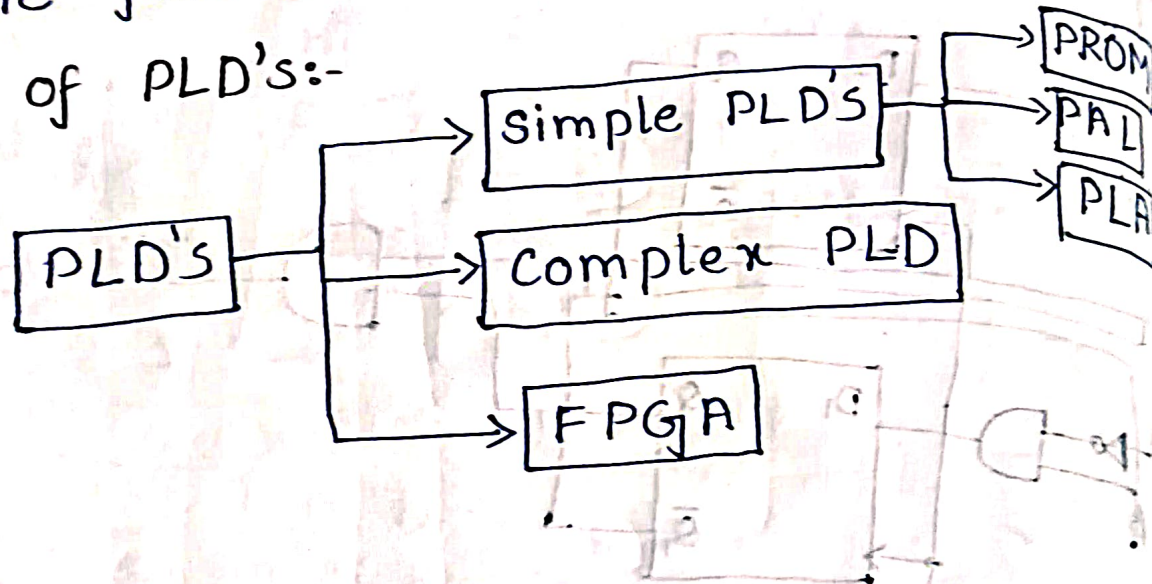# Programable logic devices.

*PLD's are used to calobarate the various digi
design's to be implemented by using single devi
*These can be earsed electricle and reprograme
with a new design.

Programable logic devices:-

A PLD is a type of digital integrated circuit th
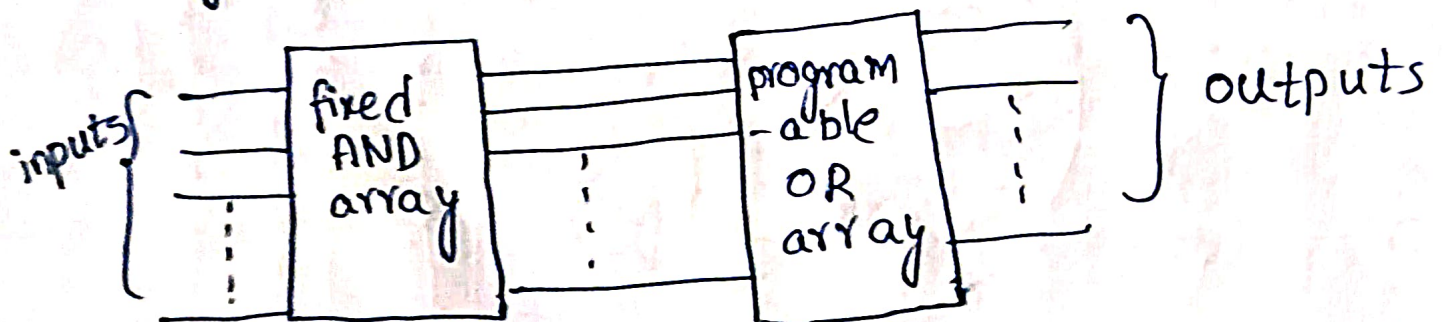can be programmed by the user to implement
various logic functions.
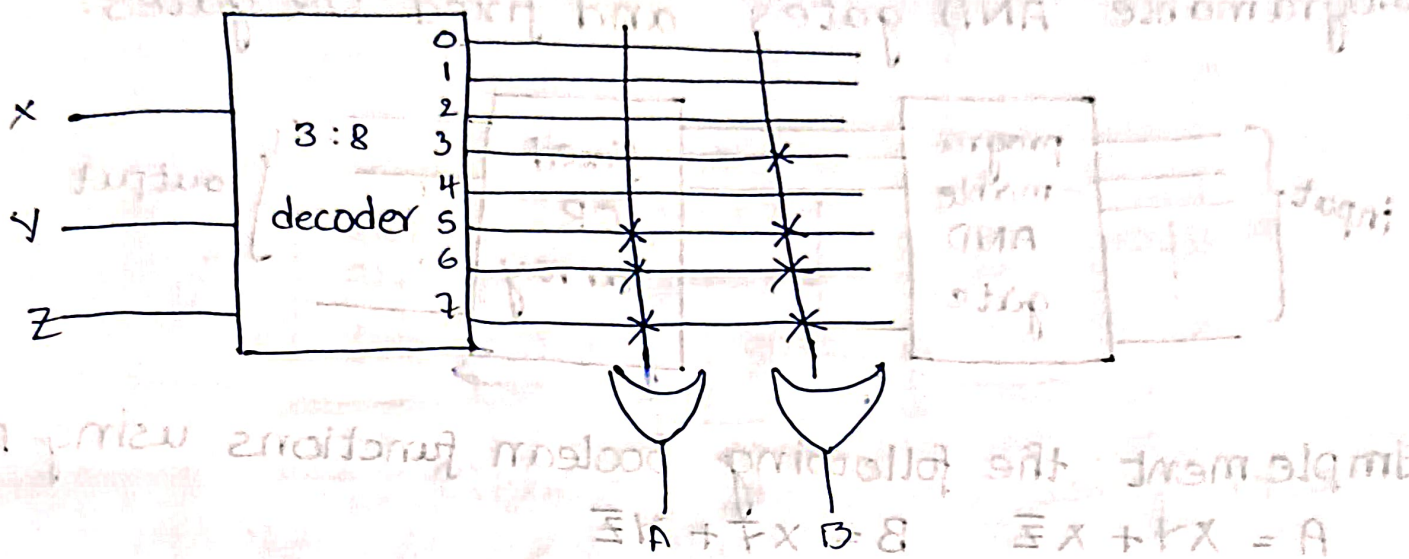
Classification of PLD's:-

```
                        →| Simple PLD's |———→| PROM
                                              →| PAL
|PLD's|——————————→| Complex PLD |             →| PLA
                        →| FPGA |
```

PROM:-

Programable read only memory.

PROM is a programable logic device that has fix
AND array and programable. OR array

```
inputs{ ——| fixed   |———| program |——} outputs
          | AND     |   | -able   |
          | array   |   | OR      |
                        | array   |
```
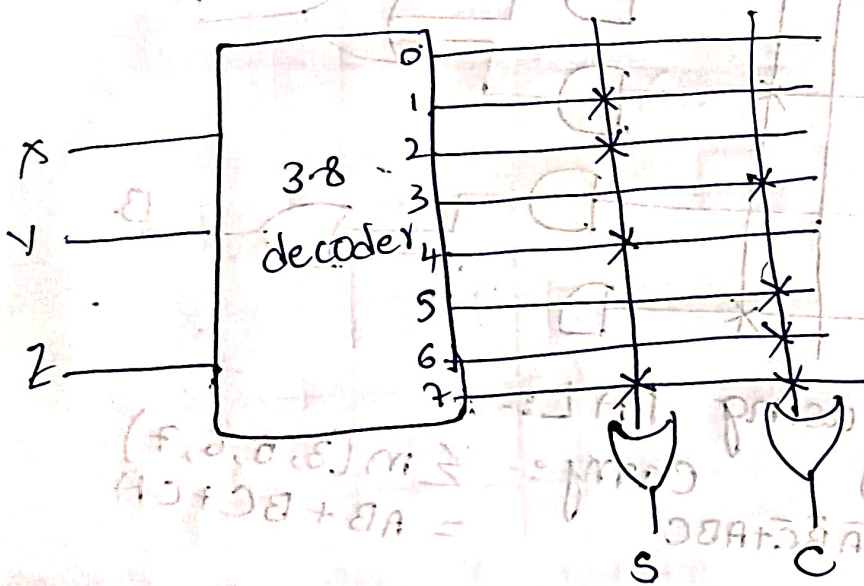
Example:- Implement the following functions using PROM (i) $A(X,Y,Z) = \Sigma m(5,6,7)$ (ii) $B(X,Y,Z) = \Sigma m(0,3,5,6,7)$
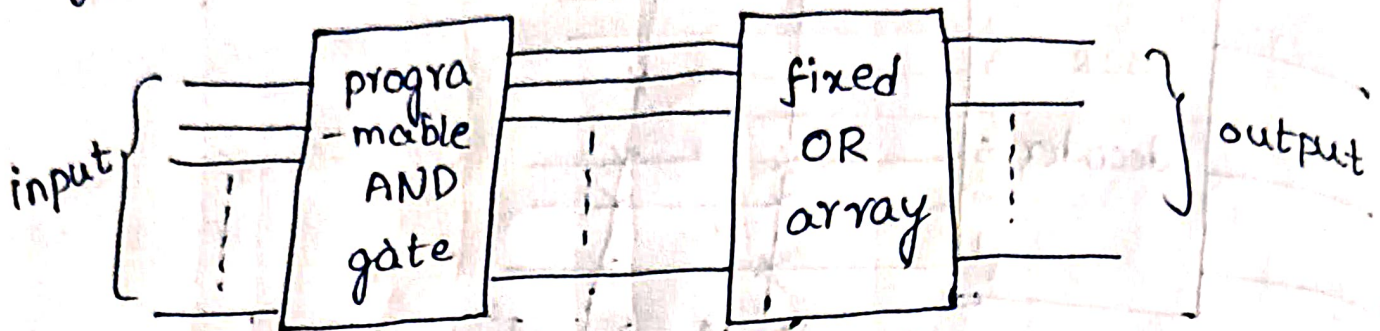

$B = \overline{X} + \overline{Y}X$ $A = X + \overline{X}Y = X$

Design full adder using PROM
$$Sum = \Sigma m(1,2,4,7) \quad Carry = \Sigma m(3,5,6,7)$$

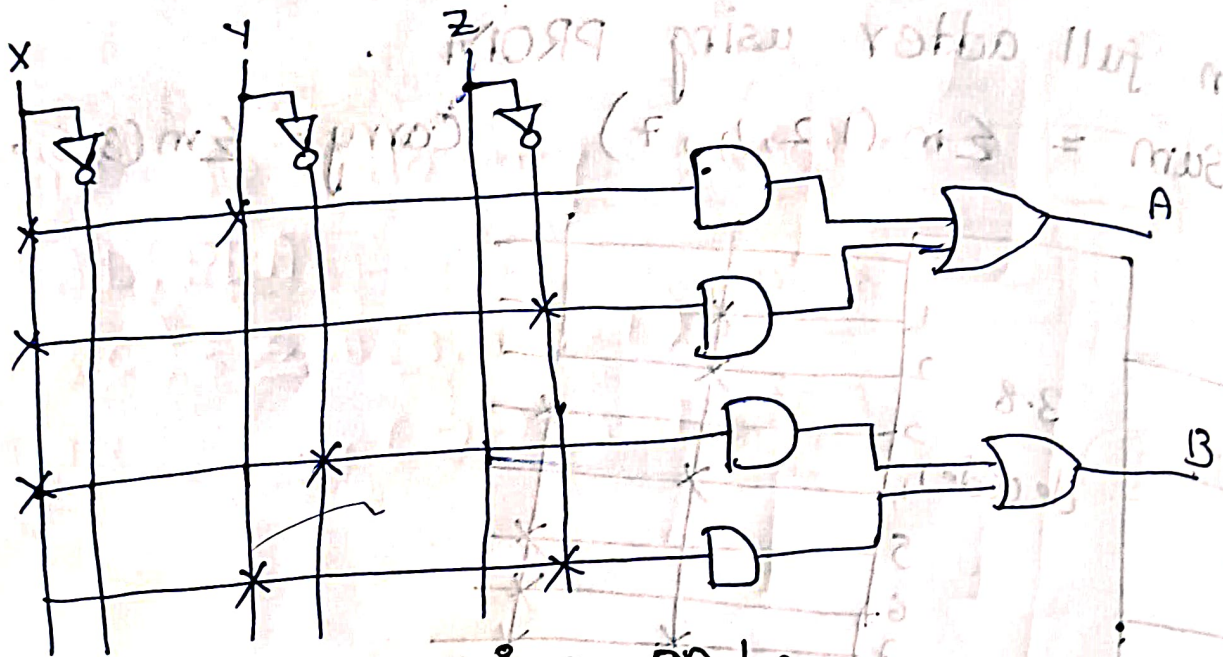# PAL:- (Programable array logic):-

PAL is a programable logic device that has programable AND gates and fixed OR gates.
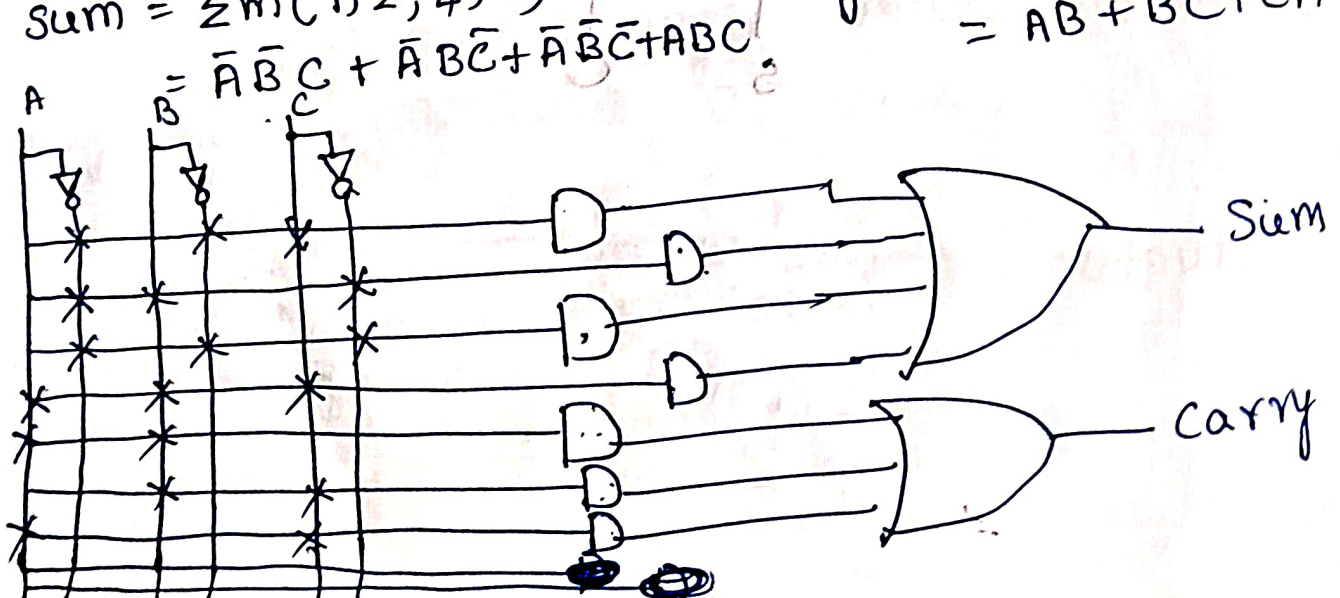

Implement the following boolean functions using

$$A = XY + X\bar{Z} \qquad B = X\bar{Y} + Y\bar{Z}$$

Implement full adder using PAL:-
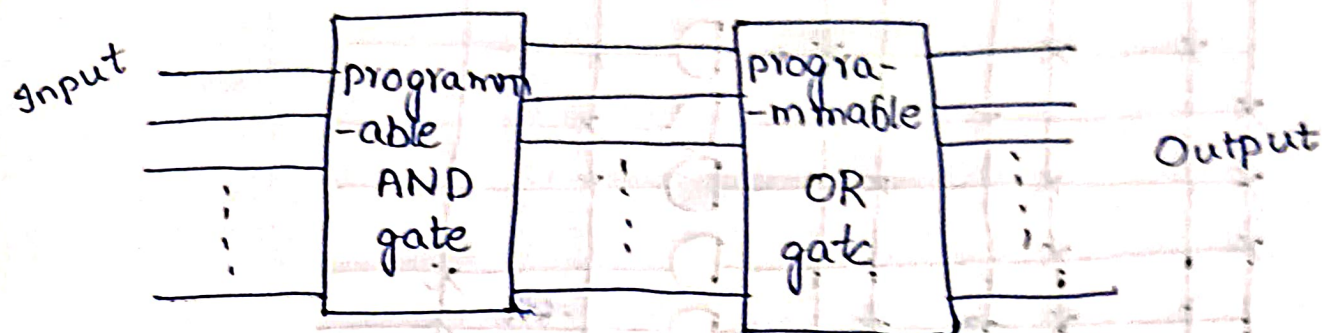
$$Sum = \sum m(1,2,4,7)$$
$$= \bar{A}\bar{B}C + \bar{A}B\bar{C} + A\bar{B}\bar{C} + ABC$$

$$Carry := \sum m(3,5,6,7).$$
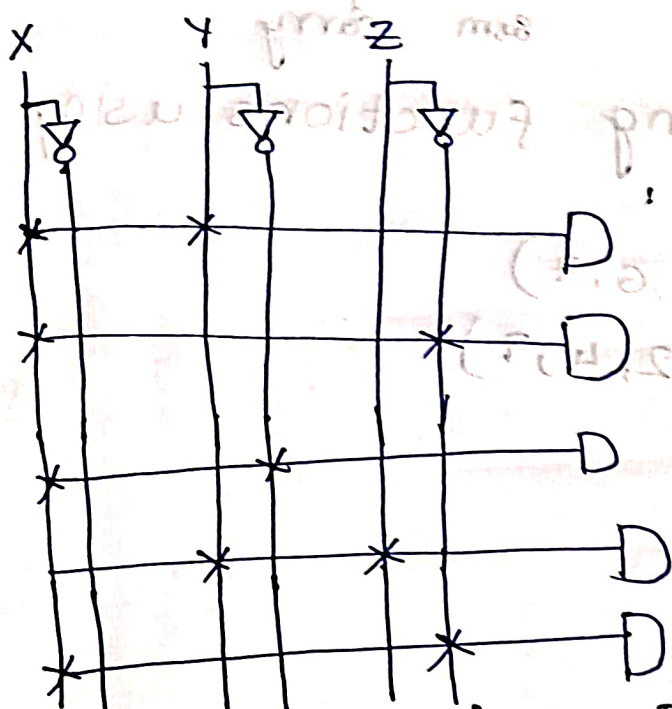$$= AB + BC + CA$$

PLA (programmable logic array):-

PLA is a programmable logic device that has both programmable AND gates and programmable OR gates.

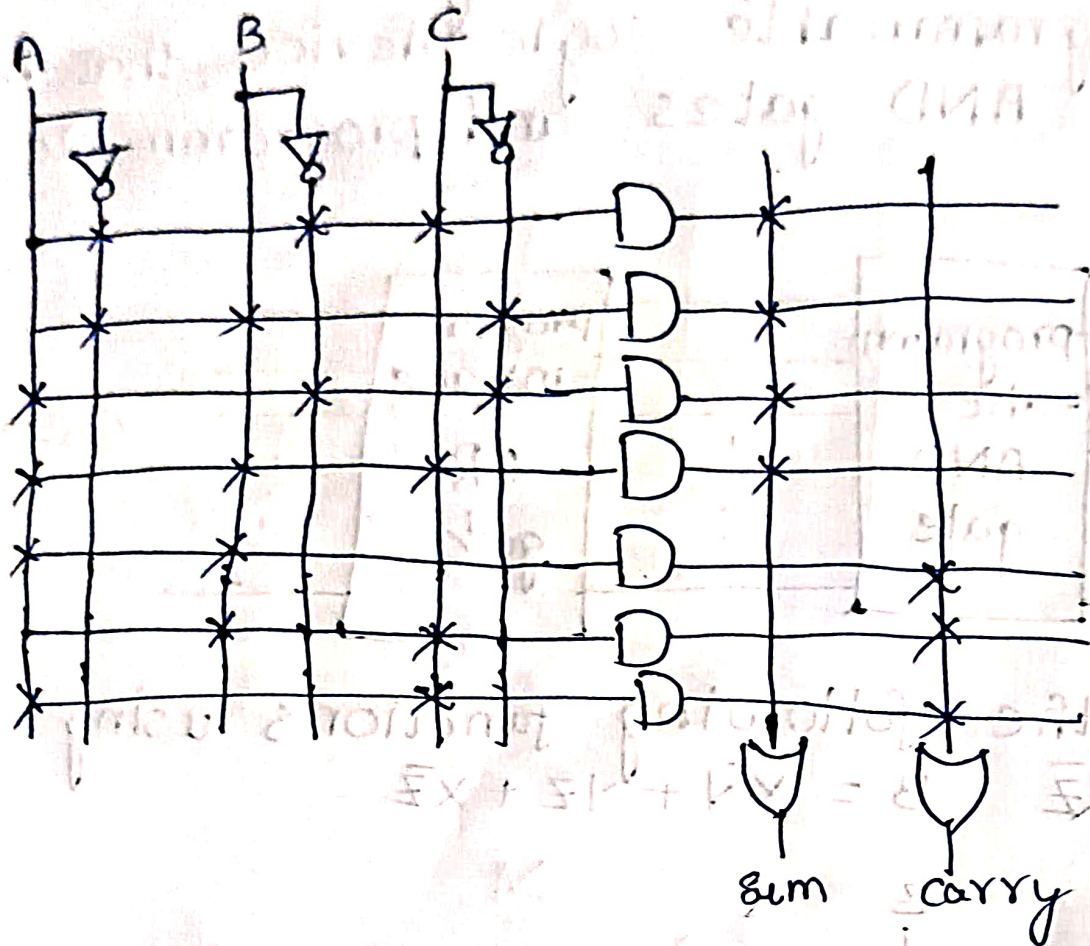Implement the following functions using PLA

$$A = XY + X\bar{Z} \qquad B = X\bar{Y} + YZ + X\bar{Z}$$

Design full adder using PLA:-

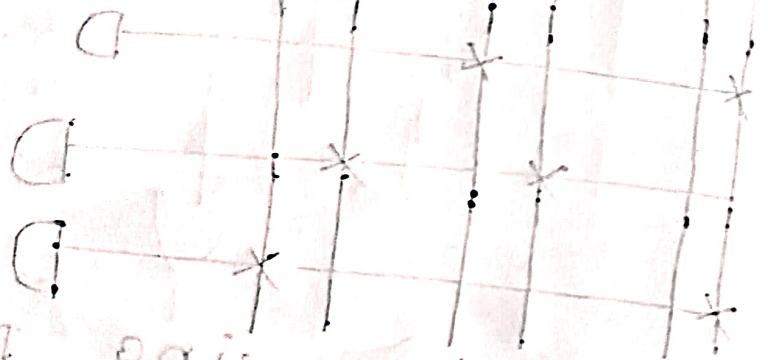$$Sum = \sum m(1,2,4,7) = \bar{A}\bar{B}C + \bar{A}B\bar{C} + A\bar{B}\bar{C} + ABC$$

$$Carry = \sum m(3,5,6,7) = AB + BC + AC.$$

A   B   C

sum   carry

Implement the following functions using PROM, PAL, PLA.

(i) $F_1(A,B,C) = \sum m(3,5,6,7)$

(ii) $F_2(A,B,C) = \sum m(0,2,4,7)$