UNLV CS456: Decide/Accept

1. A deterministic machine M *accepts* a language L if:
   (a) If $w \in L$, the computation of M with input w halts in an accepting state.
   (b) If $w \notin L$, the computation of M with input w does not halt in an accepting state.
2. A deterministic machine M *decides* a language L if:
   (a) If $w \in L$, the computation of M with input w halts in an accepting state.
   (b) If $w \notin L$, the computation of M with input w halts in a rejecting state.
3. A non-deterministic machine M *accepts* a language L if:
   (a) If $w \in L$, there is a computation of M with input w which halts in an accepting state. (This computation may require making "all the right guesses.")
   (b) If $w \notin L$, there is no computation of M with input w which halts in an accepting state.

Let T be an non-decreasing function on integers.

4. A deterministic machine M *accepts* a language L in time T if:
   (a) If $w \in L$, the computation of M with input w halts in an accepting state within $T(n)$ steps, where $n = |w|$.
   (b) If $w \notin L$, the computation of M with input w does not halt in an accepting state.
5. A deterministic machine M *decides* a language L in time T if:
   (a) If $w \in L$, the computation of M with input w halts in an accepting state within $T(n)$ steps, where $n = |w|$.
   (b) If $w \notin L$, the computation of M with input w halts in a rejecting state within $T(n)$ steps, where $n = |w|$.
6. If $T(n)$ is recursive (that means computable) and if, for any n, $T(n)$ can be computed within $O(T(n))$ steps, and if a language L is accepted by some deterministic machine M_1 in time T, Then L is decided by some deterministic machine within time $O(T)$.
7. If L is accepted by some deterministic machine M, then there is an increasing function T such that M accepts L in time T. In this case, can we conclude that L is decided by some deterministic machine?
8. A non-deterministic machine M *accepts* a language L in time T if:
   (a) If $w \in L$, there is a computation of M with input w which halts in an accepting state within $T(n)$ steps, where $n = |w|$.
   (b) If $w \notin L$, there is no computation of M with input w which halts in an accepting state.