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Give regular expressions that describe each of the following languages over the alphabet  $\{0, 1\}$ . We won't get to all of these in section.

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1. All strings containing at least three 0s.
2. All strings containing at least two 0s and at least one 1.
3. All strings containing the substring 000.
4. All strings *not* containing the substring 000.
5. All strings in which every run of 0s has length at least 3.
6. All strings such that every substring 000 appears after every 1.
7. Every string except 000. [*Hint: Don't try to be clever.*]
8. All strings  $w$  such that *in every prefix of  $w$* , the number of 0s and 1s differ by at most 1.
- \*9. All strings  $w$  such that *in every prefix of  $w$* , the number of 0s and 1s differ by at most 2.
- \*10. 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.)