

Assignment 8

(Please work in groups of two or three and submit one answer sheet for the group.)

1. Suppose we have infinitely many r.e. languages L_1, L_2, \dots . Does it follow that their union $\bigcup_{i=1}^{\infty} L_i$ is also r.e.?
2. Show that if a language is recursive, then there is a Printer-TM for it that prints out the language in lexicographic (dictionary) order.
3. Show that if there is a Printer-TM that prints out a language in lexicographic (dictionary) order, then the language is recursive.
4. Show how diagonalization produces a string not on the following list:

E V E R Y
 S T A I N
 B A C O N
 C L I F F
 K N E A D

For questions 5–7, use of the Internet is allowed

5. According to the wikipedia article on “Turing machines”, which of the following models is NOT equivalent to a Turing Machine?
 - (a) Two-stack PDA
 - (b) Penrose pentangulation
 - (c) Register machine
 - (d) Post-Turing machine
6. Which of the following is FALSE?
 - (a) A quine is a program that produces a copy of its own source code as its only output
 - (b) In Escher’s lithograph “Drawing Hands”, the hands are drawing each other
 - (c) Kurt Gödel received his Ph.D. at Princeton
 - (d) “Squeamish Ossifrage” was encoded as part of an RSA challenge
7. Which of the following is an example of self-reference?
 - (a) Rene Magritte’s painting that is not a pipe.
 - (b) The Epiminedes Paradox
 - (c) GNU
 - (d) All four answers

Due: Tuesday November 19