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ROLL No : SU92-BSAIM-F24-200   
SECTION: BSAI-2C   
THE SUPERIOR UNIVESITY, LAHORE   
TOPIC:   
 Digital Logic Design   
   
   
Question no : 01   
Half Subtractor:   
 A Half Subtractor is a combinational logic circuit that performs the subtraction of two   
binary bits. It has two inputs (minuend A and subtrahend B) and provides two outputs.   
Full Subtractor:   
 A Full Subtractor is a combinational logic circuit that performs subtraction of three binary   
bits: two input bits (A and B) and a Borrow-in (Bin) from the previous stage.   
   
Question no : 02   
 Truth Table of Half Subtractor   
A   
B   
D   
Bin   
0   
0   
0   
0   
0   
1   
1   
1   
1   
0   
1   
0   
1   
1   
0   
0   
   
 Truth Table of Full Subtractor

A   
B   
C   
D   
Bin   
0   
0   
0   
0   
0   
0   
0   
1   
1   
1   
0   
1   
0   
1   
1   
0   
1   
1   
0   
1   
1   
0   
0   
1   
0   
1   
0   
1   
0   
1   
1   
1   
0   
0   
0   
1   
1   
1   
1   
1   
   
Question no : 03   
 Boolean Expression :   
( 1 )   
 Half Subtractor :   
   
o Difference = A ⊕ B   
o Borrow = A' · B   
   
 Circuit :

( 2 )   
Full Subtractor :   
o D = A ⊕ B ⊕ Bin   
o (B · Bin) + (A' · (B + Bin))   
Circuit :

Question no : 04   
 Why We Take Difference and Borrow Outputs:   
When subtracting binary numbers:   
o The difference shows the result of subtracting the current bits.   
o The borrow tells us if the current bit couldn’t subtract properly and had to borrow   
1 from the next higher bit.   
   
1  
U1  
1  
U2  
1  
U3  
U4  
U5  
U7  
U6  
U8  
U9  
U10  
U11  
U12  
U13  
U14  
U15  
X1  
X2