DLD Lab Assignment#03

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A. Implement the circuit of Ring and Johnson counter on proteus and verify the outputs.

1)Ring counter:

Truth table:

Clock pulses	QA	QB	QC	QD
0	0	0	0	0
1	1	0	0	0
2	0	1	0	0
3	0	0	1	0
4	0	0	0	1
5	1	0	0	0
6	0	1	0	0
7	0	0	1	0
8	0	0	0	1

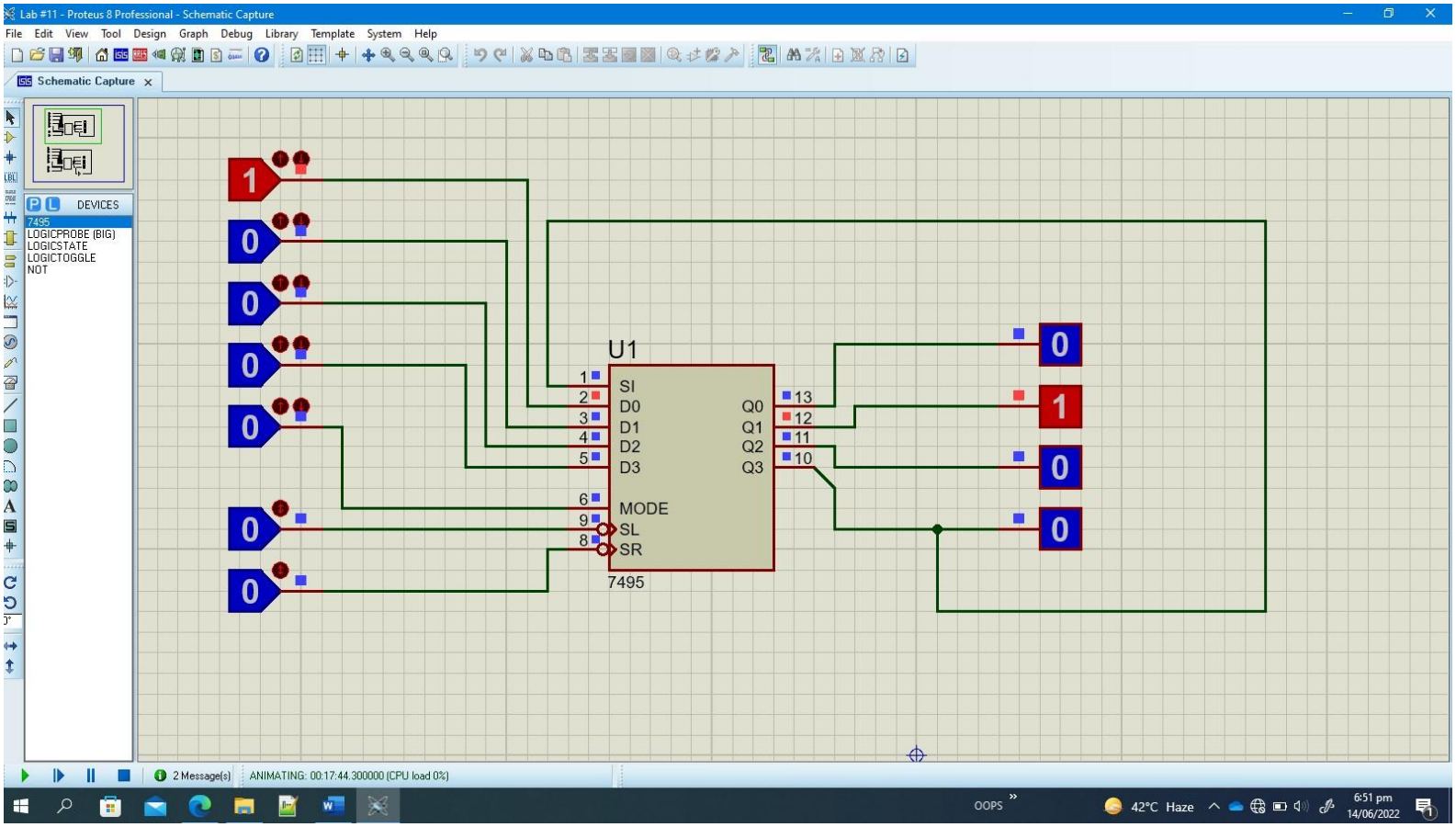
2)Johnson counter:

Truth table:

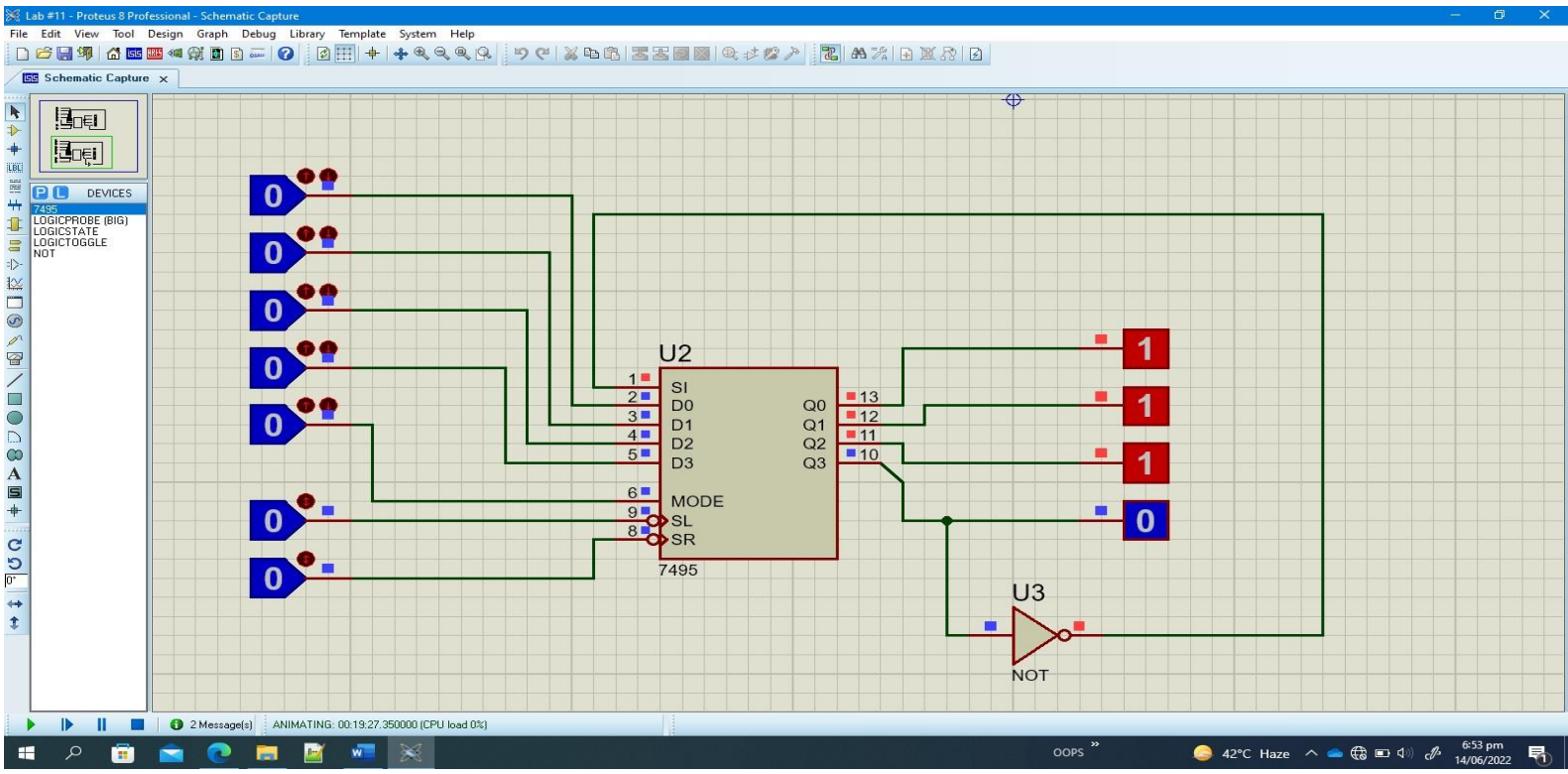
Clock pulses	QA	QB	QC	QD
0	0	0	0	0
1	1	0	0	0
2	1	1	0	0
3	1	1	1	0
4	1	1	1	1
5	0	1	1	1
6	0	0	1	1
7	0	0	0	1

8	0	0	0	0

1)Proteus output of Ring counter:



2) Proteus output of Johnson Counter:



B. Explain the working of Ring and Johnson counter.

1)Ring counter:

A Ring counter is a synchronous counter. It is a type of counter composed of flipflops connected into a shift register. It has a common clock signal that triggers all the Flip-flops at the same time. Ring counter consists of D-flip-flops connected in cascade setup with the output of last Flip-flop connected to the input of first Flip-flop. Each Flip-flop constitute a state.

Ring counter's state needs to be set before the operation. Since ring counter circulates 1 through all stages and there are on external inputs except the clock signal. So, we need to set its state to initial state 1000 manually. We need to set the first stage flip-flop and clear the rest of the stages to obtain the state 1000.

Advantages:

- It doesn't need a decoder.
- It can be implemented using JK and D flip-flop.

2)Johnson counter:

It is a modified ring counter in which the output from the last flip flop is inverted and fed back as an input to the first. It is also called as inverse feedback as an input to the first. The Johnson Ring Counter consist of several counters connected with the output feedback to the input. It is like Ring counter but the only difference between both is that the outcome of the last flip-flop is passed connected with NOT gate to the first input of flip-flop. It is also referred as Creeping Counter. There is no need to load the input. We can directly apply the serial input. We get eight outputs in Johnson counter.

Advantages:

- The number flip-flops in the Johnson counter are equal to the number of flip-flops in the ring counter. It counts twice the number of states the ring counter can count.
- It can also be designed using D flip-flop or JK flip-flop.
- The data is count in a continuous loop.
- Its circuit is self-decoding.