

Given:

Two disjoint languages are supposed to be A and B . Decidable Language C is chosen so that it is use for separating A and B if $A \subseteq C$ and $B \subseteq \bar{C}$. Now, according to this concept two disjoint Co-Turing recognizable languages can be separated with the help of decidable language.

Proof:

Consider two DFA M and N for languages A and B . O is a DFA for separator C . Here language A is assumed to the subset of C and language B is assumed to be the subset of \bar{C} . In this way C is separating A and B because C or \bar{C} is not deciding both A and B instead A is decided by C and B is decided by \bar{C} . It can be understood that C and \bar{C} both are dissimilar and deciding A and B individually.

Construction:

Concept can be understood in better by using following approach:

Turing Machine F = runs on input x where A and B are two DFA

- Construction of DFA O is done for C . DFA O is working as a decider for language A and B .
- Run Turing Machine T on input of C . It will find the decidability capacity of O .
- If Turing machine accept the string then it is recognized and if Turing machine reject the string then it is not recognized.

Conclusion:

Now, if T accepts then DFA O for language C is working as a decider for language A otherwise it is working as decider for language B .

Now, it is quite easy to understand two disjoint Co-Turing recognizable languages which are separable by the use of some decidable language.