Basics

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COGS 502: Symbols and Programming
METU, Informatics

Computers and computation

▶ Computers, like the mindbrain, have internal states.

▶ A computational process is a certain sequence of such states.

▶ Not every sequence of states is a computational process;
▶ but every computational process is some such sequence.

▶ A computational process differs from a random sequence of states by "meaningful" relations between some states in the sequence.

$$S_0, S_1, S_2, \ldots, S_{149}$$

Example

↓ input

[A B C D] : S_0 "transition"

meaning

[X A B C D] : S_1

[D X A B C] : S_2 "reversal"

[D C X A B] : S_3

[D C B X A] : S_4

[D C B A X] : S_5

[D C B A] : S_6

↑ output

Algorithms

```
     ↕
→ [ A B C D ]
→ [ X A B C D ]
  [ D X A B C ]
  [ D C X A B ]
  [ D C B X A ]
  [ D C B A X ]
  [ D C B A ]
     ↑
```
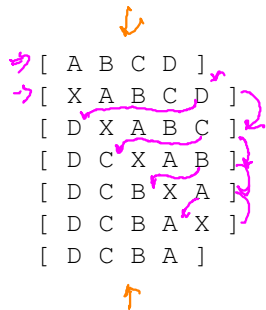
Seq

1. insert 'x' to the front of Seq
2. If X is the final symbol, remove it and stop.

   else, move the final symbol to the left of X and repeat step 2 with the new Seq

"abstraction"

Programs

Common Lisp

▶ A set of instructions (or declarations) to manage computational processes.

is the implementation of an algorithm.
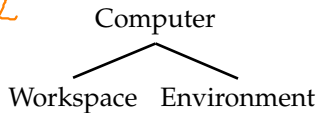*(description*
that can
be understood and executed by a
computer)

program as a machine

Structure of the computer

SBCL   "top level"
       "console"
       "REPL"

                    Computer
                   /   \
            Workspace   Environment
                ✓   =

3   +   7   => infix not.
     ↑ operator

operands

(+   3   7) => prefix
                      not.
       ↓   ↓
      10   Polish
                   Notation