CSE 311 Quiz Section: June 6, 2013

1 Countability

Show that the following sets are countable:

a) The set of all rational numbers (not just the positives)

b) The set of all pairs of binary strings

2 Computability

Show the following problem INFINITE is undecidable: **Given:** $\langle Q \rangle$, the code of a program Q**Output:** 1 if Q halts on an infinite number of inputs

0 if Q only halts on a finite number of inputs

3 Another Computability Problem

(Note: The solution to this one will be posted online if we don't have time to go over it.) Show the following problem ONE is undecidable: **Given:** $\langle Q \rangle$, the code of a program Q**Output:** 1 if Q halts and outputs 1 on input !

1

0 if Q runs for ever or outputs something else on input !