L9: More Turing Machine Design and Introduction to Nondeterministic Turing Machines

3.3) Modify the proof of Theorem 3.16 to obtain Corollary 3.19, showing that a language is decidable iff some nondeterministic Turing machine decides it. (You may assume the following theorem about trees. If every node has finitely many children and every branch of the tree has finitely many nodes, the tree itself has finitely many nodes.)

As per theorem 3.16, every DTM (Deterministic Turing machine) has an NDTM (Non-Deterministic Turing machine). The Corollary 3.19 states that a language is decidable iff some NDTM decides it.

In order to modify the proof of theorem 3.16 to obtain Corollary 3.19, prove the following:

i.) If a language L is decidable then the language L can be decided by NDTM.

Let L be a language. The Language L is decidable if it is decided by a deterministic Turing machine. Any DTM is automatically a NDTM.

Thus, language L is decidable if it is decided by NDTM TM also.