NAZARBAYEV UNIVERSITY
SCHOOL OF SCIENCE AND TECHNOLOGY

NAME ..... "Solution" ..... Quiz #4

EXAMINATION RULES

- The duration of this exam is **20** minutes.
- The exam consists of **6** pages including this one. Write your name to each page.
- The total points are **100**.
- Students are required to follow all instructions given by the examiners.
- Talking is NOT allowed under any circumstances.
- Students MAY NOT bring any written or printed materials into the examination room except where explicitly allowed by the examiner.
- Mobile phones are strictly prohibited in the examination room.
- Students MAY NOT bring any electronic device into the examination room except where explicitly allowed by the examiner (e.g., calculators with specified capabilities).
- Students may raise their hand to ask the examiner a question. The examiner may decide not to answer the question: students are expected to know the requisite terminology and understand the examination questions.
- For examinations lasting two hours or less, students are NOT allowed to leave the examination room until ready to turn in their work.
- Once a student has seen the examination paper, the student is assumed to be in good health at the time of the examination.

I have read and understood the examination rules. I will not cheat, copy from other students, or use unauthorized materials or devices, and I have not brought such materials or devices into the examination room.

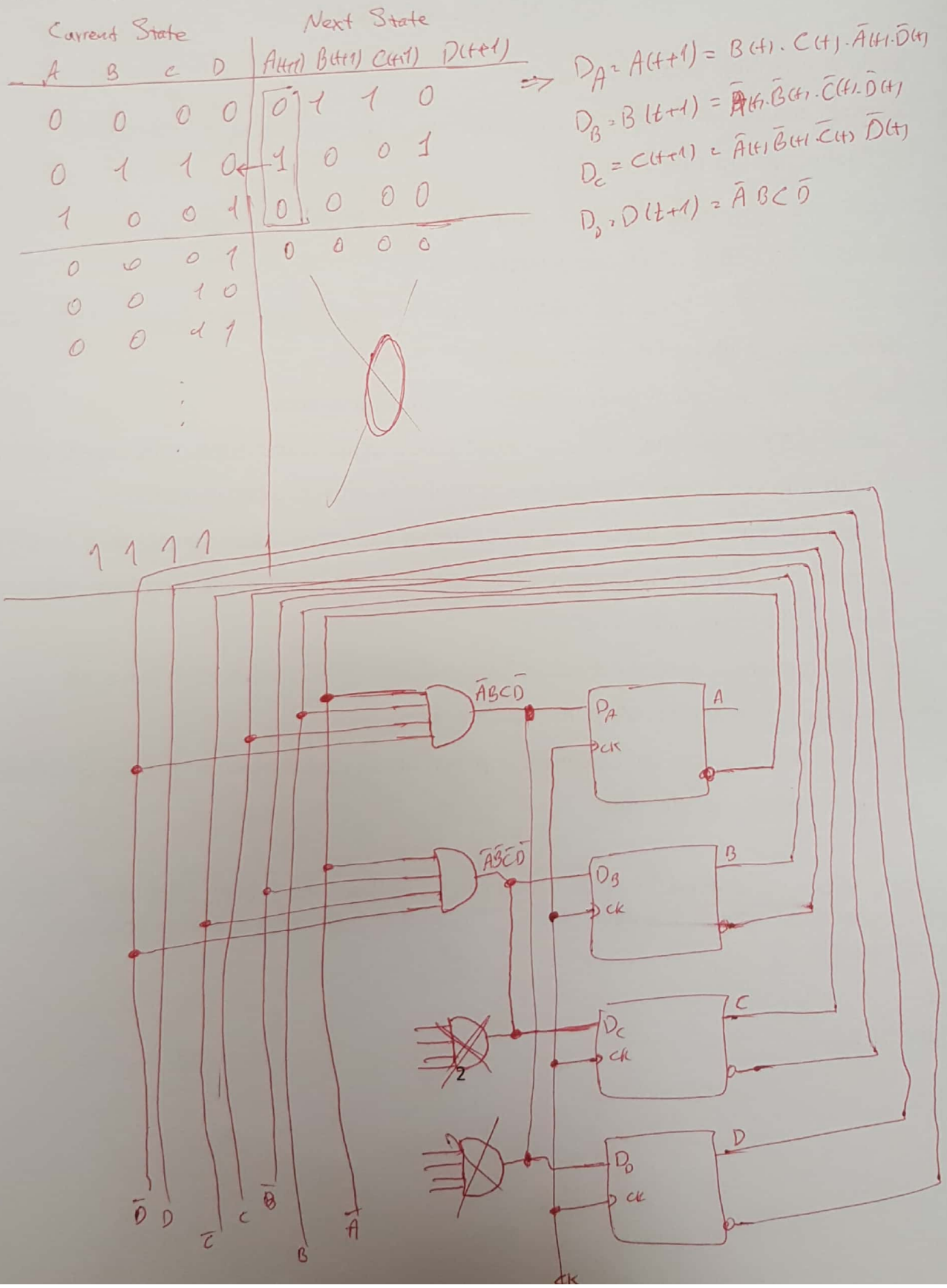
Signed: .....

Student Name:

ROBT 206 – Microcontrollers with Laboratory Quiz #4 17 April, 2018

Answer ALL the problems. Please provide precise and neat answers.

1. Using **D-type flip flops** and **logic gates** design and construct a binary counter to repeat sequence of states 0, 6, 9. Starting from any other value (such as 1, 2, 3, etc.) the next state should be 0 (**40 point**)



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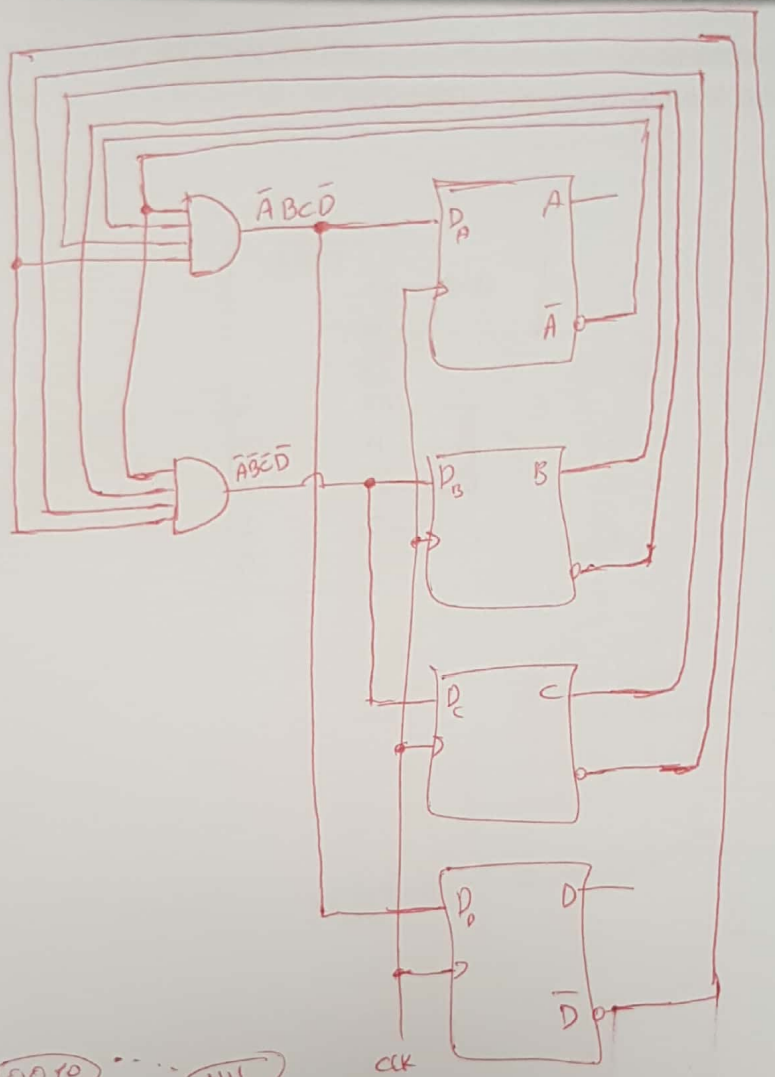

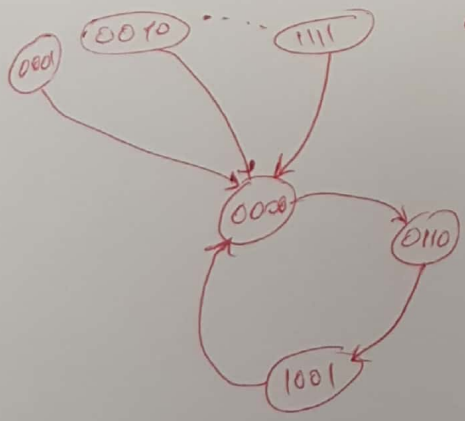

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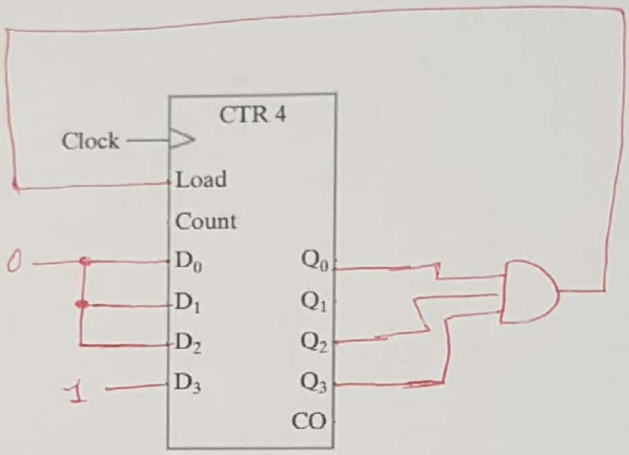
2. Using a synchronous 4 bit binary counter (shown below) and logic gates construct a binary counter that counts from decimal 8 through decimal 13. (**30 point**)

8 : 1000
13 : 1101

8	1000
9	1001
10	1010
11	1011
12	1100
13	1101



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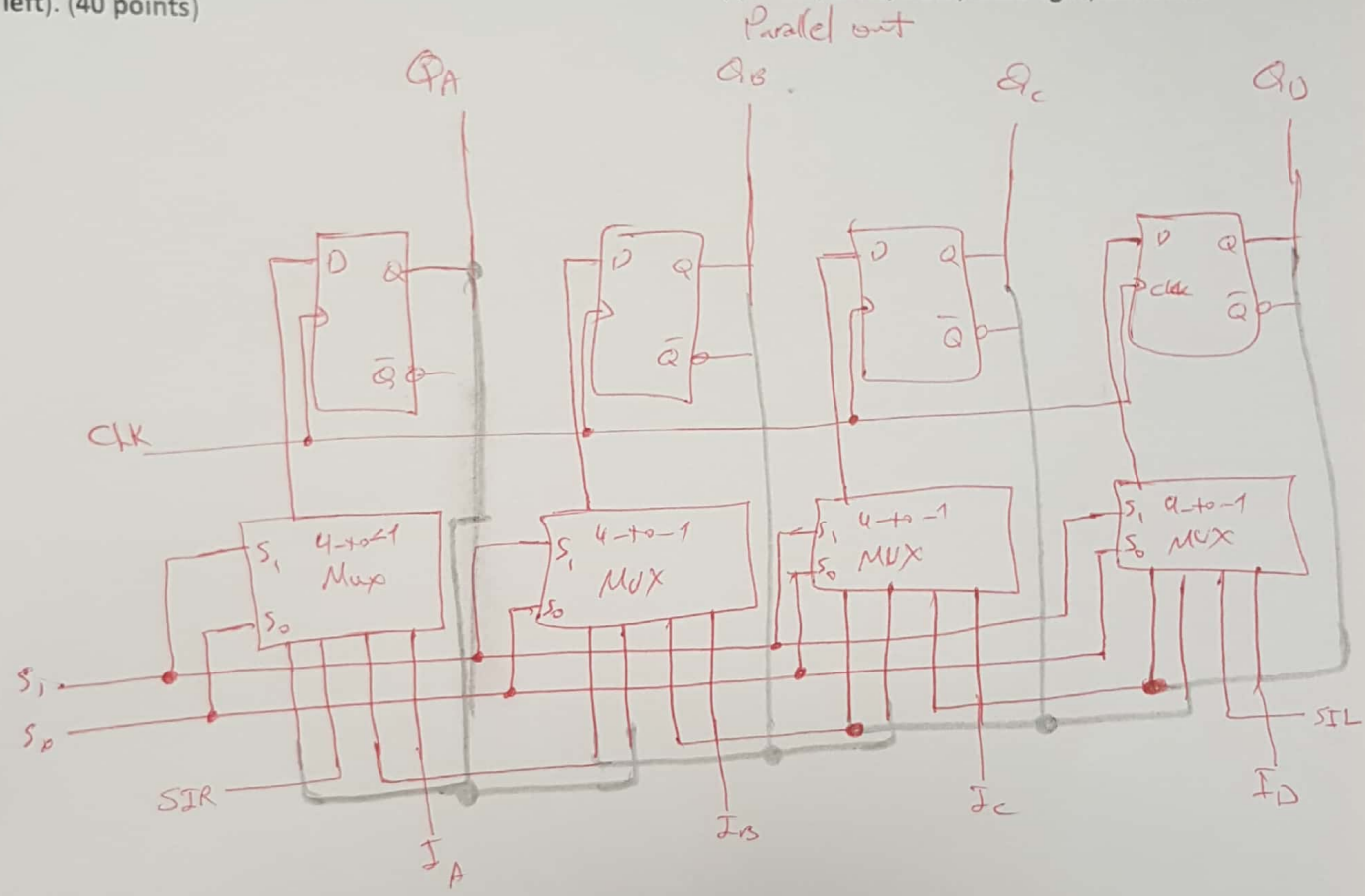
Answer ALL the problems. Please provide precise and neat answers.

3. Using **4 D-type flip-flops** and **multiplexers**, design a parallel load bi-directional shift register with the capability of shifting right or left (Four functions should be supported; **Load**, **Hold**, **Shift right**, and **Shift left**). **(40 points)**



S_1	S_0	Operation
0	0	Hold
0	1	Shift right
1	0	Shift left
1	1	Parallel load