

Problem Set 6

Fall 11

Due: Tuesday, 8th November, 2011, 11:00 am before class begins

Please follow the homework format guidelines posted on the class web page:

<http://www.cs.illinois.edu/class/fa11/cs373/>

1. Reduction à la Rice's Theorem [Category: Proof, Points: 30]

Show the following languages are undecidable. You may *not* simply appeal to Rice's theorem (however, you can *adapt* the proof of Rice's theorem to solve these particular problems).

(a) $L_{cs373} = \{\langle M \rangle \mid M \text{ is a TM and } L(M) \text{ contains the string "CS373"}.\}$

(b) $L_{finite} = \{\langle M \rangle \mid M \text{ is a TM and } L(M) \text{ is finite.}\}$

(c) $L_{reject} = \{\langle M \rangle \mid M \text{ is a TM and } M \text{ rejects all inputs.}\}$