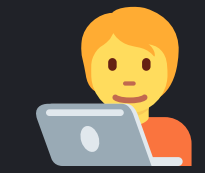
CMPUT 474 - Nature of computation 

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3 topics:

- consequences of simple mechanisms
- finiteness versus infiniteness
- consequences of self-referability

Also note computers have finite state control over unbounded but finitely addressable memory

1. Consequences of simple mechanisms

Simple mechanisms **can** lead to complex behaviour, e.g. 1D cellular automata

In fact, simple mechanisms can lead to complex behaviour that may not be possible to predict. Only simulation can tell the end state

2. Finiteness versus infiniteness

- strings are finite
- strings are bounded
- there are infinite strings
- there are infinite programs
- there are infinite problems
- more problems than programs
  (You cannot create a one-to-one mapping between programs and problems)

computation is a finite state control with a finite set of finitely-specified operators, accessing a finitely-addressable memory with a finite alphabet