

CS581 Worksheet # 8

Due by midnight, Thursday, May 23th, Submit via D2L

1. Reducability is a technique for showing languages are decidable or undecidable.
 1. A Template is a structure with holes in it. When I say give a template, I mean: outline the structure and show where the holes are, what additional proof structure ties together the holes. Additional structure may include things like case analysis, proof by contradiction, inductive hypotheses, implication, quantifier structure (forall and exists), construction of artifacts with given properties, etc.
 2. Give a template for a proof that shows that some language, A, is decidable by reduction to another decidable language, B.
 3. Give a template for a proof that shows that some language B is undecidable, by reduction from a known undecidable language A.

2. The problem EQ_{DFA} (Theorem 4.5, page 169) is shown decidable by using the symmetric difference, and use of E_{DFA} . Can you outline another method for showing EQ_{DFA} ? Hint: think about the consequence of part c, of question 1.52 on page 91. You probably know about this property, but question 1.52 suggests how one might prove it. I am not asking you to prove this property, but only to use it to show EQ_{DFA} is decidable.

3. Now think about EQ_{CFG} . Consider the two methods discussed (one using Symmetric difference, the other using the method you demonstrated) and argue why neither of these apply to EQ_{CFG} .

- 4.