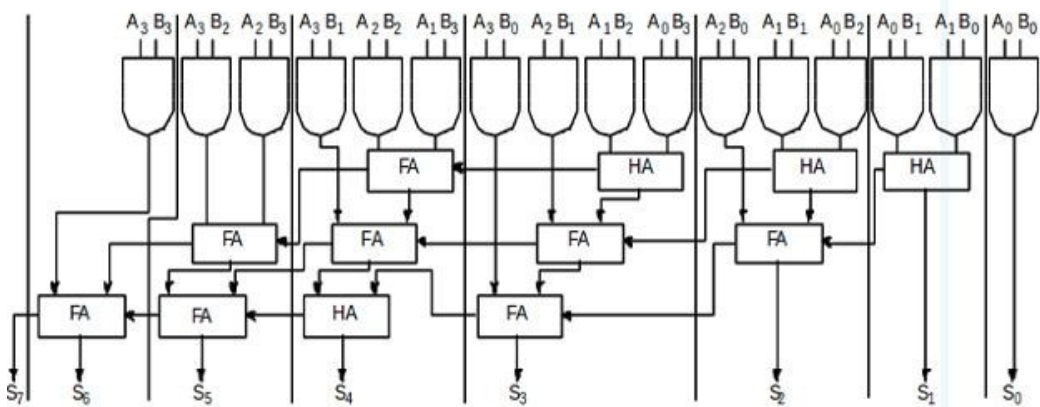# EXPERIMENT NO: 10

Title: To implement a combinational multiplier/Booth's multiplier using simulator

EXPERIMENT NO: 10

Name:Hayden Cordeiro   **SECOMPS**   **Rollno:05**

Simulate a combinational multiplier/Booth's multiplier

AIM	To implementsimulator. a combinationaI multiplier/ Booth's multiplier using
LEARNING OBJECTIVE	To explore a simulation tool for computer organization components.
LEARNINGOUT COME	Students can simulate the operation of multiplier unit .
LAB OUTCOME	CSL 403.2: Ability to estimate the output of computer operations hardware using simulator.
PROGRAM OUTCOME	PO11, PO32, PO41, PO52, PO83, PO93, PO122, PSO11
BLOOM'S TAXONOMY LEVEL	Evaluate
THEORY	Combinational Multipliers do multiplication of two unsigned binary numbers.Each bit of the multiplier is multiplied against the multiplicand, the product is aligned according to the position of the bit within the multiplier, and the resulting products are then summed to form the final result. Main advantage of binary multiplication is that the generation of intermediate products are simple: if the multiplier bit is a 1, the product is an appropriately shifted copy of the multiplicand; if the multiplier bit is a 0, the product is simply 0. Some features of the multiplication scheme: • it can be designed by unrolling the multiplier loop • instead of handling the carry out of partial product summation bit,the carry out can be sent to the next bit of the next step • this scheme of handling the carry is called carry save addition • this scheme is more regular and modular

| | **Combinational Multiplier:**

CIRCUIT DIAGRAM

COMPONENTS USED	**Combinational Multiplier:** To build a Combinational Multiplier, we need : 16 2input AND Gates 4 half adders 8 full adders Display unit to show the outputs. Wires to connect.
STEPS TO DESIGN THE CIRCUIT	**Combinational Multiplier:** Start the simulator as directed. This simulator supports 5valued logic. To design the circuit we need 8 full adders, 4 half adders, 16 AND
	gates, 8 bit switch (to give input,which will toggle its value with a double click), 8 bit displays (to see the output), wires. The pin configuration of a component is shown whenever the mouse is hovered on any canned component of the palette or press the 'show pinconfig' button. Pin numbering starts from 1 and from the bottom left corner (indicated with the circle) and increases anticlockwise. For half adder input is in pin5,8 output sum is in pin4 and carry is pin1, For full adder input is in pin5,6,8 output sum is in pin4 and carry is in pin1 Click on the half adder component (in the Adder drawer in the pallet) and then click on the position of the editor window where you want to add the component (no drag and drop, simple click will serve the purpose), likewise add 3 more half adders, 8 full adders (from the Adder drawer in the pallet), 16 AND gates (from Logic Gates drawer of the pallet,if it is not seen scroll down in the drawer), 8 Bit switches, 8 bit Displays (from Display and Input drawerofthepallet,ifitisnotseenscrolldowninthedrawer) To connect any two components select the Connection

menu of Palette, and then click on the Source terminal and click on the target terminal. According to the circuit diagram connect all the components, connect bit switches to the input terminals. connect the output terminals to the Bit display component. After the connection is over click the selection tool in the pallete. See the output, bit switches are used to give input so that you can toggle its value with a double click and see the outputs with different inputs.
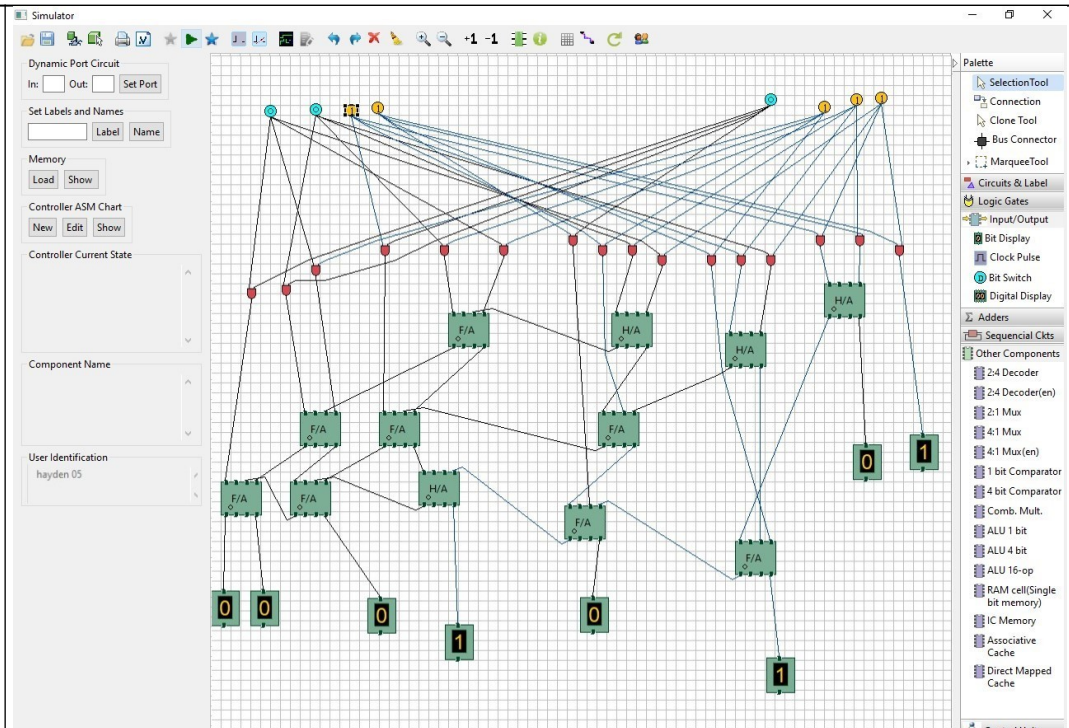
SIMULATED RESULTS	
CONCLUSION	We have succesfully understood and simulated combinational multiplier
REFERENCES	**https://cse.iitkgp.ac.in/~chitta/coldvl/rca_design.html**