CDA 3201L – Computer Logic Design Laboratory

Lab Exercise 5

Sequential Logic Circuits (I)

Part A: Verify the operation of a J$\overline{K}$ flip-flop (TTL 74LS109) on the breadboard by providing appropriate inputs to the J, $\overline{K}$, Preset, and Clear pins. Use a function generator as the source of the CLOCK input to the flip-flop.

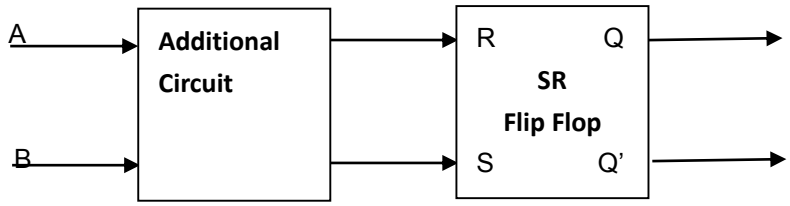
Part B: Verify the operation of a D flip-flop (TTL 7474) on the breadboard by providing appropriate inputs to the D, Preset, and Clear pins. Use a function generator as the source of the CLOCK input to the flip-flop.

Part C: Configure a J$\overline{K}$ flip-flop (TTL 74LS109) to function as a D flip-flop.

Part D: Configure a D flip-flop (TTL 7474) to function as a Toggle flip-flop.

Part E: Build a SR (Set-Reset) Flip flop using logic gates and verify its correctness of operation by comparing the outputs with the truth table. Then modify the functionality of the SR FF by adding additional circuit elements (logic gates) to its input lines. The new circuit should produce the following output:

Inputs to the Circuit		**SR FF Outputs**	
A	**B**	**Q**	**Q'**
0	0	Previous Q	Previous Q'
0	1	1	0
1	0	0	1
1	1	Previous Q	Previous Q'



Important: Lab grade will depend on the working of the circuit & will be checked of by your lab instructor.

References:

“Fundamentals of Logic Design”, 7th Edition, by Charles H. Roth Jr. and Larry L Kinney, 2014, ISBN-13: 978-1133628477 or ISBN-10: 1133628478, CENGAGE Learning, Stamford, CT, USA

Notes:

1. You can use http://en.wikipedia.org/wiki/List of 7400 series integrated circuits to find the TTL chip you need.
2. Datasheets of some commonly used TTL chips can be found at the following sites:
    - http://www.jameco.com
    - http://www.ti.com/sc/docs/psheets/databook.htm
    - http://www.datasheetcatalog.com/fairchildsemiconductor/1/