Name Surname:
Student ID
Sign:

COM2075/COM275 Digital Logic Design

Final Exam – 2 Hours (13:00-15:00)

ANKARA ÜNİVERSİTESİ
MÜHENDİSLİK FAKÜLTESİ

SINAVLAR VE ÖDEVLER İÇİN ŞEREF SÖZÜ

Bir Ankara Üniversitesi öğrencisi olarak;

- -Bu ödevde/sınavda yardım almadığımı ya da hiç kimseye yardım etmediğimi,
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- -Sınav/ödev sorularının çözümü için hiç kimseden (öğrenci, öğretim üyesi ya da arkadaş) yardım istemediğimi,
- -Problemin çözümünü bulmak için interneti ya da çevrimiçi ya da basılı herhangi bir belgeyi kullanmadığımı beyan ederim.

Yukarıdaki ifadelere uymadığımın tespit edilmesi durumunda sınavdan/ödevden sıfır alacağımı ve hakkımda **Ankara Üniversitesi Öğrenci Disiplin Yönetmeliği** çerçevesinde soruşturma açılacağını biliyorum.

HONOR CODE FOR EXAMS and ASSIGMENTS

As an Ankara University student, I agree that;

- I have neither given nor received unauthorized assistance on this exam or assignment.
- I have not represented the work of another as my work.
- I have not asked someone else (student, teacher, and friends) to help with this assignment or exam questions.
- I have not used the internet or any online or printed document to find problem solutions

I understand that failure to comply with the statements above will result in receiving a zero from this exam/assignment and being reported for academic dishonesty by the **disciplinary policies of Ankara University**.

Rules:

1. **Write all your answers in handwriting on your exam paper(s)**
2. **Write your name and surname on each sheet and sign.**
3. **Take pictures of the answer sheets or scan them in pdf format and upload them to the system before 15:05.**

Name Surname:
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Sign:

Questions

(30 P) Q.1) Write the Boolean equations and draw the logic diagram of the circuit whose outputs are defined by the following truth table and write complete VHDL codes for the logic circuits (including architecture and entity parts).

Truth Table:

a	b	c	F1	F2
0	0	0	0	0
0	0	1	0	1
0	1	0	1	0
0	1	1	0	0
1	0	0	1	0
1	0	1	0	1
1	1	0	0	0
1	1	1	1	1

(20 P) Q.2. Implement the following Boolean function **F**, together with the don't-care condition **d**, using **no more than two NOR** gates:

F(A, B, C, D)=∑(2, 4, 10, 12, 14)

d(A, B, C, D)=∑(0, 1, 5, 8)

(20 P) Q.3. Implement the following Boolean function with a 4 x 1 multiplexer and external gates.

F(A, B, C, D)=∑(1, 2, 5, 7, 8, 10, 11, 13, 15)

(30 P) Q.4. A sequential circuit with two D flip-flops A and B, two inputs, x and y; and one output z is specified by the following next-state and output equations.

A(t+1)=xy' + xB

B(t+1)=xA + xB'

z=A

a) Draw the logic diagram of the circuit.
b) List the state table for the sequential circuit.
c) Draw the corresponding state diagram.