EGC442 Problem Set 11 Dr. Izadi

First Name:_____ Last Name: _____

1. Determine the g_i, p_i, P_i, and G_i values of the following two 16 bit numbers. What is $Cout_{15}$ (C_{16})?

0001 1010 0011 0011

\+ 1110 0101 1110 1011

$p_i = a_i + b_i$

$g_i = a_i b_i$

c_i

Repeat Using P_i and G_i

P_0= P_1= P_2= P_3=

G_0 =

G_1 =

G_2 =

G_3 =

C_4 =

2. Assume you are asked to design a 64 bit carry lookahead carry adder as indicated below:

a. At the level one, use p_i and g_i and c_i, to express the Boolean function.

b. At the second level use P_i, G_i, C_i to express the Boolean function.

c. At the third level use P_i', G_i', and C_i' to express the Boolean function.

3. One simple way to model time for logic is to assume each AND and OR gate takes the same time for a signal to pass through it. Time is estimated by simply counting the number of gates along the longest path through a piece of logic. Compare the number of gate delays for the critical paths of the following 64-bit adders
   a. Ripple carry
   b. three-level carry lookahead
   c. Carry lookahead at level one, and ripple carry between 4 bit modules
   d. Carry lookahead at levels one and two, and ripple carry between 16 bit modules.