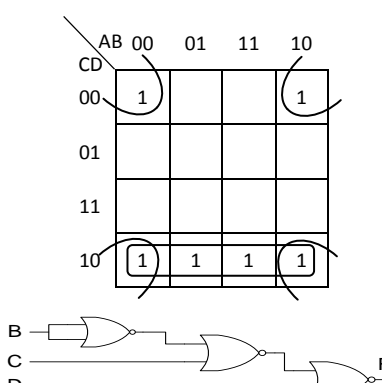
	<b>Fakülte/MYO</b>	Mühendislik	<b>Sınav</b>	Yılıçi	<b>Numara</b>	
	<b>Bölüm/Program</b>	Elektronik Müh.	<b>Tarih</b>	23/07/2014	<b>Ad-Soyad</b>	
	<b>Ders</b>	Mantık Devreleri	<b>Süre</b>	75 dk.	<b>İmza</b>	


# SORULAR


<b>SORU 1</b>	a) Aşağıdaki dönüşümleri gerçekleştiriniz. [6 x 2 puan] ➤ $(33)_8 = (?)_{BCD} = (?)_{5^{te2}} = (?)_{Gray}$ ➤ $(2)_{16} = (?)_{Aiken} = (?)_{+3} = (?)_{çift\ parity}$
	b) 10 tabanındaki 5 - 15 çıkarma işlemini, <u>2 tabanında</u> ve " <u>r-1 tümleyen</u> " ile yapınız. [8 puan]
	c) Bir mantık kapısında $t_{pHL} = 10\ ns$ ve $t_{pLH} = 10\ ns$ ise yayılım gecikmesini hesaplayınız. [5 puan]

<b>CEVAP 1</b>	a) <ul style="list-style-type: none"> <li>➤ <math>(33)_8 = (0010\ 0111)_{BCD} = (00101\ 10001)_{5^{te2}} = (10110)_{Gray}</math></li> <li>➤ <math>(2)_{16} = (0010)_{Aiken} = (101)_{+3} = (110)_{çift\ parity}</math></li> </ul>
	b) $\begin{array}{r} 0101 \\ - 1111 \\ \hline \end{array} \rightarrow \begin{array}{r} 0101 \\ + 0000 \\ \hline \end{array}$ $\begin{array}{r} 0101 \\ \rightarrow - (1010) \end{array}$
	c) $t_p = \frac{(t_{pHL} + t_{pLH})}{2} = \frac{10 + 10}{2} = 10\ ns$

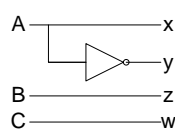
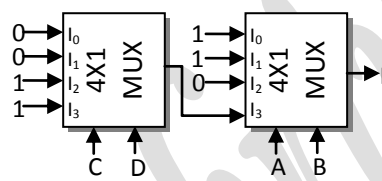
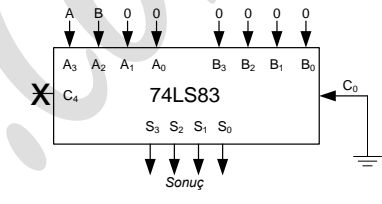
<b>SORU 2</b>	a) $F_{(ABCD)} = \sum(1,3,5,7,9,11,13,15)$ fonksiyonunu Boole Cebri kurallarıyla sadeleştiriniz. [5 puan]
	b) $F_{(ABCD)} = \prod(1,3,4,5,7,9,11,12,13,15)$ fonksiyonunun minterimlerini Karnaugh haritasına taşıyarak sadeleştiriniz ve sadece VEYADEĞİL (NOR) kapılarıyla gerçekleştiriniz. [6+4 puan]
	c) $F_{(ABC)} = \sum(0,1,4,5,6,7)$ fonksiyonunu tablo (Quine McCluskey) yöntemiyle sadeleştiriniz ve sadece VEDEĞİL (NAND) kapıları kullanarak gerçekleştiriniz. [6+4 puan]

<b>CEVAP 2</b>	a) $F_{(ABCD)} = \underbrace{A'B'C'D}_{(i)} + \underbrace{A'B'CD}_{(i)} + \underbrace{A'BC'D}_{(ii)} + \underbrace{A'BCD}_{(ii)}$ $+ \underbrace{AB'C'D}_{(iii)} + \underbrace{AB'CD}_{(iii)} + \underbrace{ABC'D}_{(iv)} + \underbrace{ABCD}_{(iv)}$ $= A'B'D(C' + C) + A'BD(C' + C) + AB'D(C' + C) + ABD(C' + C)$ $= \underbrace{A'B'D}_{(i)} + \underbrace{A'BD}_{(i)} + \underbrace{AB'D}_{(ii)} + \underbrace{ABD}_{(ii)}$ $= \underbrace{A'D(B' + B)}_{(i)} + \underbrace{AD(B' + B)}_{(i)}$ $= A'D + AD$ $= D(A' + A)$ $= D$	b) $F_{(ABCD)} = \prod(1,3,4,5,7,9,11,12,13,15)$ $= \sum(0,2,6,8,10,14) = B'D' + CD'$ 
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<b>CEVAP 2</b>	c) <table border="1" style="width: 100%; text-align: center;"> <thead> <tr> <th></th> <th>A</th> <th>B</th> <th>C</th> <th>✓</th> <th></th> <th>A</th> <th>B</th> <th>C</th> <th>✓</th> <th></th> <th>A</th> <th>B</th> <th>C</th> </tr> </thead> <tbody> <tr> <td>(0)</td> <td>0</td> <td>0</td> <td>0</td> <td>✓</td> <td>(0,1)</td> <td>0</td> <td>0</td> <td>-</td> <td>✓</td> <td>(0,1,4,5)</td> <td>-</td> <td>0</td> <td>-</td> </tr> <tr> <td>(1)</td> <td>0</td> <td>0</td> <td>1</td> <td>✓</td> <td>(0,4)</td> <td>-</td> <td>0</td> <td>0</td> <td>✓</td> <td>(0,4,1,5)</td> <td>-</td> <td>0</td> <td>-</td> </tr> <tr> <td>(4)</td> <td>1</td> <td>0</td> <td>0</td> <td>✓</td> <td>(1,5)</td> <td>-</td> <td>0</td> <td>1</td> <td>✓</td> <td>(4,5,6,7)</td> <td>1</td> <td>-</td> <td>-</td> </tr> <tr> <td>(5)</td> <td>1</td> <td>0</td> <td>1</td> <td>✓</td> <td>(4,5)</td> <td>1</td> <td>0</td> <td>-</td> <td>✓</td> <td>(4,6,5,7)</td> <td>1</td> <td>-</td> <td>-</td> </tr> <tr> <td>(6)</td> <td>1</td> <td>1</td> <td>0</td> <td>✓</td> <td>(4,6)</td> <td>1</td> <td>-</td> <td>0</td> <td>✓</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>(7)</td> <td>1</td> <td>1</td> <td>1</td> <td>✓</td> <td>(5,7)</td> <td>1</td> <td>-</td> <td>1</td> <td>✓</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td>(6,7)</td> <td>1</td> <td>1</td> <td>-</td> <td>✓</td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table> $F_{(ABC)} = A + B'$ 		A	B	C	✓		A	B	C	✓		A	B	C	(0)	0	0	0	✓	(0,1)	0	0	-	✓	(0,1,4,5)	-	0	-	(1)	0	0	1	✓	(0,4)	-	0	0	✓	(0,4,1,5)	-	0	-	(4)	1	0	0	✓	(1,5)	-	0	1	✓	(4,5,6,7)	1	-	-	(5)	1	0	1	✓	(4,5)	1	0	-	✓	(4,6,5,7)	1	-	-	(6)	1	1	0	✓	(4,6)	1	-	0	✓					(7)	1	1	1	✓	(5,7)	1	-	1	✓										(6,7)	1	1	-	✓				
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	<b>Ders</b>	Mantık Devreleri	<b>Süre</b>	75 dk.	<b>İmza</b>	

SORU 3	<p><b>a) 3 bitlik (ABC) sayılara dört ekleyen (+4) devreyi tasarlayınız (doğruluk tablosu+devre). [4+6 puan]</b></p> <p><b>Malzeme listesi:</b> Yetkilendirme girişine sahip 2 adet 2x4 kod çözücü (çıkışı 1'de aktif), 3 adet DEĞİL ve 4 adet 4 girişli VEYA kapısı.</p> <p><b>Not:</b> Devre tasarımındaki "en az sayıda devre elemanı ve bağlantı kullanımı" hususunu göz önünde bulundurunuz. Bu nedenle malzeme listesindeki tüm devre elemanlarını kullanmak zorunda değilsiniz.</p>
	<p><b>b) <math>F_{(ABCD)} = A' + BC</math> fonksiyonunu sadece iki adet 4x1 çoğullayıcı(MUX) kullanarak gerçekleyiniz (fonksiyon+tasarım tablosu+devre). [3+3+4 puan]</b></p>
	<p><b>c) 2 bitlik (AB) sayıyı dört ile çarpan (x4) devreyi sadece bir adet 4 bitlik paralel toplayıcı (74LS83) kullanarak tasarlayınız (doğruluk tablosu+devre). [2+8 puan]</b></p>

CEVAP 3	<p><b>a)</b></p> <table border="1"> <thead> <tr> <th>A</th> <th>B</th> <th>C</th> <th>x</th> <th>y</th> <th>z</th> <th>w</th> </tr> </thead> <tbody> <tr><td>0</td><td>0</td><td>0</td><td>0</td><td>1</td><td>0</td><td>0</td></tr> <tr><td>0</td><td>0</td><td>1</td><td>0</td><td>1</td><td>0</td><td>1</td></tr> <tr><td>0</td><td>1</td><td>0</td><td>0</td><td>1</td><td>1</td><td>0</td></tr> <tr><td>0</td><td>1</td><td>1</td><td>0</td><td>1</td><td>1</td><td>1</td></tr> <tr><td>1</td><td>0</td><td>0</td><td>1</td><td>0</td><td>0</td><td>0</td></tr> <tr><td>1</td><td>0</td><td>1</td><td>1</td><td>0</td><td>0</td><td>1</td></tr> <tr><td>1</td><td>1</td><td>0</td><td>1</td><td>0</td><td>1</td><td>0</td></tr> <tr><td>1</td><td>1</td><td>1</td><td>1</td><td>0</td><td>1</td><td>1</td></tr> </tbody> </table> 	A	B	C	x	y	z	w	0	0	0	0	1	0	0	0	0	1	0	1	0	1	0	1	0	0	1	1	0	0	1	1	0	1	1	1	1	0	0	1	0	0	0	1	0	1	1	0	0	1	1	1	0	1	0	1	0	1	1	1	1	0	1	1	<p><b>b)</b></p> $F_{(ABCD)} = \sum(0,1,2,3,4,5,6,7,14,15)$ <table border="1"> <thead> <tr> <th>A'B'</th> <th>A'B</th> <th>AB'</th> <th>AB</th> </tr> <tr> <th>I<sub>0</sub></th> <th>I<sub>1</sub></th> <th>I<sub>2</sub></th> <th>I<sub>3</sub></th> </tr> </thead> <tbody> <tr> <td>C'D'</td> <td>1</td> <td>1</td> <td>0</td> <td>0</td> </tr> <tr> <td>C'D</td> <td>1</td> <td>1</td> <td>0</td> <td>0</td> </tr> <tr> <td>CD'</td> <td>1</td> <td>1</td> <td>0</td> <td>1</td> </tr> <tr> <td>CD</td> <td>1</td> <td>1</td> <td>0</td> <td>1</td> </tr> </tbody> </table> 	A'B'	A'B	AB'	AB	I <sub>0</sub>	I <sub>1</sub>	I <sub>2</sub>	I <sub>3</sub>	C'D'	1	1	0	0	C'D	1	1	0	0	CD'	1	1	0	1	CD	1	1	0	1	<p><b>c)</b></p> <table border="1"> <thead> <tr> <th>A</th> <th>B</th> <th>x</th> <th>y</th> <th>z</th> <th>w</th> </tr> </thead> <tbody> <tr><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td></tr> <tr><td>0</td><td>1</td><td>0</td><td>1</td><td>0</td><td>0</td></tr> <tr><td>1</td><td>0</td><td>1</td><td>0</td><td>0</td><td>0</td></tr> <tr><td>1</td><td>1</td><td>1</td><td>1</td><td>0</td><td>0</td></tr> </tbody> </table> 	A	B	x	y	z	w	0	0	0	0	0	0	0	1	0	1	0	0	1	0	1	0	0	0	1	1	1	1	0	0
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SORU 4	<p>BCD giriřli bir devrede <u>tek sayıları</u> tespit eden devreyi mantıksal kapılarla gerçekleyiniz (doğruluk tablosu + Karnaugh haritalarıyla sadeleřtirme + devre çizimi). [10+6+4 puan]</p>																																																																																				
	<p><b>CEVAP 4</b></p> <table border="1"> <thead> <tr> <th>A</th> <th>B</th> <th>C</th> <th>D</th> <th>f</th> </tr> </thead> <tbody> <tr><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td></tr> <tr><td>0</td><td>0</td><td>0</td><td>1</td><td>1</td></tr> <tr><td>0</td><td>0</td><td>1</td><td>0</td><td>0</td></tr> <tr><td>0</td><td>0</td><td>1</td><td>1</td><td>1</td></tr> <tr><td>0</td><td>1</td><td>0</td><td>0</td><td>0</td></tr> <tr><td>0</td><td>1</td><td>0</td><td>1</td><td>1</td></tr> <tr><td>0</td><td>1</td><td>1</td><td>0</td><td>0</td></tr> <tr><td>0</td><td>1</td><td>1</td><td>1</td><td>1</td></tr> <tr><td>1</td><td>0</td><td>0</td><td>0</td><td>0</td></tr> <tr><td>1</td><td>0</td><td>0</td><td>1</td><td>1</td></tr> <tr><td>x</td><td>x</td><td>x</td><td>x</td><td>x</td></tr> </tbody> </table> <table border="1"> <thead> <tr> <th>AB</th> <th>00</th> <th>01</th> <th>11</th> <th>10</th> </tr> </thead> <tbody> <tr> <th>00</th> <td></td> <td></td> <td>x</td> <td></td> </tr> <tr> <th>01</th> <td>1</td> <td>1</td> <td>x</td> <td>1</td> </tr> <tr> <th>11</th> <td>1</td> <td>1</td> <td>x</td> <td>x</td> </tr> <tr> <th>10</th> <td></td> <td>1</td> <td>x</td> <td>x</td> </tr> </tbody> </table> $F = D$	A	B	C	D	f	0	0	0	0	0	0	0	0	1	1	0	0	1	0	0	0	0	1	1	1	0	1	0	0	0	0	1	0	1	1	0	1	1	0	0	0	1	1	1	1	1	0	0	0	0	1	0	0	1	1	x	x	x	x	x	AB	00	01	11	10	00			x		01	1	1	x	1	11	1	1	x	x	10		1	x
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