8   Homework

Due: Wednesday, November 28, 2007.

Instructions

- Please, review the homework grading policy outlined in the course information page.

- On the *first page* of your solution write-up you *must* make explicit which problems are to be graded for regular credit, whic problems are to be graded for extra credit, and which problems you did not attmept. Use a table that looks like this:

Problem	1	2	3	4	5	6	7	8	9	...
Credit	RC	RC	RC	EC	RC	EC	NA	NA	EC	...

  where "RC" denotes "regular credit", "EC" denotes "extra credit", and "NA" denotes "not attempted". Failure to include such a table will result in an arbitrary set of problems being graded for regular credit, no problems being graded for extra credit, and a 5% penalty assessment.

- You must also write down with whom you worked on the assignment. If this varies from problem to problem, write down this information separately with each problem.

Problems

Required: 4 of the following 5 problems
Points: 25 points per problem

1. Do the Problem 5.1

2. Do the Problem 5.9

3. Do the Problem 5.20

4. Use a mapping reduction to prove that

   $DECIDER_{TM} = \{< M > | M \text{ is a } TM \text{ and } M \text{ is a decider}\}$

   is undecidable.

5. Prove that $REGULAR_{TM}$ (defined on p. 191 of Sipser) is neither Turing-recognizable nor co-Turing-recognizable. *Hint:* For part of this you should create one new mapping reduction.