Name: **Id#**

COE 202, Term 162
Fundamentals of Computer Engineering

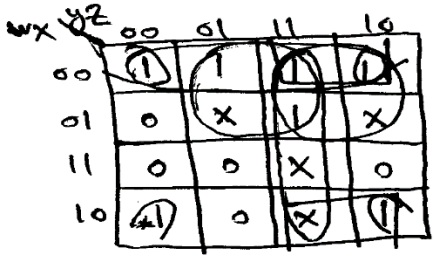
Quiz# 3 Solution

Date: Thursday, March 23

Q1. Simplify the following Boolean function **F** together with the don`t care condition **d** in (1) sum-of-products and (2) product-of-sums form. In your solution, identify prime implicants and essential prime implicants for each case.

$F(W, X, Y, Z)=\Sigma\, m(0, 1, 2, 3, 7, 8, 10)$, $d(W, X, Y, Z)=\Sigma\, m(5, 6, 11, 15)$

Sum of products:

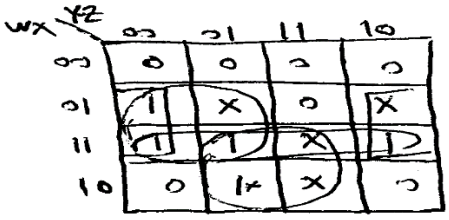


Prime implicants: $\bar{w}\bar{x}$, $\bar{x}\bar{z}$, $\bar{w}z$, $\bar{w}y$, yz, $\bar{x}y$

Essential prime implicants: $\bar{x}\bar{z}$

$F = \bar{x}\bar{z} + \bar{w}z$

Product of sums:



Prime implicants: $x\bar{y}$, $x\bar{z}$, wx, wz

Essential prime implicants: wz

$\bar{F} = wz + x\bar{z}$

$F = \bar{\bar{F}} = (\bar{w} + \bar{z})(\bar{x} + z)$

Q2. Convert the circuit given below using minimum number of only 2-input NOR gates and inverters.