Version: 1.1

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

- 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 1 does not appear after a substring 000.
- 5 All strings containing at least three 0s.
- 6 Every string except 000. (Hint: Don't try to be clever.)

Work on these later:

- All strings w such that in every prefix of w, the number of 0s and 1s differ by at most 1.
- **8** (Hard.) All strings containing at least two 0s and at least one 1.
- **9** (Hard.) All strings w such that in every prefix of w, the number of 0s and 1s differ by at most 2.
- 10 (Really 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.)