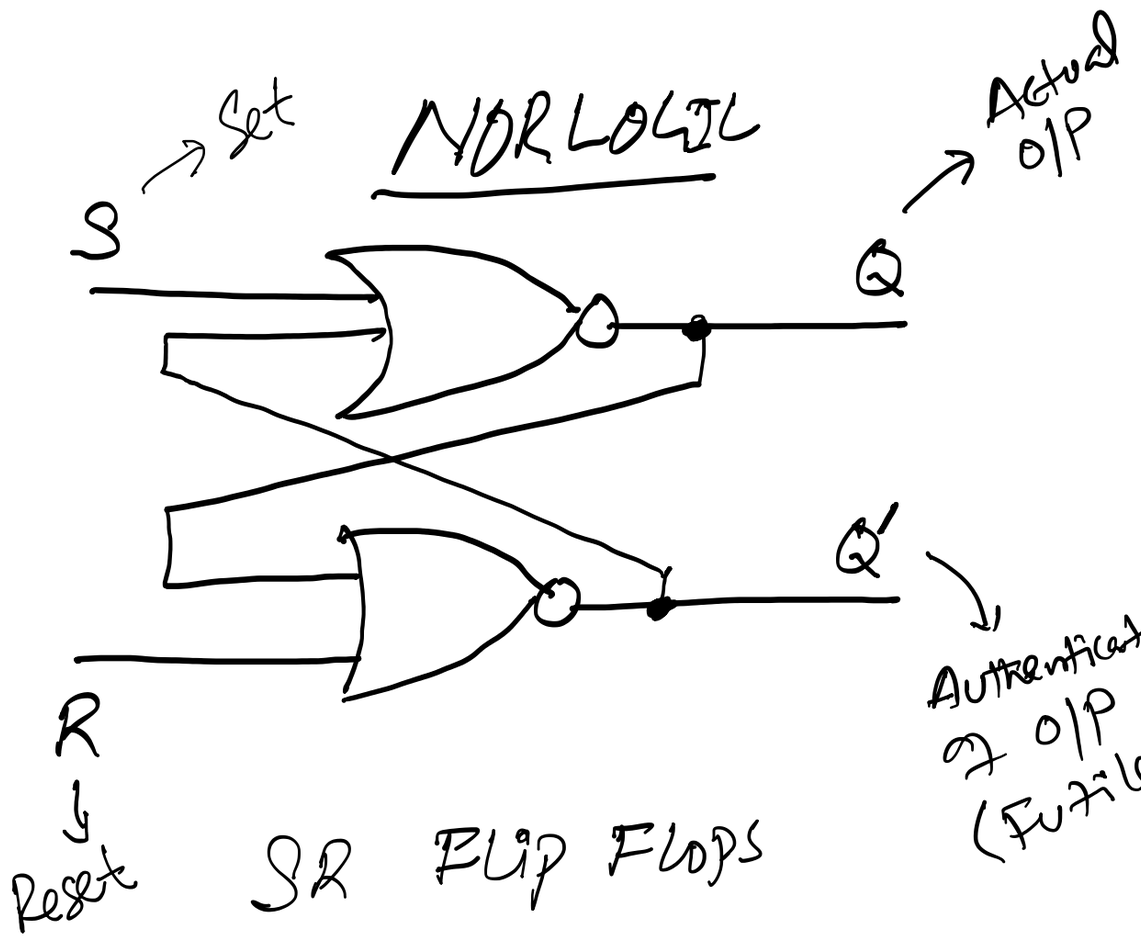
# Flip Flops

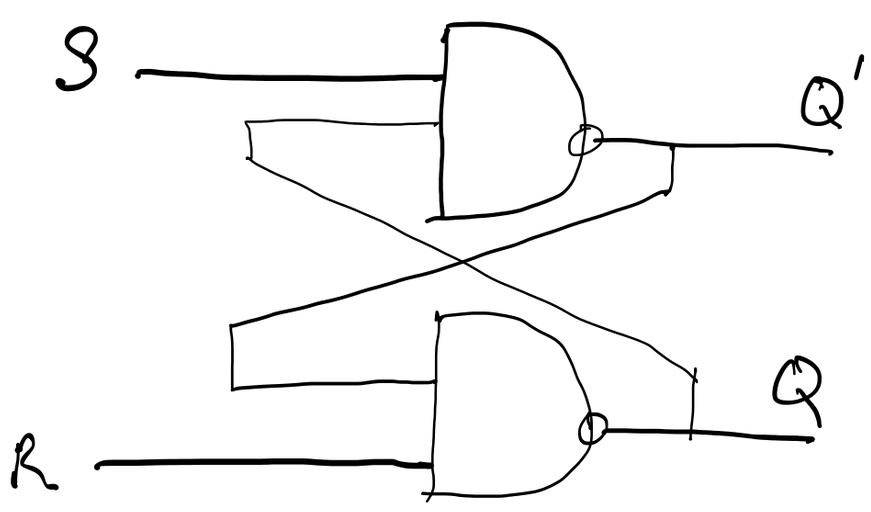



SR Flip Flops

| S | R | Q | Q' | |
|---|---|---|---|---|
| 1 | 0 | 1 | 0 | Set |
| 0 | 0 | 1 | 0 | Latch |
| 0 | 1 | 0 | 1 | Reset |
| 0 | 0 | 0 | 1 | Latch |
| 1 | 1 | 0 | 0 | Race (Error) |

- Flip flops are used to hold bits (data) in memory.

**LIMITATIONS:**
1. Single input change
2. Error occurs.



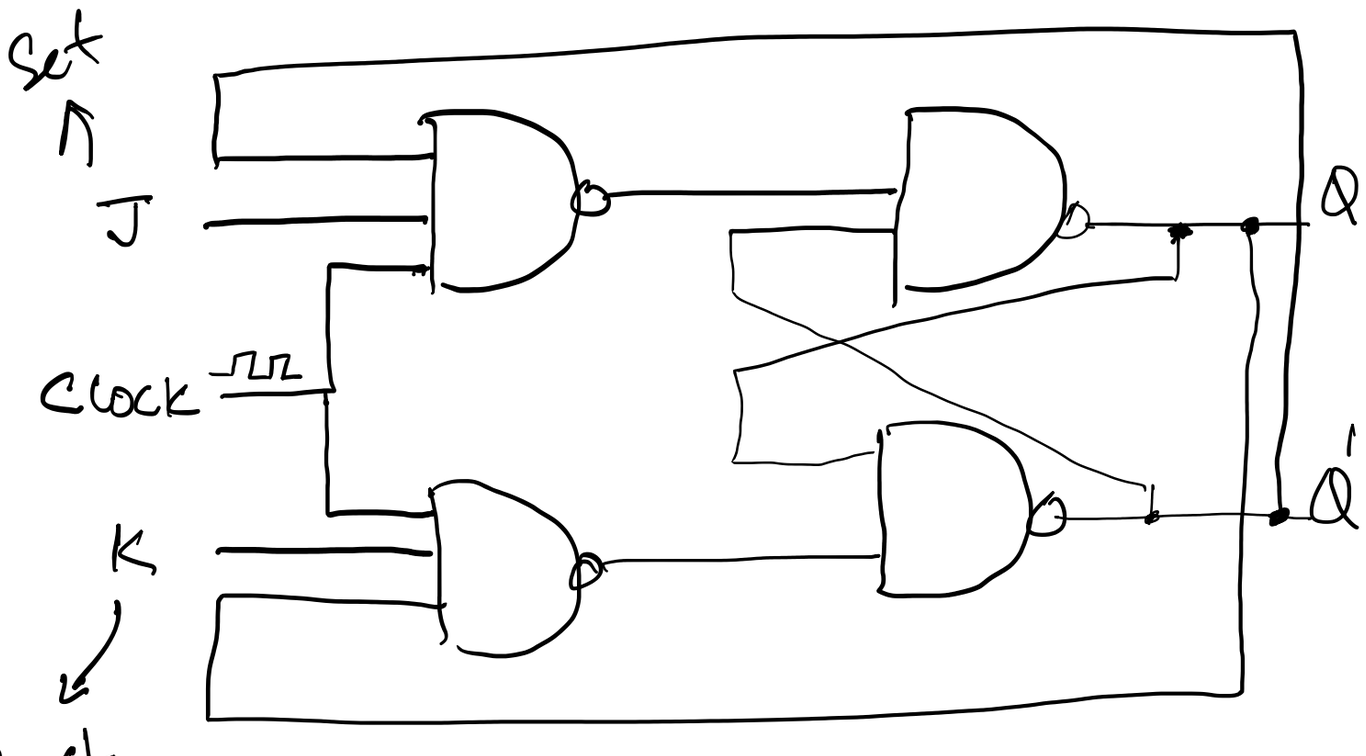

NAND LOGIC

| S | R | Q | Q' | |
|---|---|---|---|---|
| 0 | 1 | 1 | 0 | Set |
| 1 | 1 | 1 | 0 | Latch |
| 1 | 0 | 0 | 1 | Reset |
| 1 | 1 | 0 | 1 | Latch |
| 0 | 0 | 1 | 1 | Race (Error) |

- These sequential circuits; which use their output as their new input.
- Only one change can be made to circuit input at a time; otherwise an error occurs.

---

## JK Flip Flops:




- It overcomes all weaknesses of SR Flip Flop
- No Race
- No limitation of single input
- only works when clock produces high (↑) cycle.
- When two inputs are changed, a new operation of toggle/ invert a bit occurs.

| J | K | Clock | Q | Q' | |
|---|---|---|---|---|---|
| 1 | 0 | ↑ | 1 | 0 | Set |
| 0 | 1 | ↑ | 0 | 1 | Reset |
| 0 | 0 | ↑ | 0 | 1 | Latch |
| 1 | 1 | ↑ | 1 | 0 | Toggle. |