Give regular expressions for each of the following languages over the alphabet \{0, 1\}.

1. All strings containing the substring \texttt{000}.

2. All strings not containing the substring \texttt{000}.

3. All strings in which every run of \texttt{0}s has length at least 3.

4. All strings in which every substring \texttt{000} appears after every \texttt{1}.

5. All strings containing at least three \texttt{0}s.

6. Every string except \texttt{000}. [Hint: Don't try to be clever.]

Work on these later:

7. All strings \(w\) such that \textit{in every prefix of} \(w\), the number of \texttt{0}s and \texttt{1}s differ by at most 1.

*8. All strings containing at least two \texttt{0}s and at least one \texttt{1}.

*9. All strings \(w\) such that \textit{in every prefix of} \(w\), the number of \texttt{0}s and \texttt{1}s differ by at most 2.

★10. All strings in which the substring \texttt{000} appears an even number of times.

(For example, \texttt{0001000} and \texttt{0000} are in this language, but \texttt{000000} is not.)