A set is a special function: $f : \Sigma^* \to \{0, 1\}$

$= \{ x \mid f(x) = 1 \}$

Given a function $f : \Sigma^* \longrightarrow \Sigma^*$,

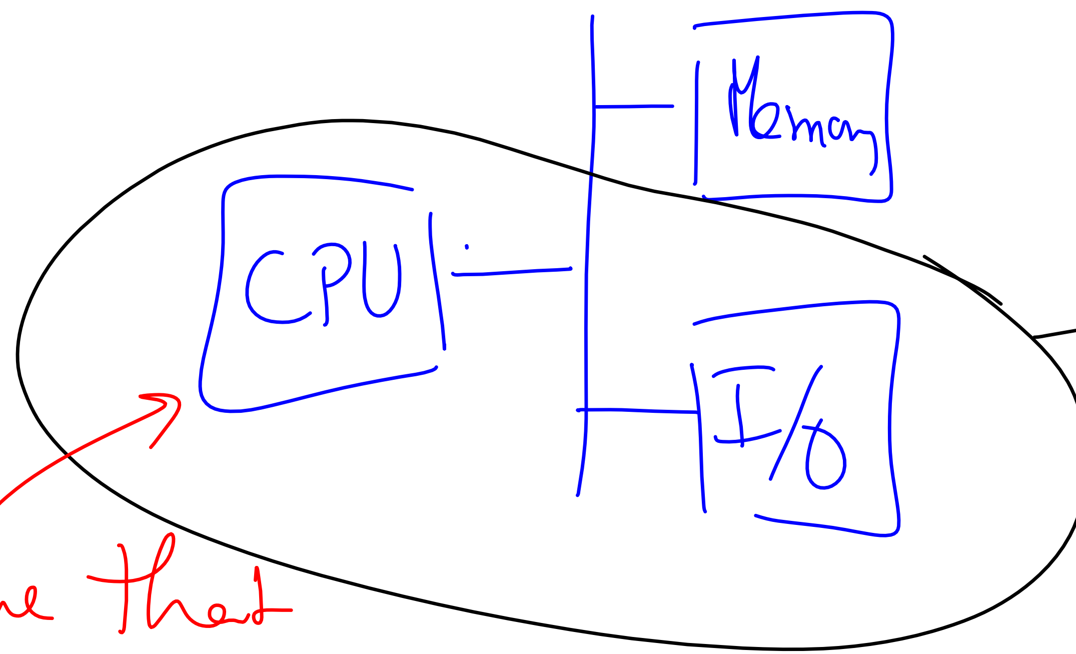
define $A_f = \{ (x, y) \mid f(x) = yz \}$ for some $z \in \Sigma^*$

String y is a prefix of string z if $z = yz'$ for some string z'

Computing f from A_f

Given input x, first check if $(x, 0) \in A_f$ or $(x, 1) \in A_f$.

We will study sets and their computability



We will start with this device

assume that program resides here

Consider CPU at a specific stage of computation.

Contents of its registers define the state of CPU at that stage.

CPU has finitely many states independent of input.

Q : the set of states of CPU

S_0 : starting state of CPU

null or empty string

δ : $\delta : Q \times \Sigma \cup \{\epsilon\} \rightarrow Q$

F : $F \subseteq Q$

Σ : alphabet

A finite automata is described by 5-tuple $(Q, s_0, \Sigma, \delta, F)$.