FPGA LAB ASSIGNMENT 1

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Problem

Obtain the minimal form for the following Boolean expression using Karnaugh's Map.

$$H(P,Q,R,S) = \sum(0,1,2,3,5,7,8,9,10,14,15)$$

Solution

After simplification of the above truth table in Karnaugh's map, we get

$$H = Q'S' + Q'R' + P'S + PQR$$

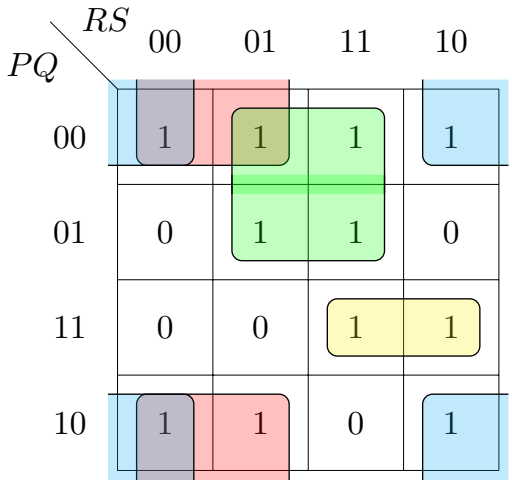
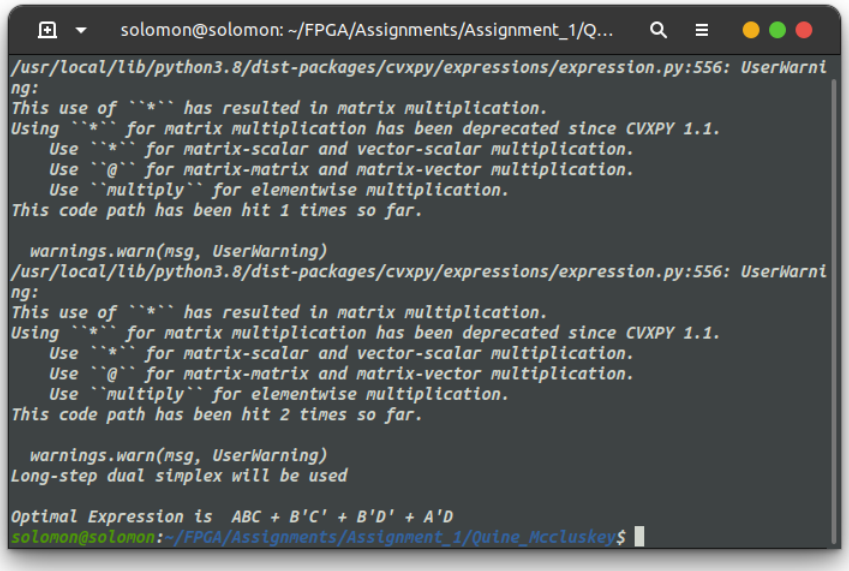


Figure 1: K-Map for H.

Optimality verfication

To verify the optimality of above result, The prime implicants were given to *Quine-McCluskey* algorithm implemented here. This was implemented using *cvxpy*.



NOTE:- Here A, B, C, and D corresponds to P, Q, R, and S respectively.

Boolean expression verification

A testbench was created to verify the correctness of the obtained boolean expression.