

Lecture #8: Modelling Computations of Languages

What Will Happen During the Lecture

Remember... You Had Homework!

Students were asked to have worked through a set of notes before this first lecture:

- Lecture Notes — “Modelling Computations of Languages”

Of course, you may attend the lecture presentation if you have not worked through this material ahead of time — but it will not be repeated for you during the lecture presentation.

Problem To Be Solved

Let

$$\Sigma_D = \{0, 1, 2, 3, 4, 5, 6, 7, 8, 9\}$$

and consider the language $L_{\text{unpad}} \subseteq \Sigma_D^*$ of **unpadded** decimal representations of natural numbers — that is, the union of the set $\{0\}$ and the set of strings beginning with any digit except “0”.

Let $f_{+1} : \Sigma_D^* \rightarrow \Sigma_D^*$ be the following total function.

- If $x \in L_{\text{unpad}}$, so that x is the unpadded decimal representation of some natural number n , then $f_{+1}(x)$ is the unpadded decimal representation of $n + 1$.
- If $x \notin L_{\text{unpad}}$ then $f_{+1}(x) = \lambda$, the empty string.

In order to aid understanding of the models of computation introduced in this lecture, the following things will be discussed in the lecture presentation:

- a **phrase-structure grammar** for the language L_{unpad} , and
- a **Markov algorithm** that computes the function f_{+1} .