Limitations:

This trainer is suitable for instructional purposes. The following 'real world' parameters are ignored:

- fan-out - a typical TTL gate output can only drive three to five other TTL inputs. In this version, gate outputs can be connected to an unlimited number of inputs.
- LEDs can be assumed to have an internal resistor which limits the maximum current flow through them. In this simulation, you can connect an LED directly to the +5 volt input. If a current limiting resistor were not used, excessive current would damage (fry/smoke) the LED.
- Timing diagrams can be used for a relative comparison of signals. Changes in dip switches, for example, are centered within the clock pulse where they occured. No real-time information is provided. The timing diagrams are an accurate

first approximation. Parameters such as propogation delay,

and set up times are ignored in this version of MacBreadboard.

- Feedback loops (ie tying a gates output to one of it's inputs)

is generally allowed, but only relative timing information can

be provided for asynchronous gates.