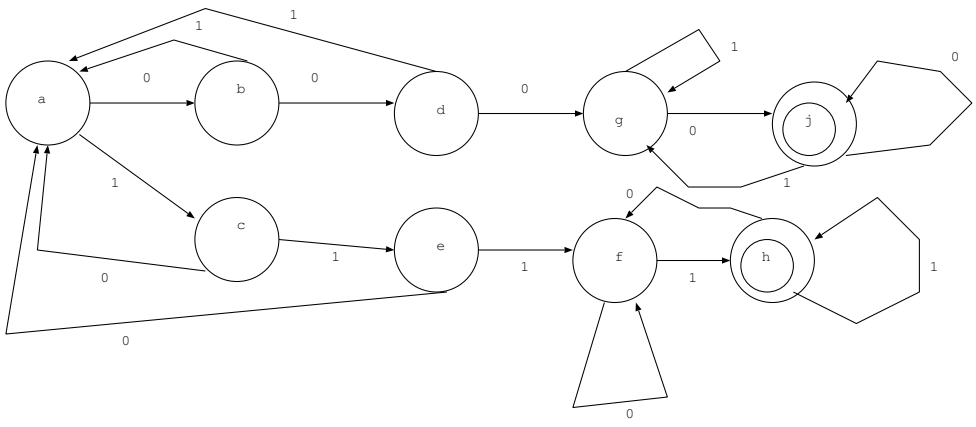
2. Describe in a short English sentence the language accepted by the following DFA, and give a regular expression for it (hint: the names of the states reflect their meaning). Then, define a 5-state NFA that accepts the same language.

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 decminal values.

Regular expression: $(0 + 1)^*0(0 + 1)(0 + 1)(0 + 1)$



3. Define a DFA equivalent to the following NFA.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