

LSV PA1

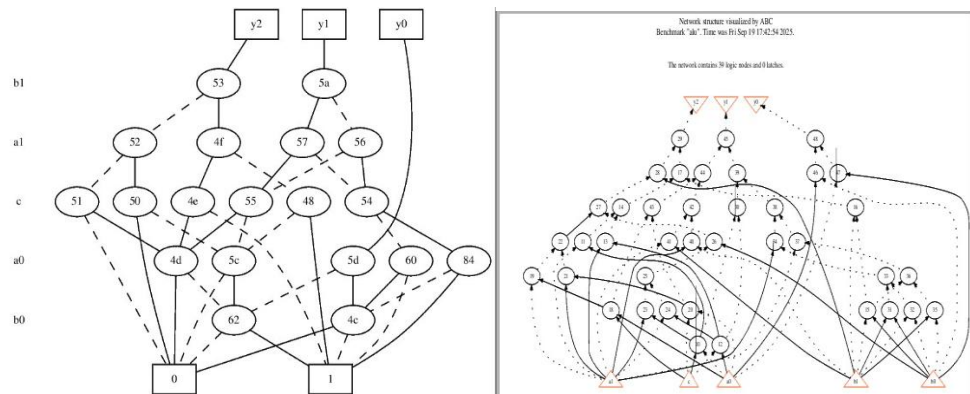
2.(b)

```

abc 01> read /home/jchuang/LSV/lsv/pa1/benchmarks/alu.blif
abc 02> print_status
Status = -1 Frames = -1 Cex is not defined.
abc 02> strash
abc 03> show
abc 03> Warning: Missing charsets in String to FontSet conversion
collapse
abc 04> show bdd -g

```

3.(a)



BDD vs AIG

形式：

- 左圖：BDD/ROBDD (Binary Decision Diagram)。節點是變數判斷，有 0/1 兩條邊（常以虛線=0、實線=1），匯到終端 0/1。按固定的變數順序分層。
- 右圖：AIG (And-Inverter Graph)。節點是二輸入 AND，反相放在邊上（小圓/虛線表示反相）。輸入/輸出用三角形標。沒有全域變數順序。

性質：

- BDD：在給定順序下是典範表示 (canonical)，等價判定、量化等操作直接且精確，但大小對變數順序很敏感，可能爆炸。
- AIG：非典範，結構取決於網表；通常更緊湊、適合重寫與 SAT-based 驗證/合成，需要最佳化步驟來簡化。

3.(b)

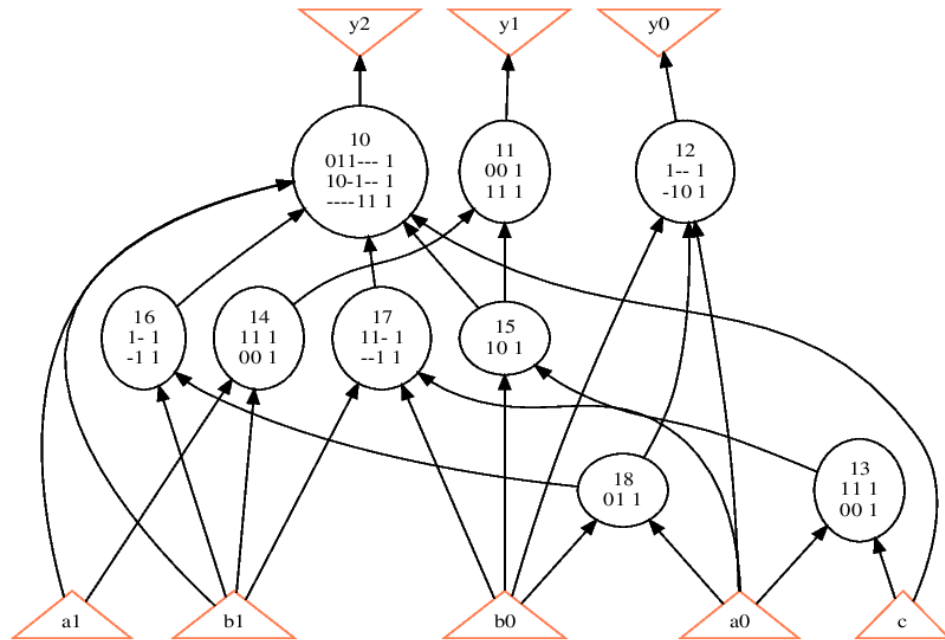
```

abc 03> strash
abc 04> ps
alu          : i/o = 5/ 3 lat = 0 and = 32 lev = 6
abc 04> collapse
abc 05> ps
alu          : i/o = 5/ 3 lat = 0 nd = 3 edge = 12 bdd = 18 lev = 1
abc 05> sop
alu          : i/o = 5/ 3 lat = 0 nd = 3 edge = 12 cube = 18 lev = 1
abc 05> write_blif /home/jchuang/LSV/lsv/pa1/benchmarks/alu_sop.blif
abc 05>

```

Network structure visualized by ABC
Benchmark "alu". Time was Sun Sep 21 19:28:25 2025.

The network contains 9 logic nodes and 0 latches.



SOP graph of Alu.blif