

Lecture #7: Modelling Computations by Humans — Turing Machines

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 by Humans: Turing Machines”

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.

Considering Another — Much Simpler — Turing Machine Variant

The lecture notes introduced a variant of “Turing machine” that probably resembled Turing machines that you have seen in previous courses, in many respects, but that probably differed because it was designed to compute (partial) functions $f : (\Sigma^*)^n \rightarrow \Sigma$, for an alphabet Σ and for a positive integer n — so that there might be more than one input string.

At least one older reference — Roger’s text, *Theory of Recursive Functions and Effective Computability* [1] — uses a much simpler, and more limited, variant of a Turing machine as the model of computation to be used. This variant is so simple that it might seem surprising that it could be considered to be “equivalent”, in computational power, to the other Turing machine variants that you have already seen.

In the lecture presentation this simpler variant will be described and a proof that it is equivalent, in computational power, to the “Turing machine” given in the lecture notes, will be sketched.

As usual, an incomplete set of notes is available. If you would like to get ahead then you can try to fill in these notes before the lecture presentation.

References

- [1] Hartley Rogers. *Theory of Recursive Functions and Effective Computability*. McGraw-Hill, 1967.