**Church–Turing Thesis**

Church–Turing thesis also known as Church's thesis is a [hypothesis](https://en.wikipedia.org/wiki/Hypothesis) about the nature of [computable functions](https://en.wikipedia.org/wiki/Computable_function). It states that a [function](https://en.wikipedia.org/wiki/Function_%28mathematics%29) on the [natural numbers](https://en.wikipedia.org/wiki/Natural_numbers) can be calculated by an [effective method](https://en.wikipedia.org/wiki/Effective_method) if and only if it is computable by a [Turing machine](https://en.wikipedia.org/wiki/Turing_machine). The thesis is named after American mathematician [Alonzo Church](https://en.wikipedia.org/wiki/Alonzo_Church) and the British mathematician [Alan Turing](https://en.wikipedia.org/wiki/Alan_Turing).

The Church-Turing thesis concerns the concept of an effective or systematic or mechanical method in logic, mathematics and computer science. ‘Effective’ and its synonyms ‘systematic’ and ‘mechanical’ are terms of art in these disciplines: they do not carry their everyday meaning. A method, or procedure, M, for achieving some desired result is called ‘effective’ (or ‘systematic’ or ‘mechanical’) just in case:

1. M is set out in terms of a finite number of exact instructions (each instruction being expressed by means of a finite number of symbols);
2. M will, if carried out without error, produce the desired result in a finite number of steps;
3. M can (in practice or in principle) be carried out by a human being unaided by any machinery except paper and pencil;
4. M demands no insight, intuition, or ingenuity, on the part of the human being carrying out the method.

One way in which the two men’s approaches differed was that Turing’s concerns were rather more general than Church’s, Church considered only functions of positive integers, whereas Turing described his work as encompassing “computable functions of an integral variable or a real or computable variable, computable predicates, and so forth”. Turing intended to pursue the theory of computable functions of a real variable in a subsequent paper, but in fact did not do so.