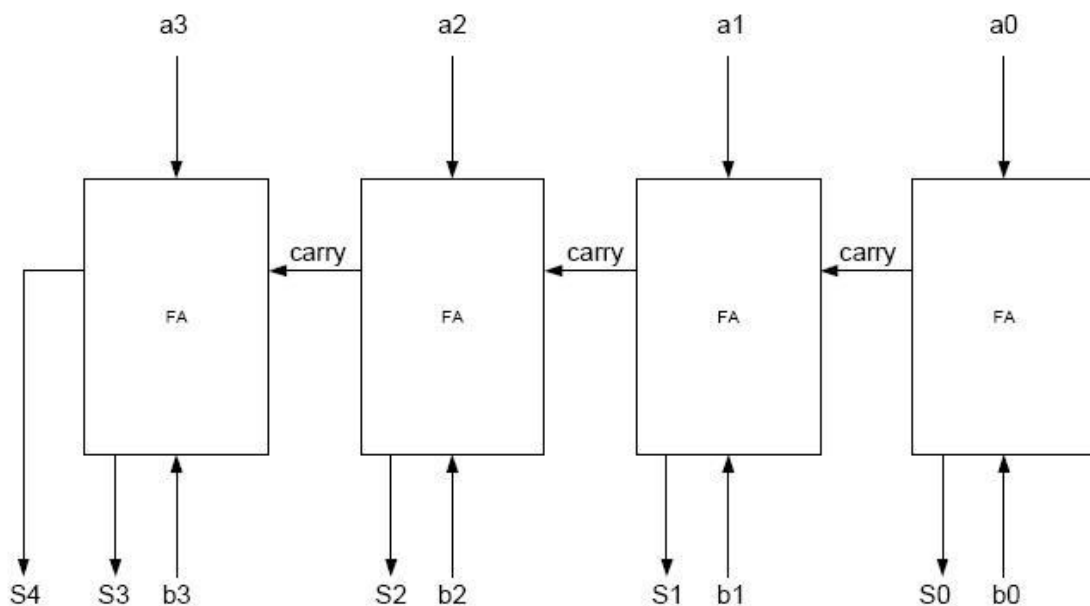


## LAB 1 – Combinatorial Devices

### Part one - Adders

Write a program which carries out the operation of addition between two variables 4 bit each one:

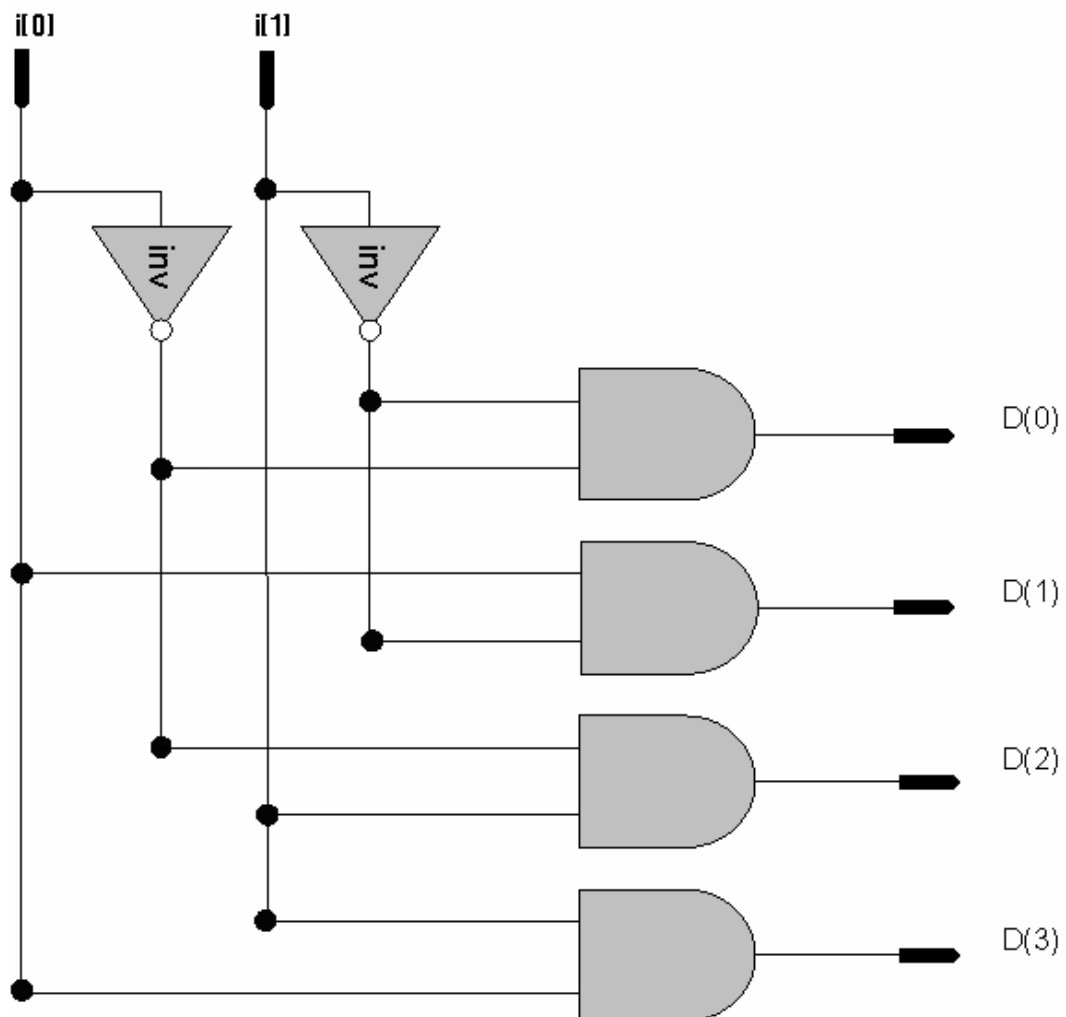
1. Using "+" operator (use integer type)
2. According to ripple adder diagram (use bit\_vector type).  
Implement each adder as logic cloud (on the gate level), and connect between them.
3. Describe single full adder and use it as black box (component) to describe 4 bit adder (refer to course book).



Run simulation for each version and compare obtained results.

Part two -Decoder and multiplexer implementation (use bit type).

1. Describe decoder 2x4 according to the given diagram (describe it on the gate level).



2. Describe mux 4x1 (on the gate level).

3. Write mux 4x1 using decoder which was described above and additional logic that should be written through
- a) logic gates
  - b) tri-state buffers (use std\_logic type).

