Computational Complexity (Autumn 2006: CS40007, CS60049)
Assignment 2

Instructor: Prof. S. P. Pal
Teaching Assistant: Rahul Gokhale

Due on: 04/09/06

Exercise 1 *Let H_f be the language of all strings $< M, x >$ where M accepts x in at most $f(|x|)$ steps. Find as small a function $g(n)$ as you can in terms of $f(n)$ so that $H_f \in DTIME(g(n))$.*

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Exercise 2 *Show that the Turing machine halting problem is partially decidable.*

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Exercise 3 *Show that a $T(n)$ time bounded TM with k tapes can be simulated by a two-tape TM in $T(n)^2$ time.*

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Exercise 4 *What is the time complexity of accepting the language of palindromes on (i) a one-tape TM and (ii) on a two-tape TM? Do Problems 2.8.4 and 2.8.5 from [Papa94], based on Kolmogorov complexity.*

10+15

Exercise 5 *Study exercise: Theorem 2.2 page 32 and page 33 before section 2.5. Write a summary.*

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Exercise 6 *Study exercise: Page 47, Theorem 4.6 and example 2.10 Write a summary.*

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Exercise 7 *Problems 2.8.17, 2.8.11, 3.4.2, 3.4.5 and 3.4.4.*

15X5=75

Exercise 8 *Study exercises: Theorem 3.1, 8.1, Prop. 8.2, pages 160-164. Write the gist.*

15X3=45