

# LSV PA1 report

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## Problem 2

```
abc 01> read /home/ferayer/LSV-PA/PA1/comp.blif
Hierarchy reader flattened 2 instances of logic boxes and left 0 black boxes.
abc 02> print_stats
fiveadder          : i/o =   5/   3 lat =   0 nd =   8 edge =   18 cube =   17 lev = 4
abc 02> show
abc 02> strash
```

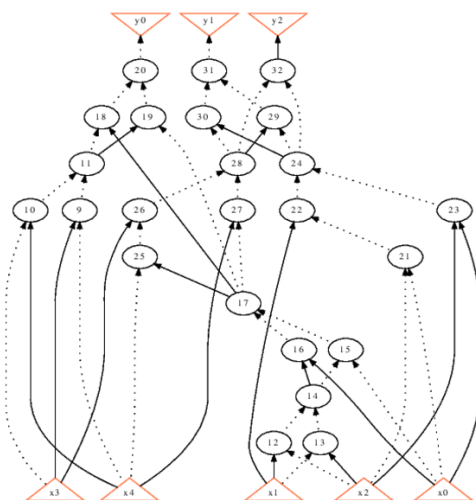
```
abc 03> show
abc 03> collapse
abc 04> show bdd -g
```

```
LSV-PA > PA1 > ≡ comp.blif
1 .model fiveadder
2 .inputs x0 x1 x2 x3 x4
3 .outputs y0 y1 y2
4
5 .subckt fulladder a=x1 b=x2 cin=x0 s=t0 cout=k1
6 .subckt fulladder a=x3 b=x4 cin=t0 s=y0 cout=k2
7 .names k1 k2 y1
8 10 1
9 01 1
10 .names k1 k2 y2
11 11 1
12 %L to chat, %K to generate
13 .end
14
15 .model fulladder
16 .inputs a b cin
17 .outputs s cout
18
19 .names a b k
20 10 1
21 01 1
22 .names k cin s
23 10 1
24 01 1
25 .names a b cin cout
26 11- 1
27 1-1 1
28 -11 1
29
30 .end
```

## Comp.blif

Network structure visualized by ABC  
Benchmark "fiveadder". Time was Wed Sep 11 10:04:46 2024.

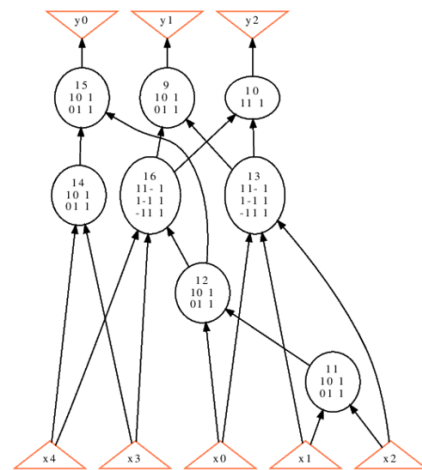
The network contains 24 logic nodes and 0 latches.



## AIG

Network structure visualized by ABC  
Benchmark "fiveadder". Time was Wed Sep 11 10:02:31 2024.

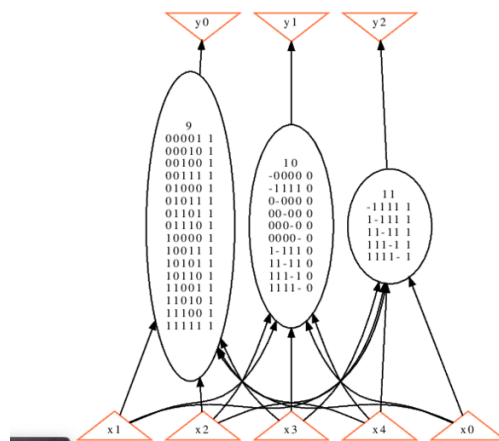
The network contains 8 logic nodes and 0 latches.



## Network structure

Network structure visualized by ABC  
Benchmark "fiveadder". Time was Wed Sep 11 10:06:39 2024.

The network contains 3 logic nodes and 0 latches.

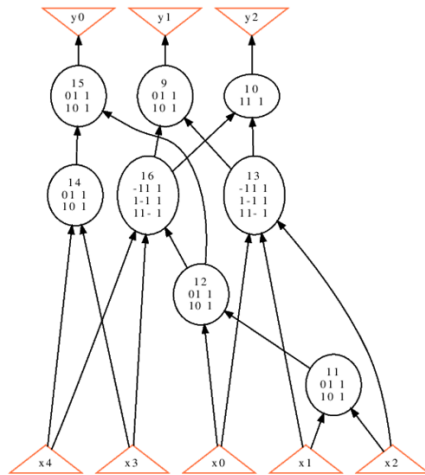


## BDD

## Problem 3.a

Network structure visualized by ABC  
Benchmark "fiveadder". Time was Wed Sep 11 11:46:44 2024.

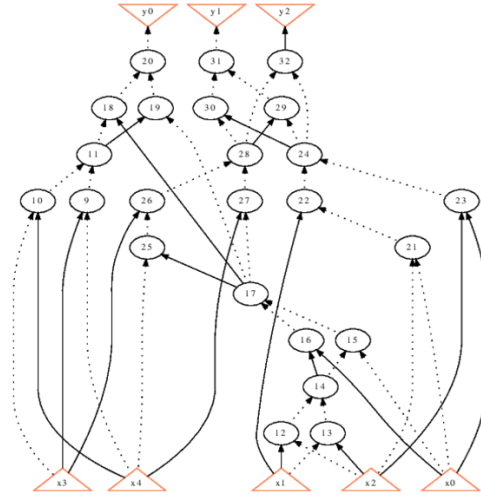
The network contains 8 logic nodes and 0 latches.



AIG

Network structure visualized by ABC  
Benchmark "fiveadder". Time was Wed Sep 11 11:39:10 2024.

The network contains 24 logic nodes and 0 latches.

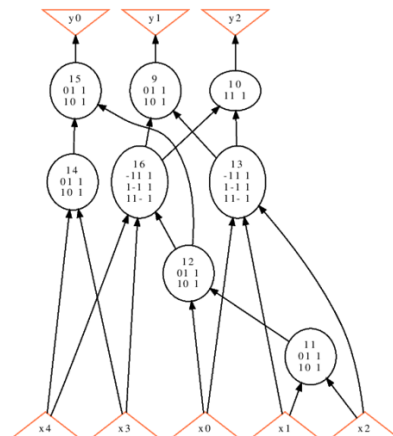


strash

- AIG follows the module structure of blip file and shows all submodule
- Strash breaks down the module, directly inspect the input variables and show the internal and shows the internal AIG procedure.

Network structure visualized by ABC  
Benchmark "fiveadder". Time was Wed Sep 11 11:43:15 2024.

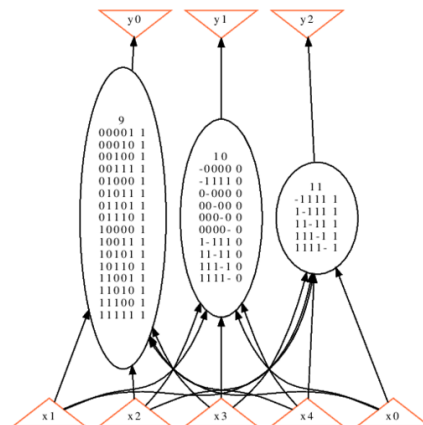
The network contains 8 logic nodes and 0 latches.



BDD

Network structure visualized by ABC  
Benchmark "fiveadder". Time was Wed Sep 11 11:44:43 2024.

The network contains 3 logic nodes and 0 latches.



Collapse

- BDD follows the module structure and shows BDD of all submodule
- Collapse directly inspect all input variables build BDD based on the input

### Problem 3.b

```
abc 06> read /home/ferayer/LSV-PA/PA1/comp.blif
Hierarchy reader flattened 2 instances of logic boxes and left 0 black boxes.
abc 07> strash
abc 08> collapse
abc 09> sop
abc 09> print_factor
    n9 = (((x3 # x4)((x0(x1 # x2)) + (!x0(x1 # x2)))) + ((x3 # x4)((x0(x1 # x2)) + (!x0(x1 # x2)))))
    n10 = ((!x0 + ((!x1 + ((!x2 + (!x3!x4))(!x3 + !x4))(!x2 + (!x3 + !x4))))((x0 + ((x1 + ((x2 + (x3
x4))(x3 + x4)))(x2 + (x3 + x4))))((x1 + x2) + (x3 + x4))(!x1 + !x2) + (!x3 + !x4))))))
    n11 = ((x0((x1((x2(x3 + x4)) + (x3x4))) + (x2(x3x4)))) + ((x1x2)(x3x4)))
```