

Figure 1: Top-level block diagram of the guess-the-number game

- Req. ① The circuit chooses a random 8-bit # → Use a counter (increment until user press the first KEY press)
 ② The player enters guess using SW_{7:0} and uses KEY₁ to confirm → USE HEX₀₋₁ displays the input value
 ③ 3 red LEDs tell whether under, over, or equal to the correct value
 ④ unlimited tries (first version), 7 tries (second version) → Remaining attempts on HEX₅
 ⑤ Ends at "equal"

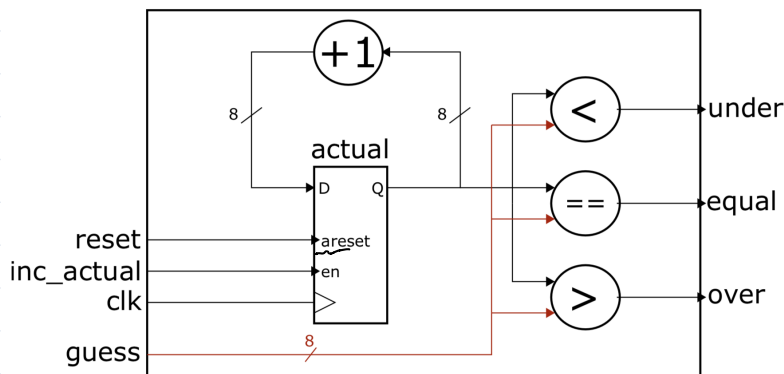
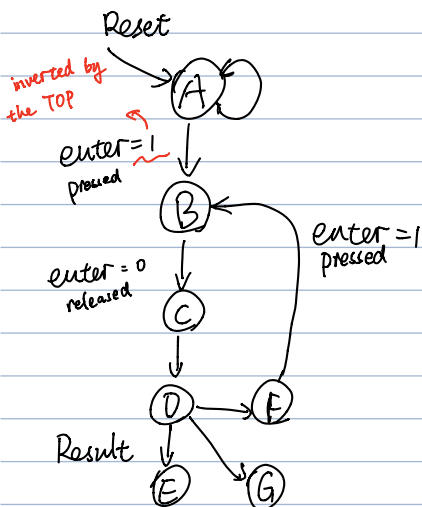


Figure 2: Game datapath



State A: Generate Random #

inc-actual = 1

Ns: State A, if enter = 0

State B, if enter = 1

State B: Stop generate Random #

inc-actual = 0 (default)

Ns: State B, if enter = 1

State C, if enter = 0

State C: Compare input with the counter

Ns: State D

State D: Display the result

RemainAttempts - 1 (part II)

update_leds = 1

Ns: State E, if "equal"

State G, if RemainAttempts = 0 (part II)

State F, if not "equal"

State E: Won!

NS: State E
(wait for Reset)

State F: wait for next enter

NS: State F, if enter = 0
State B, if enter = 1

State G: Failed!

NS: State G
(wait for Reset)