**COS10004: Computer Systems**

**Lab 3**

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7.

Diagram

Description automatically generated

7.1. To know and receive the number of counting tasks, people use counters that illustrates numbers through decimal value.

7.2. Ripple counter is a range of flip-flops, where an output of a flip-flop is clocked with the subsequent flip-flop.

|  |  |  |
| --- | --- | --- |
| Ox | Input Binary | Output Binary |
| 0 | 0000 | 0000 |
| 1 | 0001 | 0001 |
| 2 | 0010 | 0010 |
| 3 | 0011 | 0011 |
| 4 | 0100 | 0100 |
| 5 | 0101 | 0101 |
| A | 1010 | 1010 |
| B | 1011 | 1011 |
| C | 1100 | 1100 |
| D | 1101 | 1101 |
| E | 1110 | 1110 |
| F | 1111 | 1111 |

9.

Diagram

Description automatically generated

12.

Diagram

Description automatically generated

The counting-down and counting-up counter layout are quite the same, except for their attribute’s, Falling Edge is for counting-up counter and reversely.

14.

Diagram

Description automatically generated

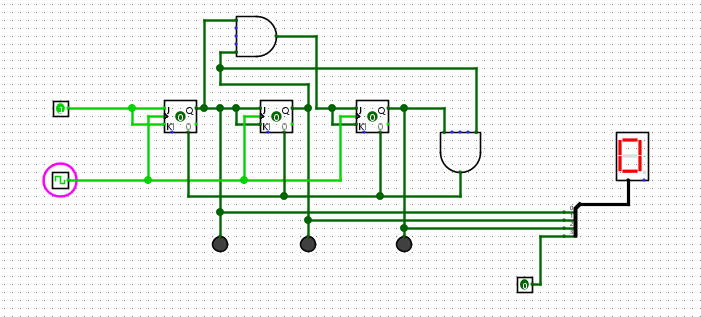
16.

Diagram

Description automatically generated

17.2. Preventing from illegal state is important, since it helps the counter be executed successfully.

18.



Diagram

Description automatically generated