University of New Brunswick

Computer Science

Computer Architecture and Organization

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Due Date: August 2, 2024 – 11:59 PM

LAB 3

Pre-lab instructions:

- Complete and test the setup required for the remote access to the FCS labs:https://www.cs.unb.ca/help/
  - Set up UNB VPN: https://unbcloud.sharepoint.com/sites/ITServices/SitePages/VPN.aspx
  - Set up SSH for the command line mode access: https://www.cs.unb.ca/help/ssh-help.shtml
  - Set up VNC for the remote desktop access:https://www.cs.unb.ca/help/remote-lab-gui-access.shtml
- Start a VNC session before the lab session.

Reference materials

- LogicWorks 5, by Capilano Computing Systems, Benjamin-Cummings. Chapter 4, pages 21 to 33, provides a tutorial with advanced features.
- Sample LogicWorks tutorial online: https://www.cs.uregina.ca/Links/class-info/201/LW5/lecture.htm

General instructions:

- Log in to Windows in the FCS lab.
- Using remote access to the FCS labs is recommended.
- Complete lab exercises and prepare a lab report.
- Group work is allowed, however, individual D2L submissions are required from each student.
- You may finish the lab on your own time.

Submission instructions:

- Submit the pdf files to the Desire2Learn dropbox

Task 1. Design a sequential circuit with 2 JK flip-flops A and B and two inputs E and x. If E = 0, the circuit remains in the same state regardless of the value of x. When E = 1 and x = 1, the circuit goes through the state transitions from 00 to 01 to 10 to 11 back to 00 and repeat. When E = 1 and x = 0, the circuit goes through the state transitions from 00 to 11 to 10 to 01 back to 00 and repeat.

- Submit a circuit diagram for this problem
- Provide a truth table for positive-edge triggered J K flip flop
- Provide a truth table for negative-edge triggered J K flip flop