**Decoder**

A decoder converts binary information of n input lines to maximum of unique output lines.

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| x | y | z | D0 | D1 | D2 | D3 | D4 | D5 | D6 | D7 |
| 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 0 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |

You can think Ds as lights.

* D0 = x’y’z’
* D1 = x’y’z
* D2 = x’yz’
* D3 = x’yz
* …
* D7 = xyz

Diagram

Description automatically generatedDiagram, schematic

Description automatically generated

------> 3x8 decoder

There is enable input e (not necessary, to on/off or combine decoders):

Diagram

Description automatically generated

If you turn off e, decoder will not work.

You can choose which decoder to work with 1 enable input:

Chart, scatter chart

Description automatically generatedA picture containing text, whiteboard

Description automatically generated



Tek bir anda bir output etkin hale gelecek. Böylelikle 4x16 decoder yarattık:

Diagram, line chart

Description automatically generated

İstersen bütün 16’lık blokğu kendin de yapabilirsin, fark olmaz.

Remember full adder. Notice that each decoder output represents a minterm. I can use this to design some circuits.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| x | y | z | sum | carry |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 1 | 1 | 0 |
| 0 | 1 | 0 | 1 | 0 |
| 0 | 1 | 1 | 0 | 1 |
| 1 | 0 | 0 | 1 | 0 |
| 1 | 0 | 1 | 0 | 1 |
| 1 | 1 | 0 | 0 | 1 |
| 1 | 1 | 1 | 1 | 1 |

S = x’y’z + x’yz’ + xy’z’ + xyz

C = x’yz + xy’z + xyz’ + xyz

Diagram

Description automatically generated

For example our function F will be : F = (0,1,3,6) then :

Diagram

Description automatically generated



🡪 Cihazın ne olduğunu üstüne yazmalısın: 3x8 decoder gibi.

Encoder

inputs ----> n outputs

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| D0 | D1 | D2 | D3 | D4 | D5 | D6 | D7 | x | y | z |
| 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 1 |
| 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 0 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 |

A picture containing text, linedrawing

Description automatically generatedCan be used to convertion from decimal to binary.

You cannot set more than one inputs to 1.

x = D4 + D5 + D6 + D7

y = D2 + D3 + D6 + D7

z = D1 + D3 + D5 + D7

Diagram

Description automatically generated with low confidenceYou can also do like this.