# EE5811 : FPGA LAB ASSIGNMENT 1

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Download the codes from

https://github.com/Anuradha−Uggi/FPGA−LAB−2022/blob/main/A1/A1.c

## 1 PROBLEM STATEMENT

Reduce the following Boolean Expression to its simplest form using K-Map.

$$F(P,Q,R,S) = \sum(0,1,2,3,5,6,7,10,14,15) \quad (1)$$

## 2 SOLUTION

Using K-Map 2.1, simplified SOP expression is:

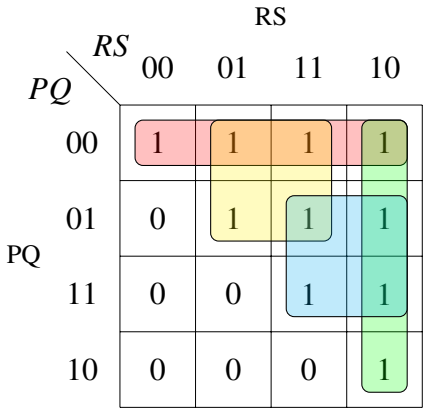


Fig. 2.1: Karnaugh-Map

$$F(P,Q,R,S) = \sum(0,1,2,3,5,6,7,10,14,15) \quad (2)$$

$$= \bar{P}\bar{Q} + R\bar{S} + \bar{P}S + QR \quad (3)$$

### 2.1 Using Nand Logic:

$$F = \bar{P}\bar{Q} + R\bar{S} + \bar{P}S + QR \quad (4)$$

$$= ((\bar{P}\bar{Q})'(P\bar{S})'(\bar{P}S)'(QR)')' \quad (5)$$

Now we can draw the logic circuit using NAND gates as below.

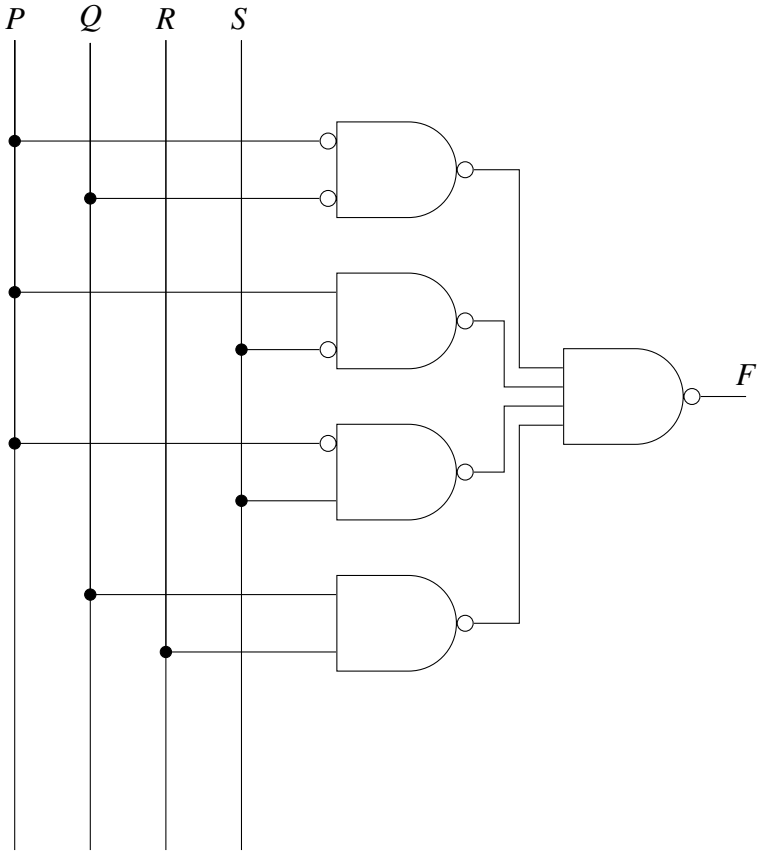


Fig. 2.2: Logic Circuit using NAND gates