Homework 6

Due: Friday, Apr. 16, at 9:00pm in the handin bin located on 2^{nd} floor CIT

Collaboration is allowed only by terms of the policy. Problems 1 and 2 are worth 33 and problem 3 is worth 34 points. Tom will hold TA hours Thursday 8-9PM, Dave Friday 3-4PM in the TA annex room on the second floor of the CIT.

Problem 1.

Show that P is closed under the star operation.

HINT: On input $y = y_1 \dots y_n$ for $y_i \in \Sigma$, build a table indicating for each $i \leq j$ whether the substring $y_i \dots y_j \in A^*$ for any $A \in P$.

HINT HINT: You do not need to use the aforementioned hint if you do not want to.

Problem 2.

Let $DOUBLE\text{-}SAT = \{\langle\phi\rangle | \phi$ has at least two satisfying assignments$\}$. Show that $DOUBLE\text{-}SAT$ is NP-complete.

Problem 3.

Show that, if P = NP, a polynomial time algorithm exists that, given a Boolean formula ϕ, actually produces a satisfying assignment for ϕ if it is satisfiable.