Homework Assignment #3

Assigned: Friday 10/30/2015; Due: Tuesday 11/10/2015 by 11:59pm through Oncourse.

(total: 60 points)

Problem 1 (10 points) For the order statistics problem, show that the complexity of the recurrence
\[ T(n) = cn + T(n/5) + T(3n/10) \]
is linear. What will happen if the array is split into fragments of size 3? What if they are of size 7?

Problem 2 (10 points) Denning et al., Problem 3.1 (page 81)

Problem 3 (15 points) Denning et al., Problem 3.2 (page 81)

Problem 4 (5 points) Denning et al., Problem 3.8 (page 83)

Problem 5 (5 points) Construct a deterministic finite-state accepter \( M \) for the language

\[ T(M) = (110(0 \cup 1)^* \cap ((0 \cup 1)^*101) \]

Consider that the input alphabet for your automaton is \( \Sigma = \{0, 1\} \).

Problem 5 (15 points) Denning et al., Problem 5.2 (page 193)

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Homework policies:

This assignment is strictly individual. All code (if applicable) should be turned in when you submit your assignment (as hard copy).

Policy for late submission assignments: Unless there are legitimate circumstances, late assignments will be accepted up to 5 days after the due date and graded using the following rule:

- on time: \( \text{your score} \times 1 \)
- 1 day late: \( \text{your score} \times 0.9 \)
- 2 days late: \( \text{your score} \times 0.7 \)
- 3 days late: \( \text{your score} \times 0.5 \)
- 4 days late: \( \text{your score} \times 0.3 \)
- 5 days late: \( \text{your score} \times 0.1 \)
For example, this means that if you submit 3 days late and get 80 points for your answers, your total number of points will be $80 \times 0.5 = 40$ points.

All the sources used for problem solution must be acknowledged, e.g. web sites, books, research papers, personal communication with people, etc. Academic honesty is taken seriously; for detailed information see Indiana University Code of Student Rights, Responsibilities, and Conduct.

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Good luck!