

Sample Quiz 3

This quiz is closed book.

1. Let L be Turing-recognizable. Describe a Turing machine that can enumerate L .
2. Say that a write-once Turing machine is a single-tape TM that can alter each tape square at most once (including the input portion of the tape). Show that this variant Turing machine model is equivalent to the ordinary Turing machine model.
3. Show that decidable languages are closed under the operation of concatenation.
4. Let $C_{TM} = \{\langle M \rangle : M \text{ is a TM and } L(M) \text{ is context-free}\}$. Is C_{TM} decidable? Justify your answer.
5. Show that $\{\langle G \rangle : G \text{ is a CFG over } \{0, 1\}^* \text{ and } 1^* \cap L(G) \neq \emptyset\}$ is decidable.
6. Show that L is decidable if and only if its complement \bar{L} is decidable.
7. Show that if A is reducible to B , and B is Turing-recognizable, then so is A .
8. Let $H = \{\langle M, x \rangle : M \text{ is a TM and } M \text{ on input } x \text{ halts}\}$. Show that H is Turing-recognizable but not decidable.
9. Let $EQ_{TM} = \{\langle M_1, M_2 \rangle : M_1 \text{ and } M_2 \text{ are TM's and } L(M_1) = L(M_2)\}$. Show that EQ_{TM} is not Turing-recognizable.