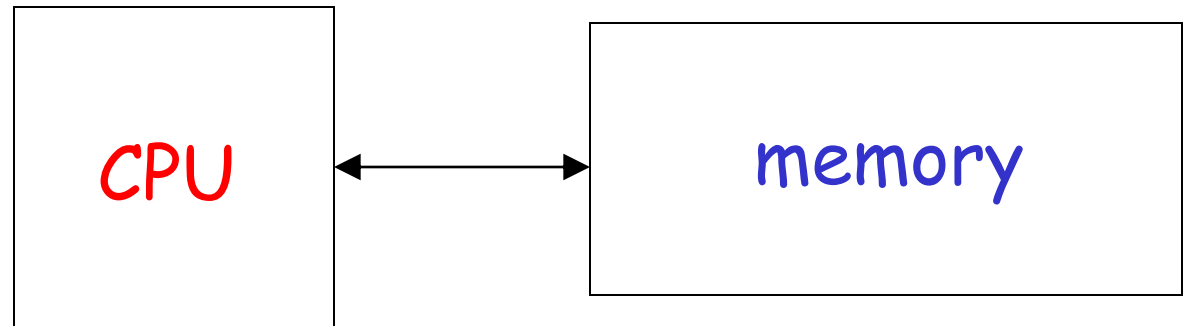
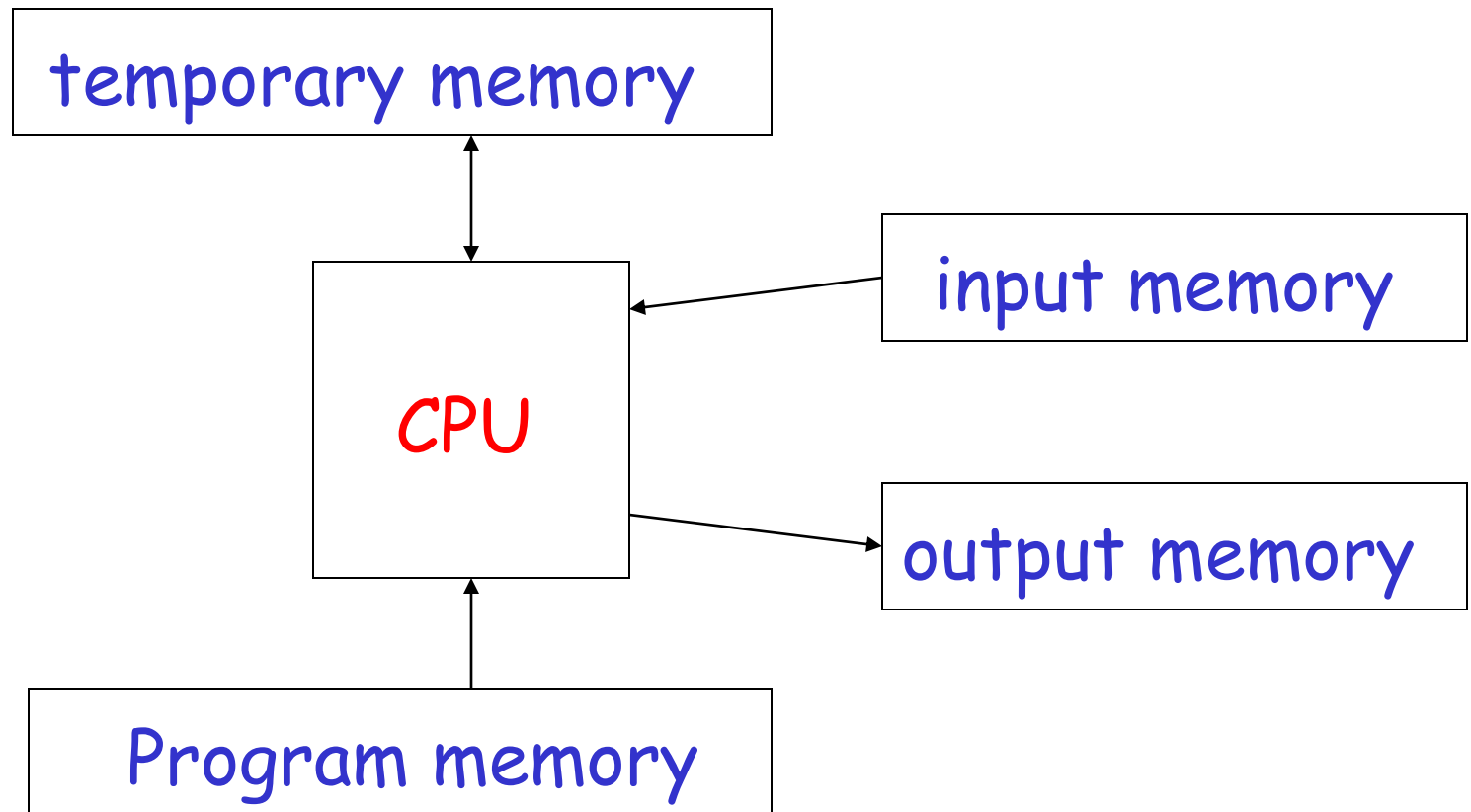


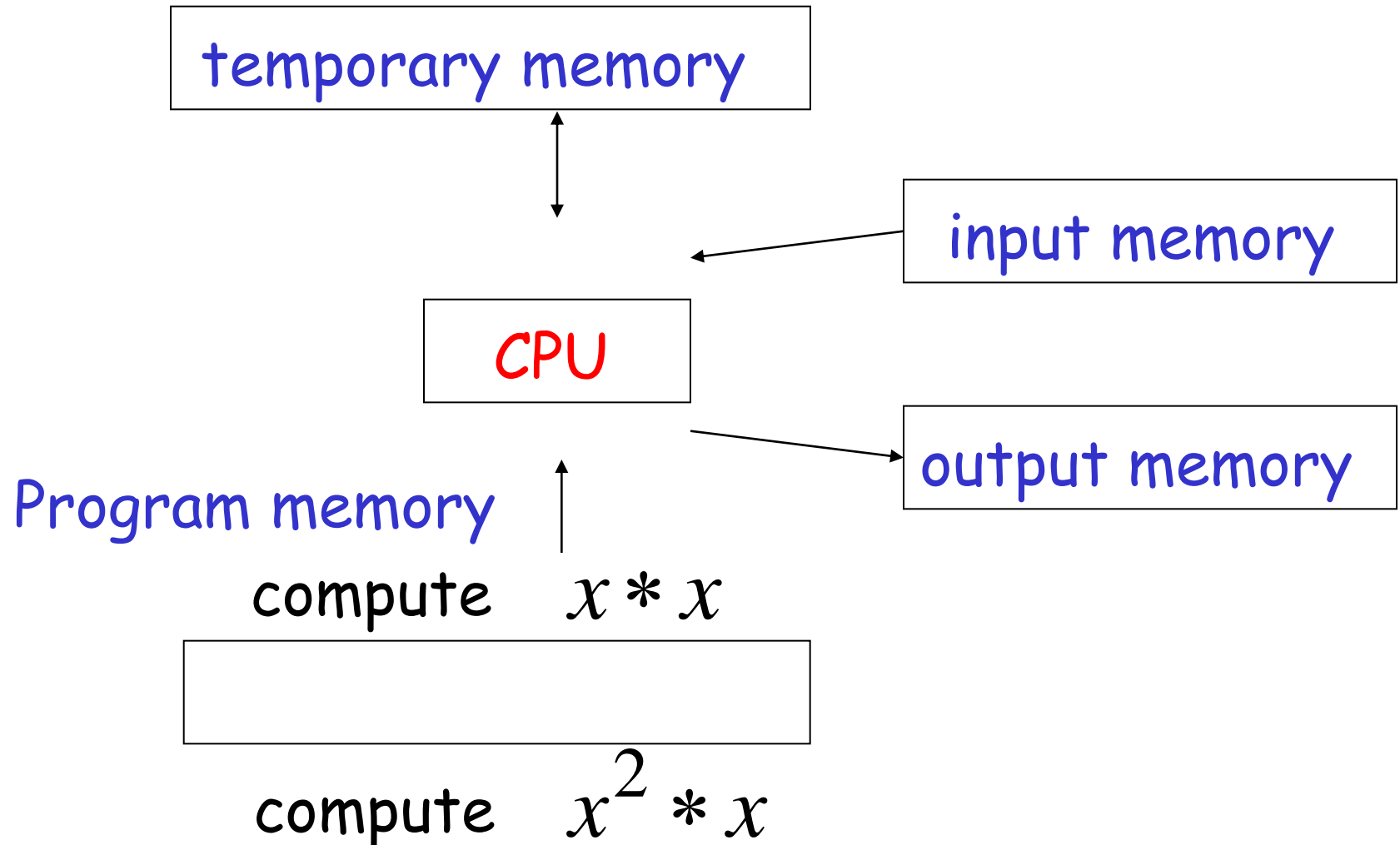
Models of Computation

Computation

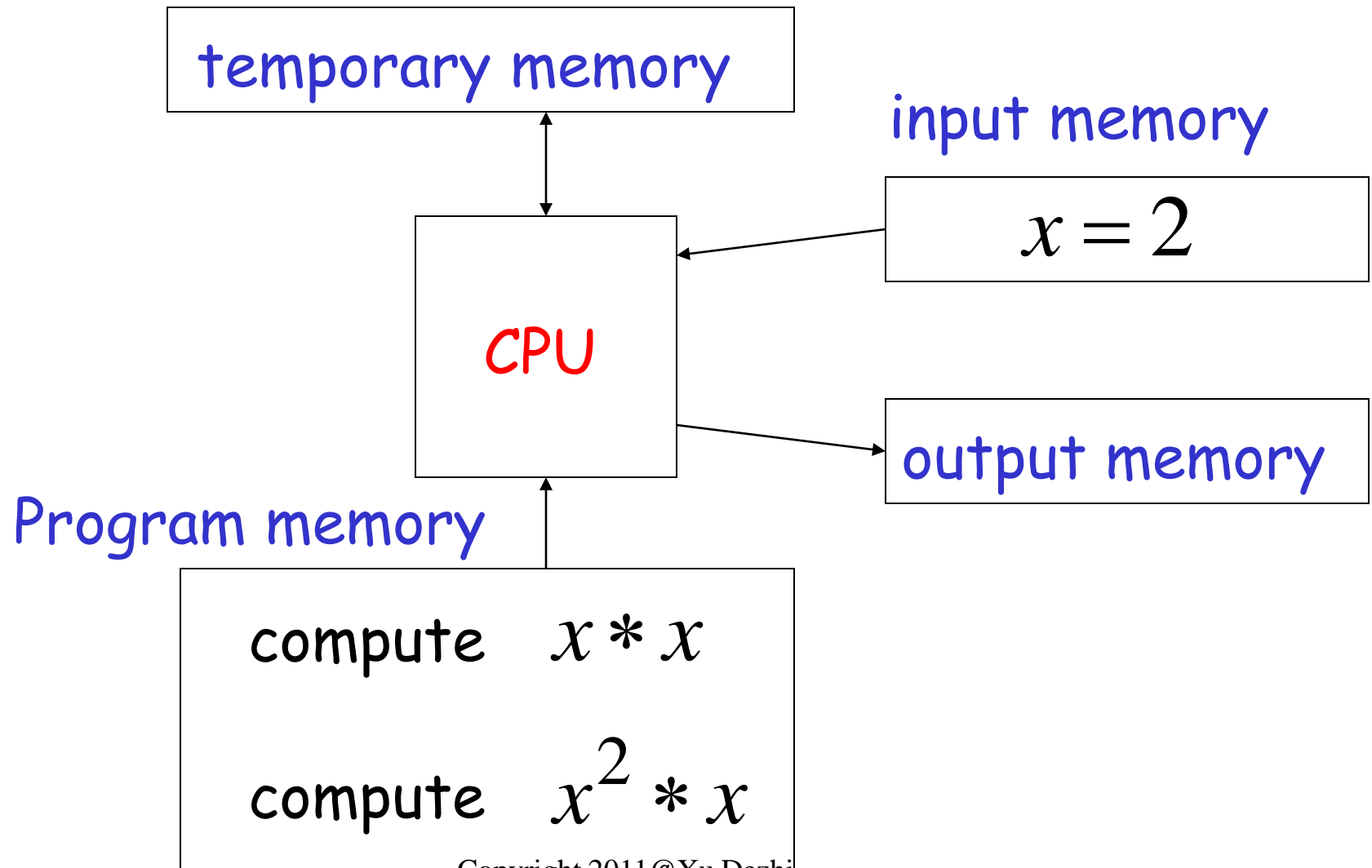




Example: $f(x) = x^3$



$$f(x) = x^3$$



temporary memory

$$f(x) = x^3$$

$$z = 2 * 2 = 4$$
$$f(x) = z * 2 = 8$$

input memory

$$x = 2$$

CPU

output memory

Program memory

compute $x * x$
compute $x^2 * x$

temporary memory

$$z = 2 * 2 = 4$$

$$f(x) = z * 2 = 8$$

$$f(x) = x^3$$

input memory

$$x = 2$$

CPU

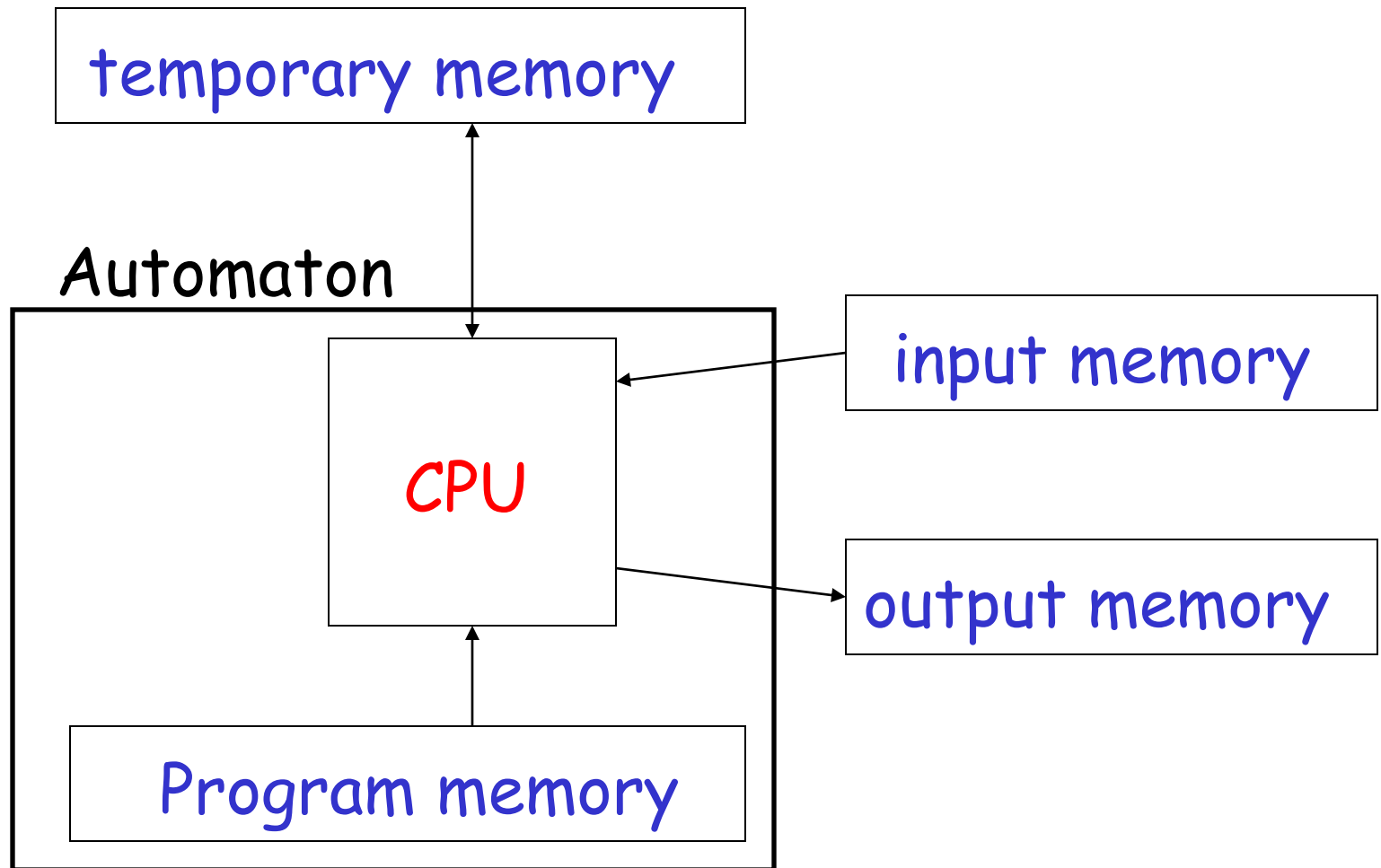
$$f(x) = 8$$

output memory

Program memory

compute $x * x$
compute $x^2 * x$

Automaton

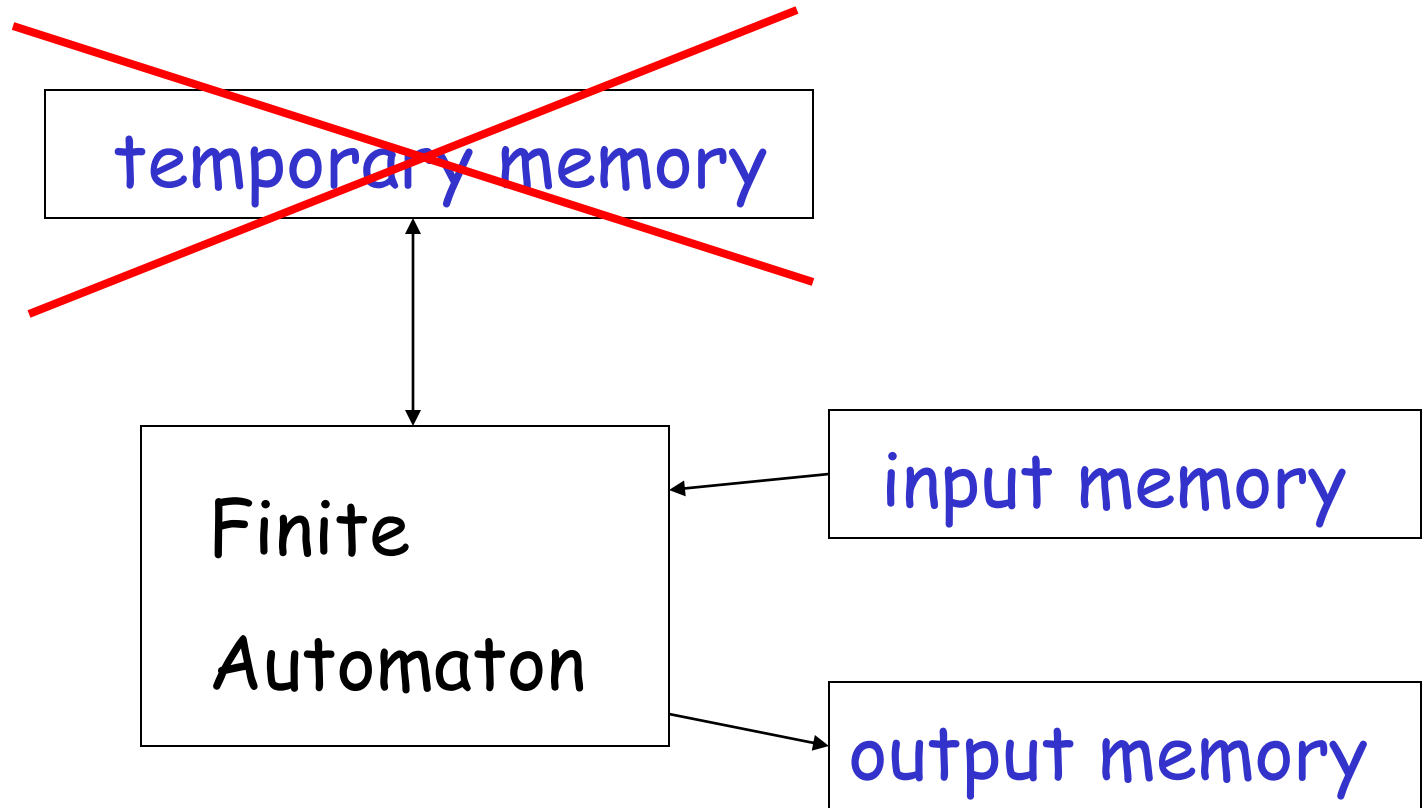


Different Kinds of Automata

Automata are distinguished by the temporary memory

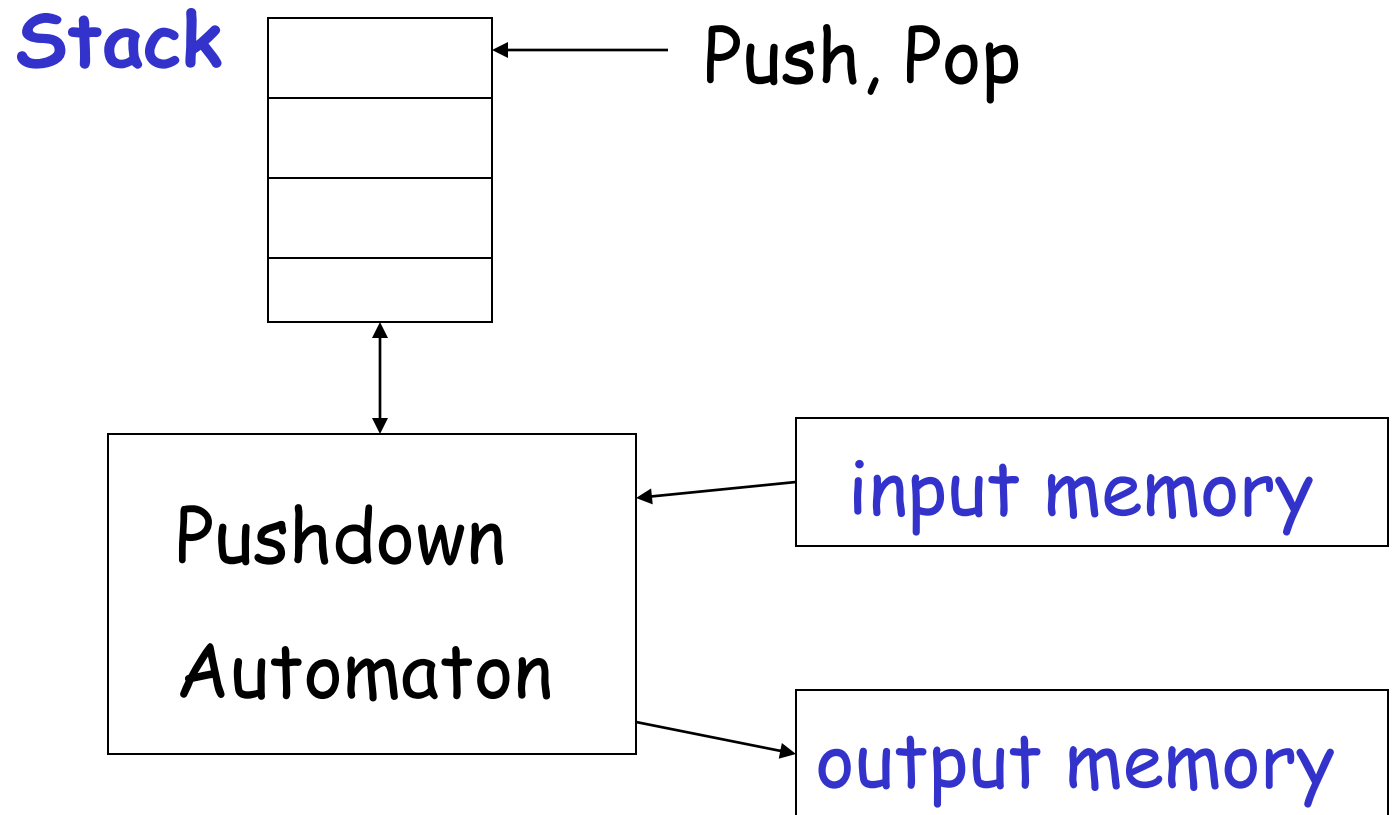
- **Finite Automata:** no temporary memory
- **Pushdown Automata:** stack
- **Turing Machines:** random access memory

Finite Automaton



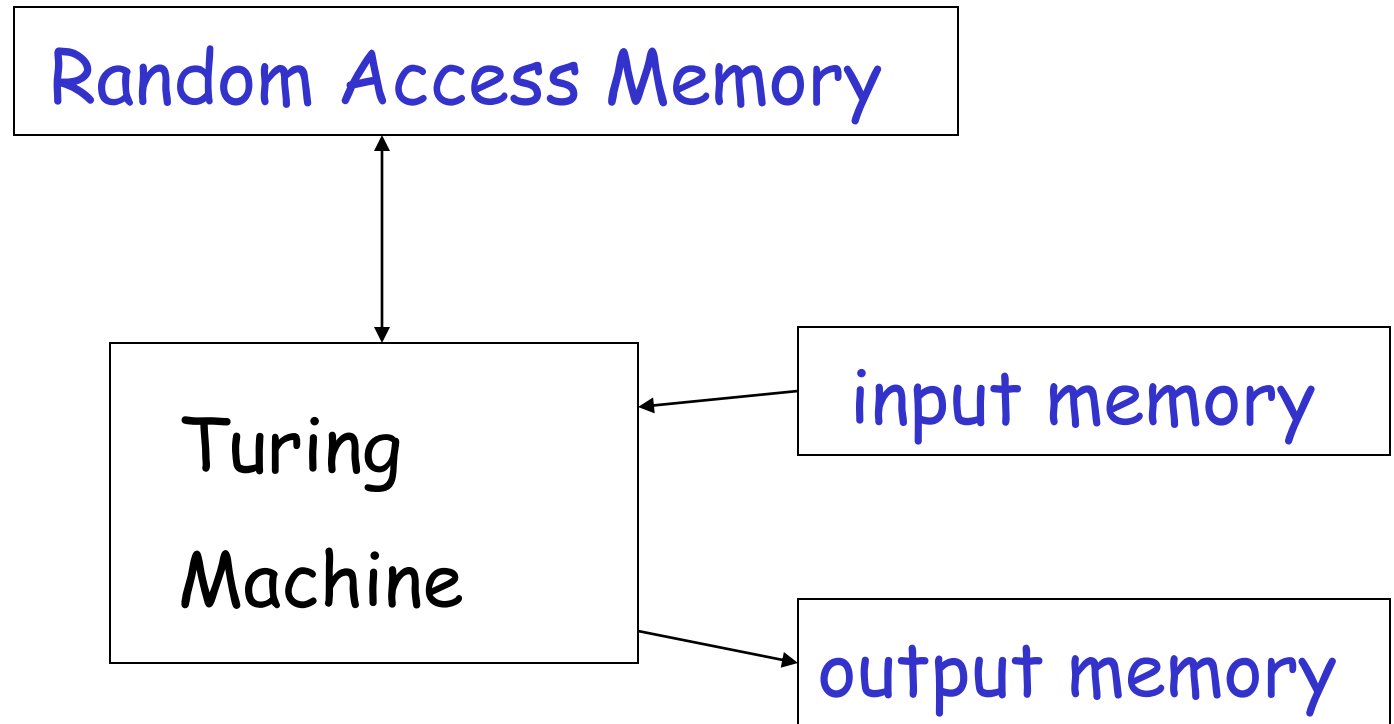
Example: Vending Machines
(small computing power)

Pushdown Automaton



Example: Compilers for Programming Languages
(medium computing power)

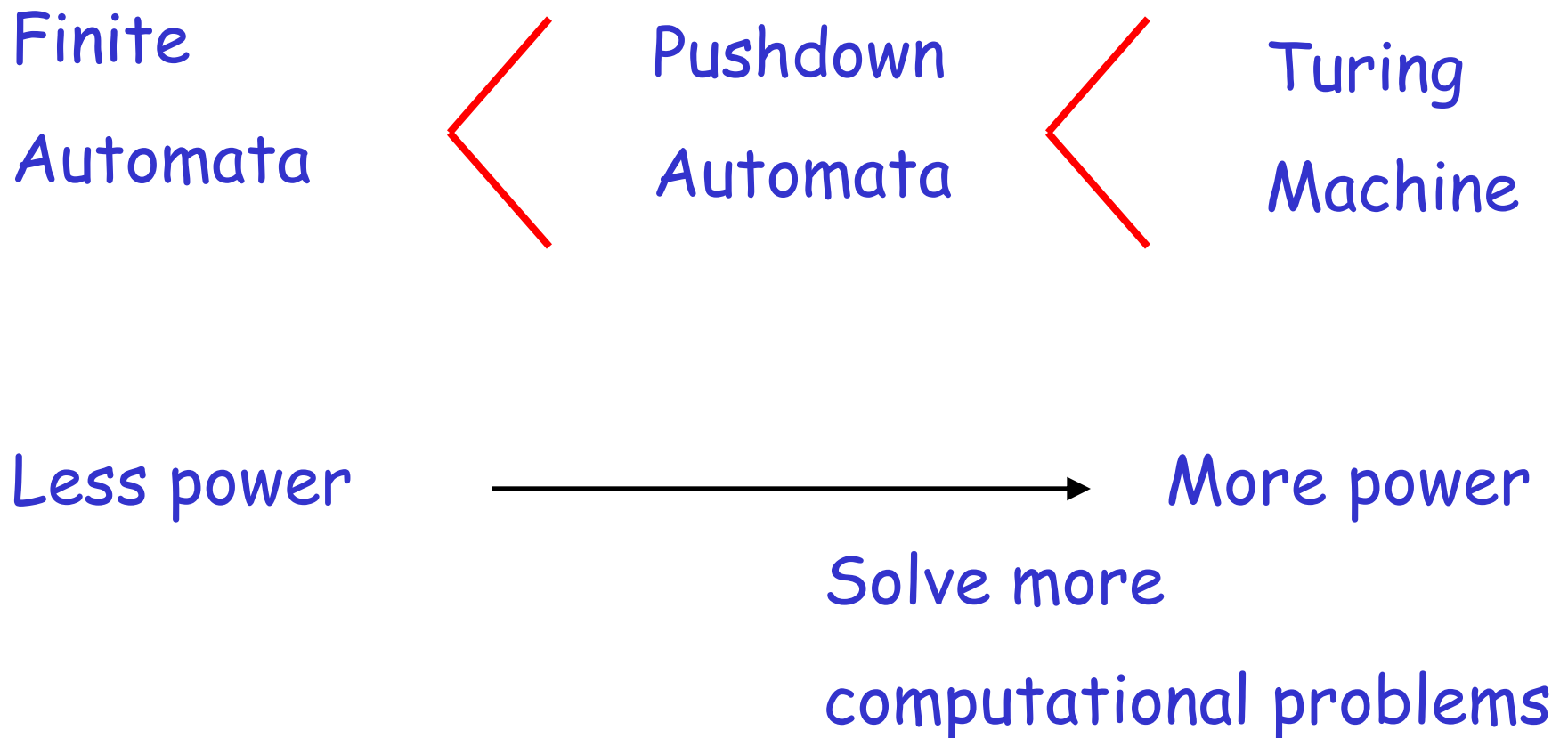
Turing Machine



Examples: Any Algorithm

(highest computing power)

Power of Automata



The End