Student Name: Student Number:

Final Exam, First Semester: 2009/2010 Computer Engineering Department

Course Title: Reverse Engineering
Course No: 630307/610307/650307/620307
Lecturer: Dr. Mohammed Bani Younis
Date: 31/01/2010
Time: 2 hour
No. of pages: 6

Question 1: System RE (15 marks)

1) Draw the Chikofsky and Cross Taxonomy highlighting the Difference between Reverse Engineering and Re-Engineering. (4 marks)

- 2) Mention the four steps needed for the RE to be considered in a product development. (2 marks)
- 3) Define the following terms briefly: (3 marks) Function, Product Function, Abstraction.

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4)	Mention the Two ways used for developing the function trees in a produc
	development. (2 marks)

5) Explain how to establish Best-in-Class Competitors by function. (2 marks) Solution:

6) Mention the four types of function—based modularity and express it using a simplified schematic. (2 marks)

Question 2: Mechanical RE (5 marks)

1) Mention one advantage and one weakness for the following three scanning systems: (3 marks)

Type of scanning	Advantage	Weakness
Laser		
CCD Camera		
Contact		

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2) Explain the method Gluing From Paper and show its schematic. (2 marks)

Question 3: Electronic RE (10 marks)

1) What is the combinational circuit that is implemented using the following VHDL code: (4 marks)

```
Entity example IS

PORT (w0,w1, s: IN std_logic;
        F: OUT std_logic);

End example;

Architecture arch-example of example

Begin

Process (s,w0,w1)

Begin

If s ='0' then f <=w0;

Else F<= w1;

End if;

End process;
End arch-example;
```

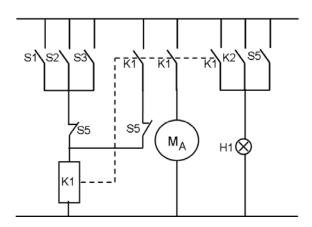
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- 2) Which information and documentation is needed to RE a PCB? (4 marks)
- 3) What are the two goals of the electronic RE? (2 marks)

Question 4: Software RE

(20 marks)

1) Find the Boolean algebra expression for the following diagram: (5 marks)



- 2) Consider the mealy finite state (FSM) machine shown below:
 - a) What is the type of the Finite State Machine? (1 mark)
 - b) Convert the Automaton table into the Automaton graph. (3 marks)

	а	b	С	d
0/0	1	2	-	-
1/0	2	-	-	3
2/0	-	-	4	-
3/1	1	2	-	-
4/k	1	2	-	-

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- 3) Consider the PLC Instruction list below. (9 marks)
- a) Write the IF-THEN-ELSE statement structure.
- b) Draw the FSM (state) diagram.

0000	: U	E 0.6
0001	: U	E 1.2
0002	: U	E 1.3
0003	:UN	E 0.4
0004	:=	M 120.0
0005	: U	E 0.0
0006	: U	M 100.0
0007	:0	
8000	: U	M 101.0
0009	: U	M 120.0
A000	:UN	M 102.0
000B	:SPB	LAB1
000C	: U	E 38.1
000D	: U	E 18.3
000D	: U	E 20.4
000E	: S	A 1.1
0012	:SPA	LAB2
0014 LAB1	: U	E 20.7
0016	:=	A 15.0
001B	LAB2	:BE

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Best of Luck