Basic elements

State machine consists of:
-- set of states $S$
-- initial state $I \in S$
-- set of event classes $E$
-- transition relation $R \subseteq S \times E \times S$

Semantics of state machine is:
-- 'alphabet' of event classes $E$
-- set of traces $T \subseteq E^*$ defined like this:
  -- the empty sequence is a trace
  $<> \in T$ leading to the initial state
  -- if trace $t$ can lead to state $s$, and
  $(s,e,s') \in R$, then $t^<e> \in T$ is a
  trace that can lead to state $s'$

I/O shorthand

Parallel combination:
-- given machines $(E_1,T_1)$ and $(E_2,T_2)$
-- a sequence $t$ in $(E_1 \cup E_2)^*$ is a trace
  of the combined machine if
  $t$ restricted to the events in $E_1$ ($E_2$)
  is in $T_1$ ($T_2$)

Defining a state machine

Definition should include:
-- state machine diagram
-- designations of events

Sample designation:
offhook: user hangs up phone
by pressing END button