Open-Book Marked Practical Logic Circuits and Number Systems

3.00 pm to 5.00 pm ██████████████████████████████.

Committed files should be timestamped no later than ████████████████████

Demonstration and marking of completed practical circuits will take place on █████████████ ██████████████████
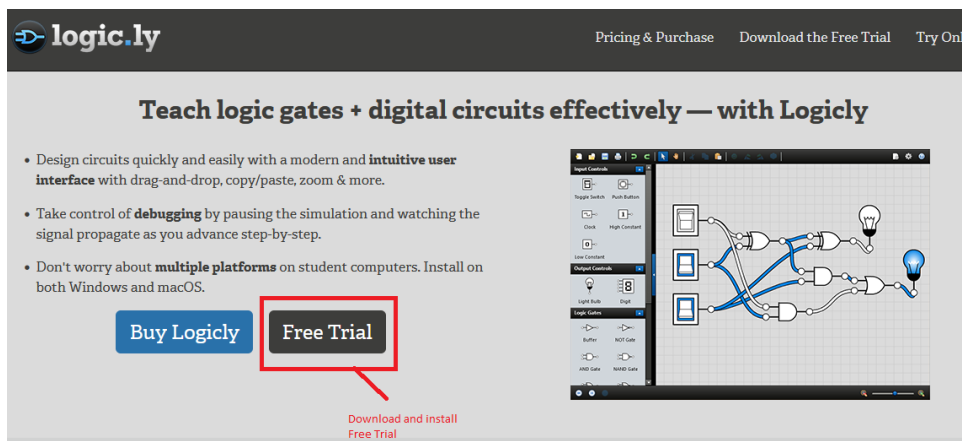
Completed practical is work ████

Work must be submitted to GitHub.

Save and commit your progress to GitHub regularly during mark practical.

Step 1

Download and install logic.ly

Step 2

Create a Github or Bitbucket Repository

Name the repository

LogicCircuitsCompArch

Step 3

Add lecturers as collaborators for this repository

Step 4

 <u>**Share your screen via Discord**</u> so that your work can be invigilated. You will be assigned a Discord Room. Remain in that Discord Room until 5.00 pm, or your work has been checked.

Add Link to repository to CA Spreadsheet, this must be done before proceeding to Step 5.

<u>**See next Page....**</u>

Step 5

Read preamble

You have been asked to prototype a circuit for a Building Management System. The circuit controls the temperature display of a Server Room. The ideal temperature of the Server Room is between 10 and 12 degrees.

The current temperature of the Server Room is **15 degrees**. Your circuit needs to include a subtraction mechanism to reduce the temperature, so that the server room reaches an ideal operating temperature.

The Building Management system is remote from Server Room. Wiring has been put in place which can transfer address and temperature setting data.

See circuit block diagram **Figure 1**

Step 6

Create a 4 Bit Ripple Adder (with Two Complement enabled). The A and B bits should be input to a 7 segment displays. The **A bits** display and represent the Current Room Temperature **15 Degrees**. The **B bits** display and represent the Server Room Temperature **reduction**. The **B bits and second 7 Segment Display** should be set to *0000.* This circuit will be used to reduce the operating temperature.

See circuit block diagram **Figure 1**

When this circuit is complete, **Save** your work and Upload to Github or BitBucket Repository

Step 7

Reduce Room Temperature by 1 Degree. Take a screenshot of the circuit including 7 segment display(s) output.

See circuit block diagram **Figure 1**

When this screenshot is complete, **Save** your work and Upload to Github or BitBucket Repository

Step 8

Create a 4-bit Encoder Circuit to send temperature data over a data line. Use switches for the address lines and Label them A and B.

See circuit block diagram **Figure 1**

When this circuit is complete, **Save** your work and Upload to Github or BitBucket Repository

Step 9

Create a 4-bit Decoder Circuit to receive temperature over a data line.

See circuit block diagram **Figure 1**

When this circuit is complete, **Save** your work and Upload to Github or BitBucket Repository

Step 10

Attach a 7-segment display to the decoder data lines.

See circuit block diagram **Figure 1**

When this circuit is complete, **Save** your work and Upload to Github or BitBucket Repository
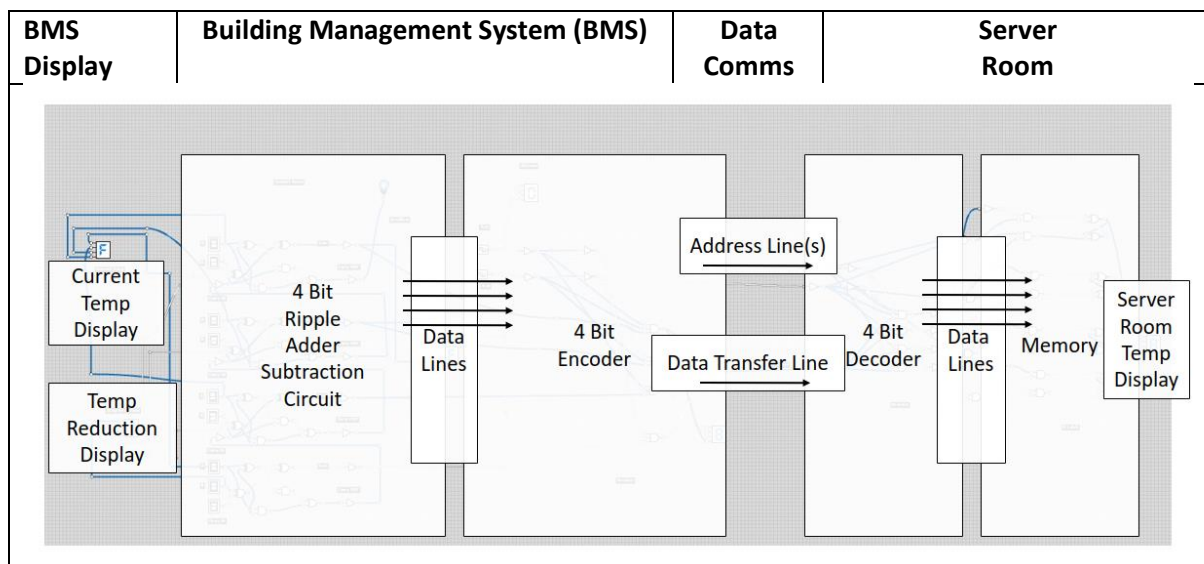
Step 11

Reduce Server Room Temperature by 1 Degree. Take a screenshot of circuit including 7 segment display output. Repeat the steps until the Server Room is set to ideal operating temperature. The remote 7 segment display should display the correct data line output.

When these screenshots are complete, **Save** your work and Upload to Github or BitBucket Repository

Step 12

Using a D-Latch Circuits (4 D-Latch Circuits) combine the outputs from the decoder circuit such that the Display at the Control Room matches the 7-segment display at the Server Room.

Figure 1 Block diagram of completed Circuit

:ENDS