

## Theory Jigsaw - possible entries

	Universality	Computability	Intractability
Big Idea	General purpose computer	Some problems are non-computable	Some problems take too long to solve.
	Church-Turing Thesis		
Vocabulary	thesis	undecidable	search problem - has solution checkable in Polynomial time.
	model of computation	unsolvable	P (efficient)
		paradox	NP (all search problems)
		proof by contradiction	NP-complete (e.g., 3SAT, TSP)
Practical Consequence	Same machine can be used for many jobs	No guaranteed virus detection.	Take advantage of intractability e.g., RSA encryption
	Different machines can be used for same job.	No automated infinite loop detection.	
	Improving the hardware cannot make the machine more powerful.		
People	Alan Turing Turing Machine	Alan Turing Halting Problem undecidable	Dick Karp 3SAT reduces to a set of problems
	Alonzo Church lambda calculus	David Hilbert all math solvable (wrong)	Stephen Cook Set of problems reduces to 3SAT
	Ada Lovelace idea of general purpose computers	Kurt Godel Incompleteness Theorem	

Church-Turing Thesis: Turing machines can do anything that can be described by a purely mechanical process. (i.e., TM as *powerful* as any other machine.)

Extended Church-Turing Thesis: P is the set of search problems solvable in poly-time in this universe (i.e., TM as *efficient* as any other machine.)