

# VLSI Design Lab

## Experiment - V

### I Pre-Lab Questions:

1. Write the expression for propagate and generate term in a CSA.  
 Soln.  $P_i = a_i \oplus b_i$
2. List the efficient method for implementing 64-bit adder using CSA technique.

Soln. a) ~~Divide~~ To implement a 64 bit adder using Carry Shift adder, divide into 16 4-bit blocks, implement 4-bit carry shift adder, connect carry out to carry in of each block, add any remaining carry bits with a final 4-bit adder, and connect final carry out to carry out of 16th block.

### II Post-Lab Questions:

1. Compare the area, delay and power report of Ripple Carry and CSA in Xilinx ISE. Create a comparison chart and justify the results.

Soln.

	Ripple Carry Adder	Carry Shift adder
Area	Small.	Large
Delay	Large	Small
Power	More efficient.	less efficient.

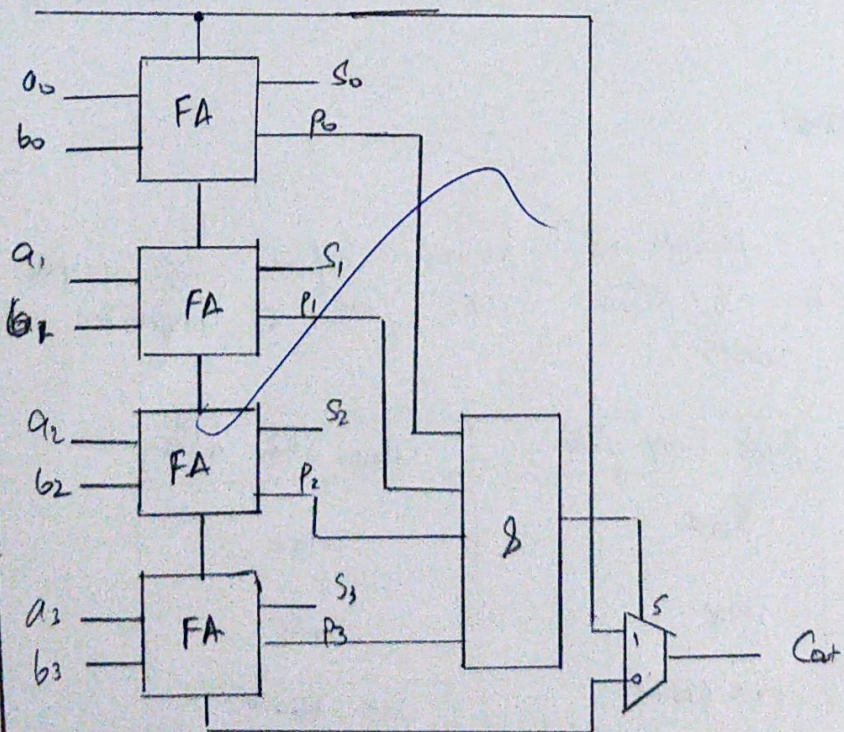
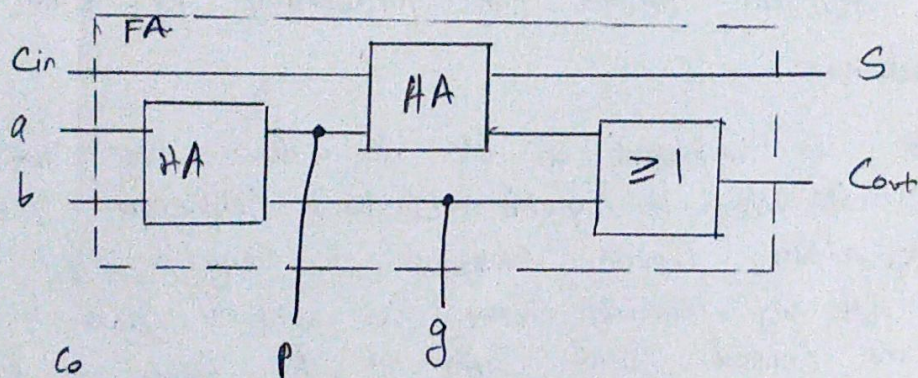
2. List the application of CSA in VLSI Design.

Soln. Carry Shift adders are widely used in VLSI Design for high speed arithmetic operations in microprocessors, DSP, image.



and video processing, Cryptography, and high-performance Computing. They enable fast and reliable arithmetic operations in a wide range of applications

3. Prepare the Synthesis Chart for a 4-bit Carry Shift adder.  
Soln.





4. Can retiming mechanism improve the speed of CSA architecture?

Soln. Yes, Retiming mechanism can improve the speed of Carry Skip adder by reducing the number of levels and logic and minimizing the delay caused by the Carry chain.

### RESULT:

Thus, the design of 4-bit Carry Skip adder circuit was simulated in Verilog and synthesized using EDA tools.

