

LSV Programming Assignment 1

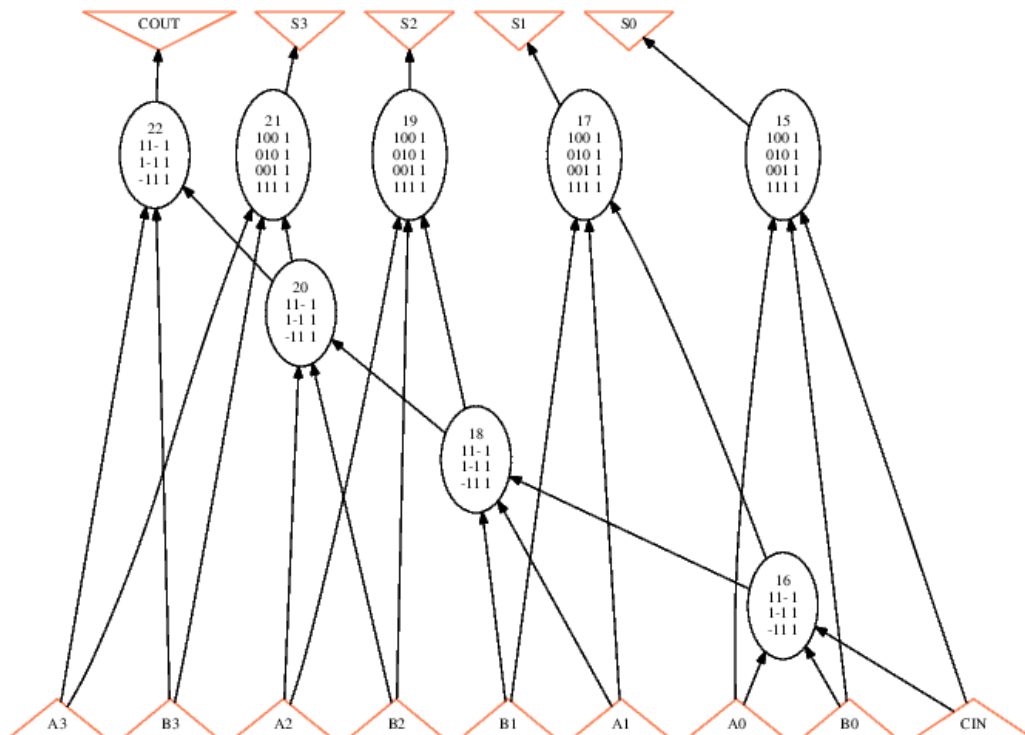
r09943098 郭承賢

1. [Using ABC]

Original network structure :

Network structure visualized by ABC
Benchmark "4bitadder". Time was Mon Oct 12 16:02:29 2020.

The network contains 8 logic nodes and 0 latches.

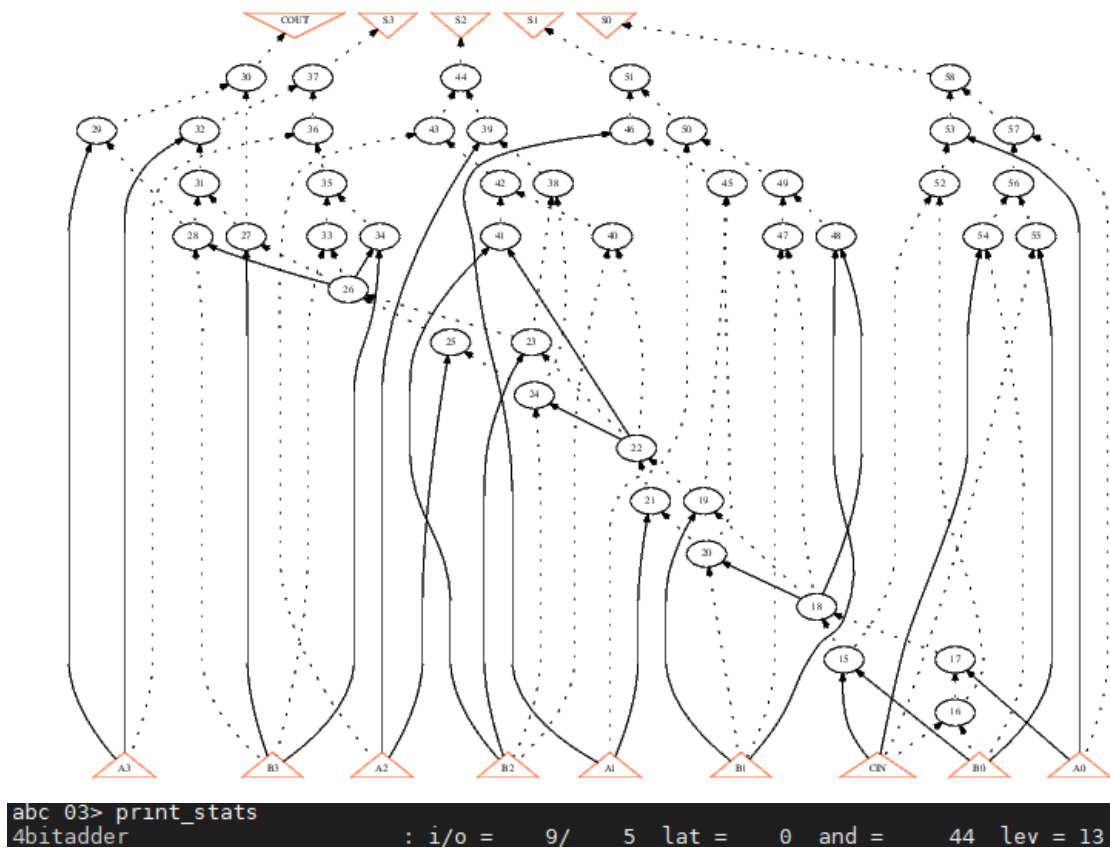


```
abc 02> print_stats
4bitadder : i/o = 9/ 5 lat = 0 nd = 8 edge = 24 cube = 28 lev = 4
```

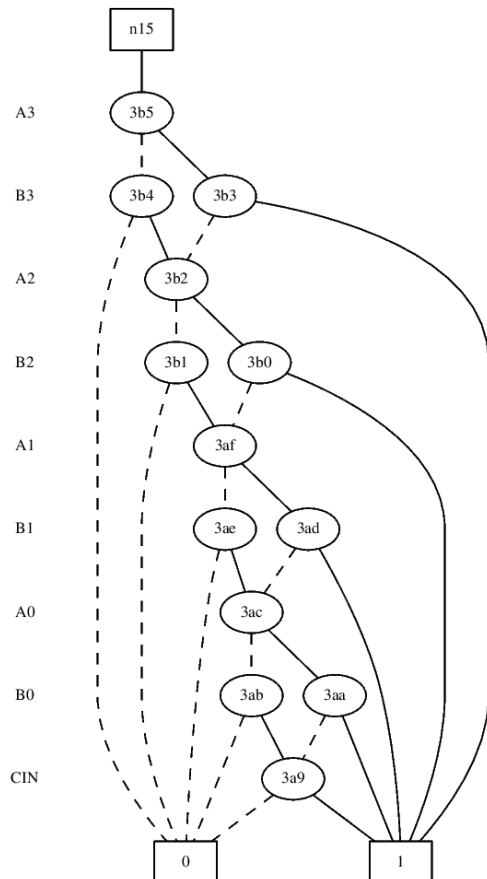
ALG network structure :

Network structure visualized by ABC
Benchmark "4bitadder". Time was Mon Oct 12 16:07:22 2020.

The network contains 44 logic nodes and 0 latches.



BDD network structure :



```

abc 04> print_stats
4bitadder           : i/o =  9/   5 lat =   0 nd =   5 edge =  33 bdd =  43 lev =  1
  
```

2. [ABC Boolean Function Representations]

In ABC there are different ways to represent Boolean functions.

(a) Compare the following differences with the four-bit adder example.

1. logic network in AIG (by command `aig`) vs. structurally hashed AIG (by command `strash`)

The logic network in AIG means its functions of internal nodes are represented in AIG, and the circuit is a logic network.

The structurally hashed AIG means the whole network has been transformed into an AIG network which is different from a logic network.

2. logic network in BDD (by command `bdd`) vs. collapsed BDD (by command `collapse`)

The logic network in BDD means its functions of internal nodes are represented in BDD, and the circuit is a logic network.

The collapsed BDD means the whole network has been transformed into a BDD network which is different from a logic network.

(b) Given a structurally hashed AIG, find a sequence of ABC command(s) to convert it to a logic network with node function expressed in sum-of-products (SOP).

Command : `logic`