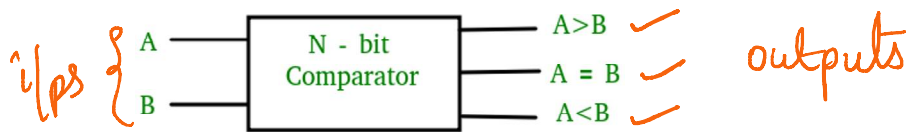


Magnitude Comparator in Digital Logic

A magnitude digital Comparator is a combinational circuit that **compares two digital or binary numbers** in order to find out whether one binary number is equal, less than or greater than the other binary number.



1-Bit Magnitude Comparator –

1 bit for A & 1 bit for B

A comparator used to compare two bits is called a single bit comparator. It consists of two inputs each for two single bit numbers and three outputs to generate less than, equal to and greater than between two binary numbers.

The truth table for a 1-bit comparator is given below:

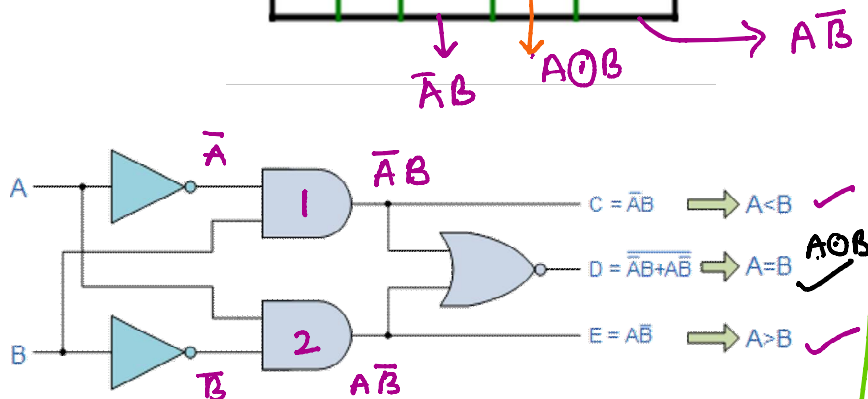
| i/p's | | o/p's | | |
|-------|---|-------|-------|-------|
| A | B | A < B | A = B | A > B |
| 0 | 0 | 0 | 1 | 0 |
| 0 | 1 | 1 | 0 | 0 |
| 1 | 0 | 0 | 0 | 1 |
| 1 | 1 | 0 | 1 | 0 |

1 bit Comparator

$$A = B \Rightarrow A \odot B$$

$$A > B = A \bar{B}$$

$$A < B = \bar{A} B$$



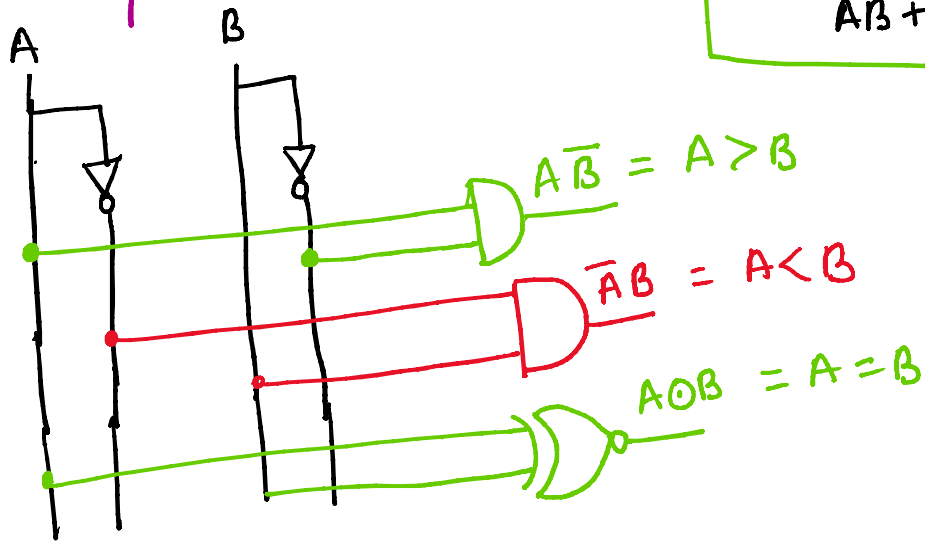
use DeMorgan $\overline{A+B} = \bar{A} \cdot \bar{B}$

$$\overline{A \cdot B} = \bar{A} + \bar{B}$$

$$\overline{\bar{A} + \bar{B}} = A \cdot B$$

\overline{B} — $A\overline{B}$

1 bit Comparator



$A \odot B = \overline{A \oplus B}$

$$\overline{A \odot B} = \overline{A + B}$$

$$(\overline{A + B}) \cdot (\overline{A + B})$$

$$\because \overline{\overline{A}} = A$$

$$(A + \overline{B}) (\overline{A} + B)$$

$$\underbrace{A \cdot \overline{A}}_0 + A \cdot B + \overline{A} \cdot \overline{B} + \underbrace{B \cdot \overline{B}}_0$$

$$AB + \overline{A}\overline{B} = \underline{A \odot B}$$