Objective:
To build and test various adder circuits, including a Half Adder, Full Adder, and 2-bit Ripple Carry Adder.

Preparation:
1. Construct the truth table for the Half Adder (inputs: A, B; output: Sum)
2. Construct the truth table for the Full Adder. (inputs: A, B, Cin; outputs: Sum, Cout)
3. Draw a block diagram for a 2-bit Ripple Carry Adder (from two 1-bit Full Adders).

Procedure:
1. Design and build a Half Adder using five NAND gates only.
   
   *Hint: An XOR gate can be realized using four NAND gates as illustrated below*

   ![Half Adder Circuit Diagram](image)

2. Design and build a Full Adder using two XOR gates, two AND gates, and one OR gate.

   ![Full Adder Circuit Diagram](image)
3. Design and build a 2-bit Ripple Carry Adder.
   (a) Build a second Full Adder (using the same set of gates as in part 2).
   (b) Connect the two Full Adders to realize the 2-bit Ripple Carry Adder.

**Demonstrate all adder circuits to the TA.**

*The adder circuits should work for all combinations of the inputs.*