Describe a deterministic finite-state automata (DFA) that accept each of the following languages over the alphabet $\Sigma = \{0, 1\}$. Describe briefly what each state in your DFAs *means*.

1 All strings containing the substring 000.

2 All strings *not* containing the substring 000.

3 All strings in which every run of 0s has length at least 3.

4 All strings in which no substring 000 appears before a 1.
(Equivalently: All strings in which every substring 000 appears after every 1.)

5 All strings containing at least three 0s.

6 Every string except 000. (**Hint:** Don't try to be clever.)

Work on these later:

7 All strings w such that *in every prefix of* w, the number of 0s and 1s differ by at most 1.

8 All strings containing at least two 0s and at least one 1.

9 All strings w such that *in every prefix of* w, the number of 0s and 1s differ by at most 2.

10 (Hard.) All strings in which the substring 000 appears an even number of times.
(For example, 0001000 and 0000 are in this language, but 00000 is not.)