CS 4810 Homework Assignment 10 due Friday class Nov 15

Please place your net ID in upper right corner of your homework

1. Create an infinite set that contains no infinite recursively enumerable set.

2. Let $x_1, x_2, x_3, \cdots$ be a list of all strings over the alphabet $\{0, 1\}$ and let $M_1, M_2, M_3, \cdots$ be a list of all Turing machines. Is the set $\{x_i \in L(M_i)\}$ a recursively enumerable set? Give a compelling argument for your answer.

3. Is the class of recursive sets closed under homomorphism? Is the class of recursively enumerable sets closed under homomorphisms? Give compelling arguments for your answers.

4. init(L)=$\{x | \exists y \quad xy \in L\}$ Is the class of recursive sets closed under init? Give a compelling argument for your answer.

5. The halting problem is the set $L_H = \{(M, x) | M$ halts when started on $x\}$ Prove that the halting problem is undecidable.