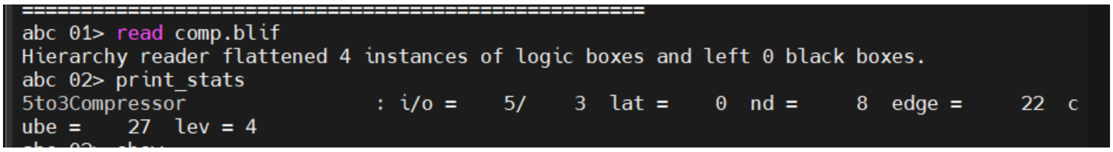
Problem2

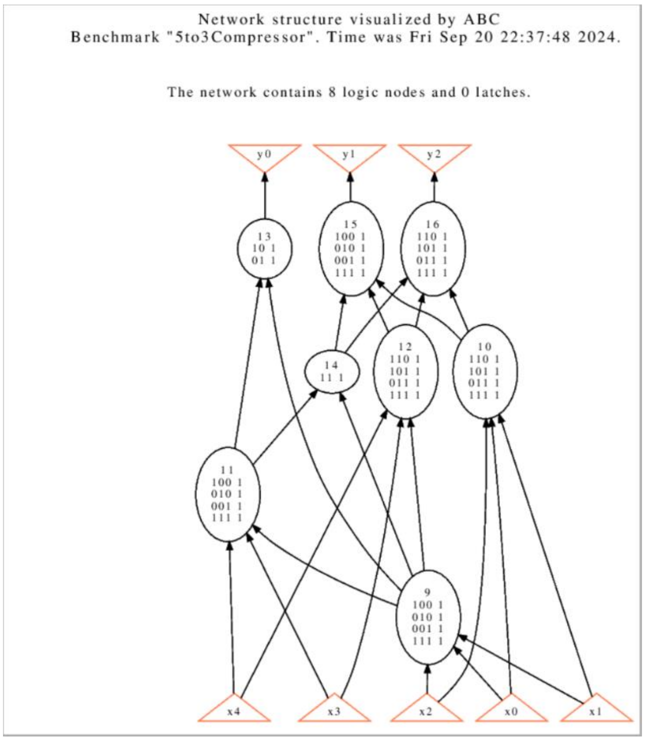
(b)

2. “print_stats”



```
========================================================
abc 01> read comp.blif
Hierarchy reader flattened 4 instances of logic boxes and left 0 black boxes.
abc 02> print_stats
5to3Compressor                  : i/o =    5/    3  lat =    0  nd =     8  edge =     22  c
ube =    27  lev = 4
```

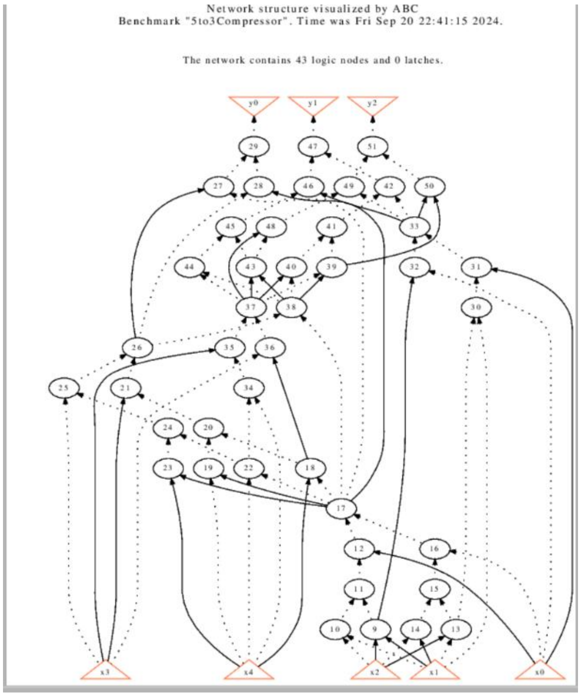
3. “show”



Network structure visualized by ABC
Benchmark "5to3Compressor". Time was Fri Sep 20 22:37:48 2024.

The network contains 8 logic nodes and 0 latches.

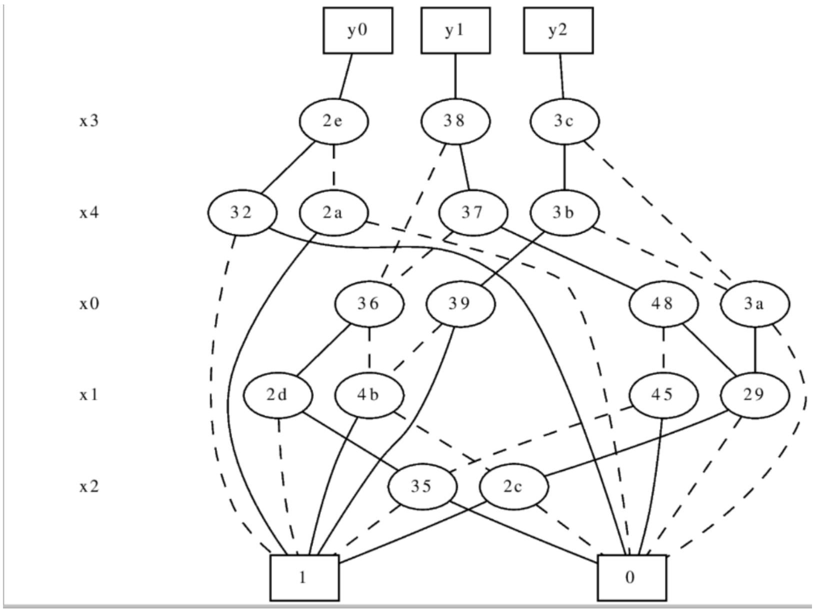
5. “show”



Network structure visualized by ABC
Benchmark "5to3Compressor". Time was Fri Sep 20 22:41:15 2024.

The network contains 43 logic nodes and 0 latches.

7. “show_bdd -g”

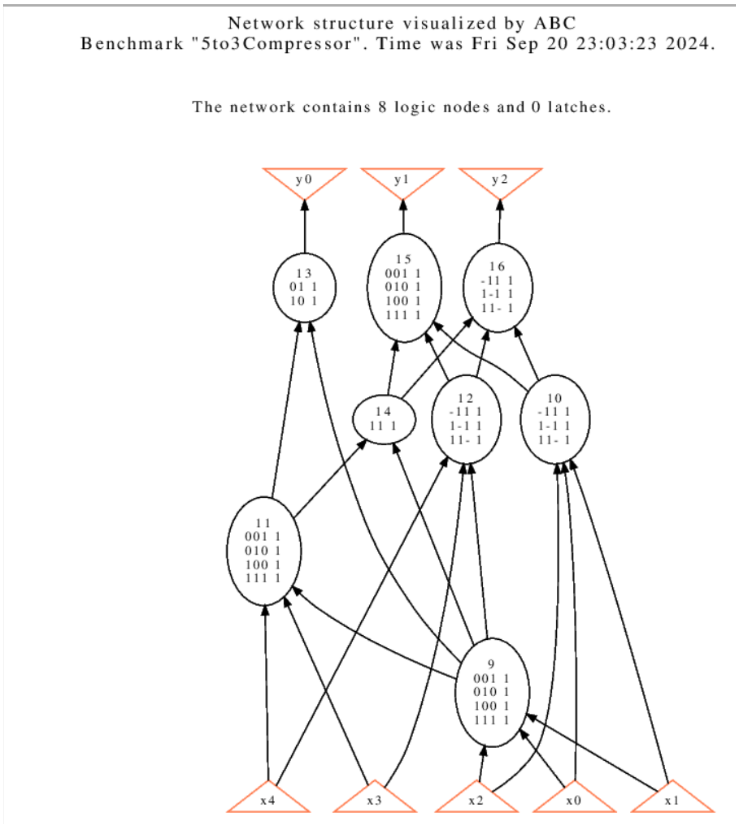


Problem3

(a)

1.

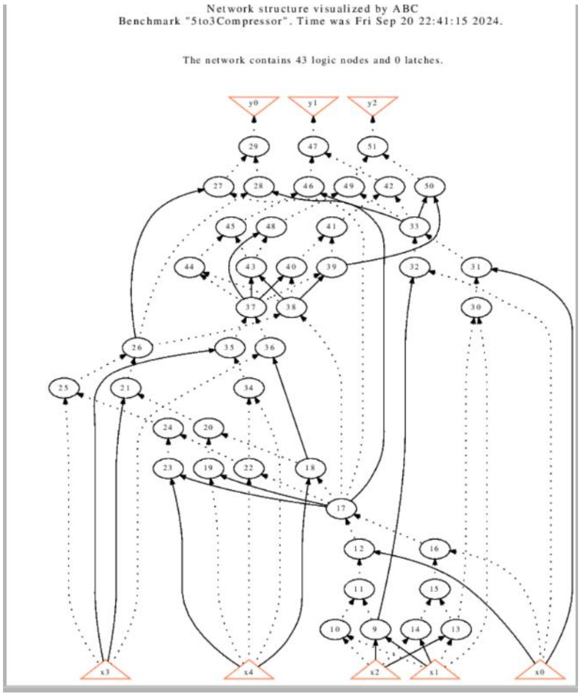
Logic network in AIG by command “aig”:



Network structure visualized by ABC
Benchmark "5to3Compressor". Time was Fri Sep 20 23:03:23 2024.

The network contains 8 logic nodes and 0 latches.

Structurally hashed AIG by command “strash”:


Network structure visualized by ABC
Benchmark "5to3Compressor". Time was Fri Sep 20 22:41:15 2024.
The network contains 43 logic nodes and 0 latches.
y0
y1
y2
x3
x4
x2
x1
x0

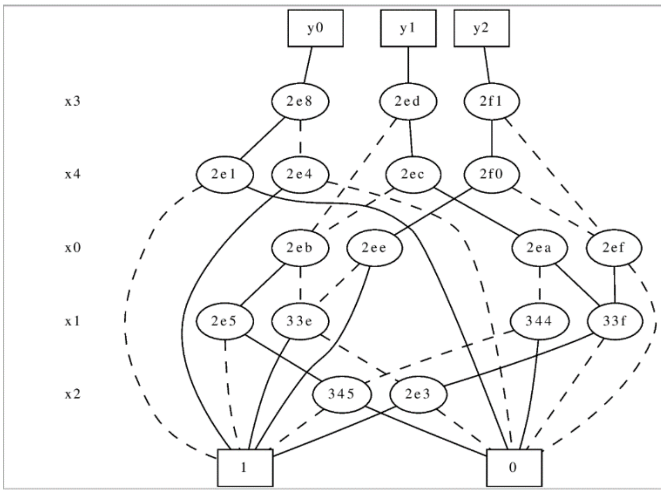
The nodes of logic network in AIG can be complicated. There can be multiple fan-ins, and the Boolean functions represented by truth tables are arbitrary.

The nodes of structurally hashed AIG have only two fan-ins, and their Boolean function is and. However, there are two kinds of edges, solid lines and dashed lines representing non-inverting inputs and inverting inputs, respectively.

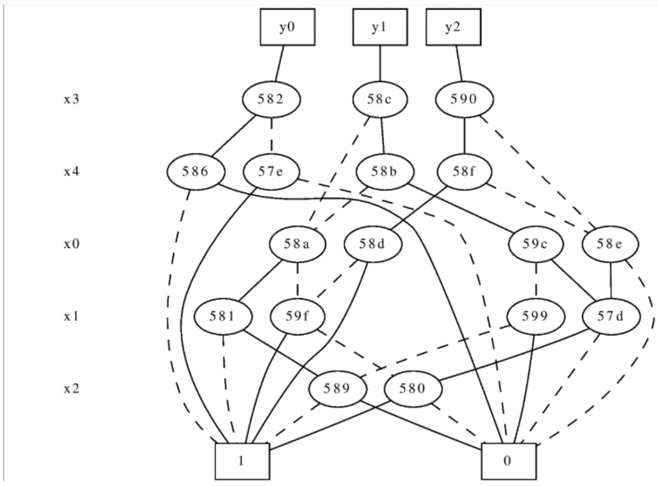
Since the nodes of logic network in AIG are much more flexible than those of structurally hashed AIG, the numbers of nodes and edges of logic network in AIG are smaller.

2.

Logic network in BDD by command "bdd":



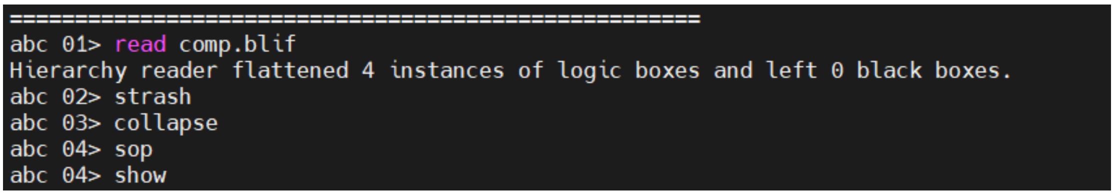
Collapsed BDD by command "collapse":



The two BDD are basically identical. The only difference is the labels of nodes.

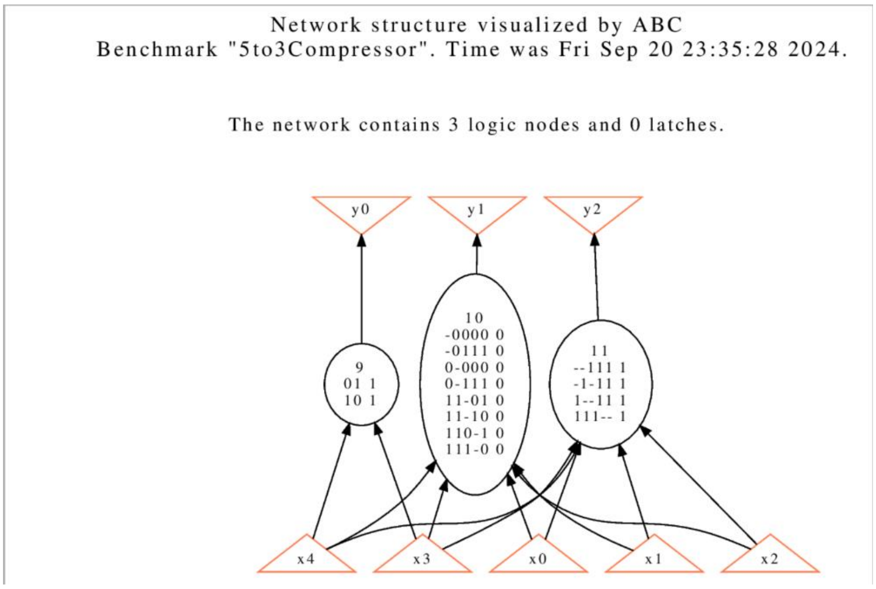
(b)

Commands:



```
=====================================================
abc 01> read comp.blif
Hierarchy reader flattened 4 instances of logic boxes and left 0 black boxes.
abc 02> strash
abc 03> collapse
abc 04> sop
abc 04> show
```

The resulting SOP:


Network structure visualized by ABC
Benchmark "5to3Compressor". Time was Fri Sep 20 23:35:28 2024.
The network contains 3 logic nodes and 0 latches.
y0
y1
y2
9
01 1
10 1
10
-0000 0
-0111 0
0-000 0
0-111 0
11-01 0
11-10 0
110-1 0
111-0 0
11
--111 1
-1-11 1
1--11 1
111-- 1
x4
x3
x0
x1
x2