

Problem Sets After Test 2

*Only turn in problems that are **not** bracketed.* Bracketed problems are additional problems you can look at. Round brackets indicate problems that may help you with problems that are assigned; square brackets are additional problems on material that you should know, but you are not required to write up solutions; curly brackets are truly optional and may contain extra nuggets that you will not be required to know but may be interested in.

Additional assignments will be filled in over time.

notation	meaning
unbracketed	assigned problem – turn these in for grading
()	helper/warm-up problem
[]	additional problems (you are responsible for content, but don't turn them in)
{}	covers optional material

Due	Task	Source	Problems
Fri 3/18	PS 11	Rosen 13.1	1ad sentences [2] (3) 4 [5] 6a 9 (13) 14bd [15] 19 types of grammars Be sure to provide an explanation for problem 19.
Mon 3/21	PS 12	Rosen 13.1 Rosen 13.3	20 palindromes 21a union 24ab derivation trees (11) testing strings 12 testing strings 16–17 what language? 25–26 create DFA
Fri 3/25	PS 13	Rosen 13.3	19–20 what language? [32] create DFA 34 create DFA 36 create NFA 45–46 what language? [47] what language? 55–56 create DFA, NFA Note: Please do 55 and 56 in this order: 55a, 56a, 55b, 56b, 55c, 56c.
Wed 3/30	PS 14	Rosen 13.3 Rosen 13.4	52–54 NFA to DFA [1] 2abde describe in words [3] 4 does it belong? 6 regex [7] regex
Fri 3/31	PS 15	Rosen 13.4	14abc grammar to NFA
Mon 4/4	PS 16	Rosen 13.4	15–17 NFA to grammar 12ab regex to NFA 13a regex to NFA
Wed 4/6	PS 17	Rosen 13.4 DFA/NFA → regex	Convert the following DFAs or NFAs into equivalent regular expressions using our algorithm for doing so. Show the intermediate steps: 13.3.43 13.3.45 (Note: these are not the instructions in the book!)
Mon 4/11	PS 18	Rosen 13.5	2 trace TM 5 trace TM [1] trace TM [3–4] trace TM 6 design TM 10 design TM [7–12] design TM For problems 6 and 10, describe your Turing machine using the syntax of our Turing machine simulator. (You can use a text editor or copy and paste from the online simulator into a file to save your work.)

Due	Task	Source	Problems
never	Review	Rosen 13.RQ Rosen 13.SE	[1–2] [3] [4] [5a] [6a–12] [15] [17] [19] [3] [7] [8] [9] [19–21] [23–25] [26–27]
Fri 4/22	PS 19	Rosen 13.4	[23, 25] <small>pumping lemma</small> Python regular expressions: Be sure to use the online tools suggested in class to get familiar with how regular expressions work in Python. (They work very similarly in other programming languages – we are just picking Python to have one concrete example.) Be sure to write up the pumping lemma problems carefully.