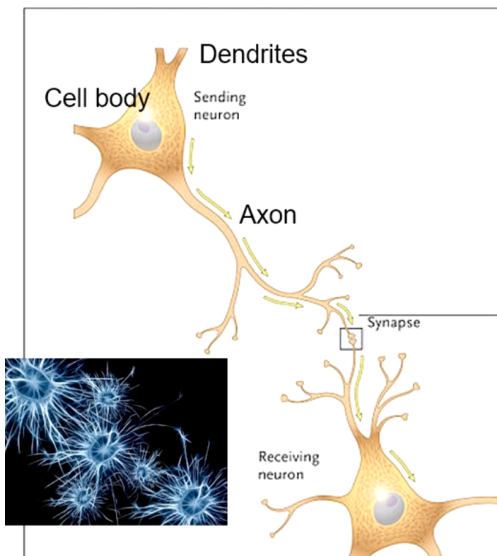**Human Neuron**
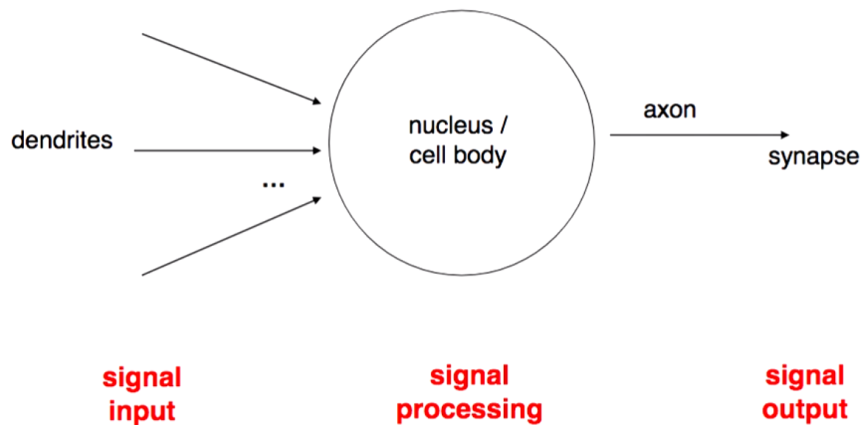
Dendrites ~ Input
Cell body ~ Processing
Axon/Synapse ~ Output

Human brain ~ 10^{12} neurons

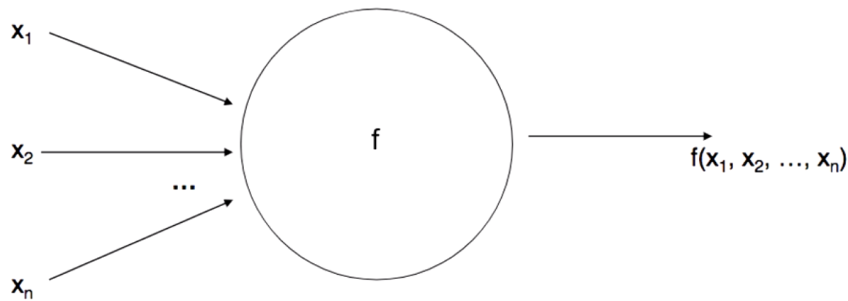**I/O Abstraction**

- similar to blackbox/function

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McCulloch-Pitts Neuron

- simplest neuron
- binary input, binary output
- output of 1 if sum of all input bits > threshold else 0

$x_1 \ldots x_n \in \{0,1\} = B$

$f: B^n \rightarrow B$

f is a threshold function: if $sum(x_1 \ldots x_n) > T$ then 1, else 0

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McCulloch-Pitts Neuron with Inhibitory Inputs

- based on McCulloch-Pitts Neuron
- two types of inputs
  - normal inputs x
  - inhibitory inputs y
- one inhibitory input true ==> false
- allows boolean logic

  if (at least one y_i = 1)

      then 0

  else if (sum($x_1 \ldots x_n$) > threshold T)

      then 1

  else

      0

  $$f(x_1 \ldots x_n, y_1 \ldots y_m) = f(x_1 \ldots x_n) * \pi(1-y_i)$$

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