Computability theory – an overview

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What are the most general models of computation?

- So far, we consider (very) restricted models of computation.
- From now, we want fully general models of computation.
- It turns out that there are a lot of “most general” models of computation, the Turing-complete ones.
- These (more or less) include all of your favourite programming languages.

What will learn about them

- These models are equivalent, because we can translate from one model to the other (aka compiler).
- These models allow for *universal computation* – there are particular instances that can take a description of an arbitrary instance and simulate it (aka interpreter).
- And there are problems that are just not computable.

Why we consider Turing machines

- Turing machines are a very simple model of computation, which is as powerful as it gets.
- This makes it easier to reason about Turing machines (as opposed to say programs in real-life programming languages).
- (Turing machines are not meant for implementation).