Clocks

- Timing is important in many circuits
- A clock is a circuit that emits pulses at regular intervals
- A clock's frequency is the number of pulses per second
    - The clock on a 4 GHz CPU has 4 billion pulses per second
    - Circuits with delays can be used to create subcycles
- Rising edge - voltage switches from low to high (output from 0 to 1)
- Falling edge - voltage switches from high to low (1 to 0)
- Output of the clock is used as input to other circuits

Memory gates

- SR Latch

    - Two inputs

        - S for setting the latch (set to 1)
        - R for resetting the latch (set to 0)

    - Two outputs

        Q and $\overline{Q}$

    - Not a combinational circuit

- (Clocked) SR latch

    The latch can only change state when the clock is 1

- Clocked D latch

    - A single input D and its complement are used as the
      S and R values
    - When the clock is 1, D is stored in the latch
    - Avoids the problem of S and R being both

- D flip-flop

  - The change in state can only happen on the rising edge
    of the clock