LSV PA1

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Part1

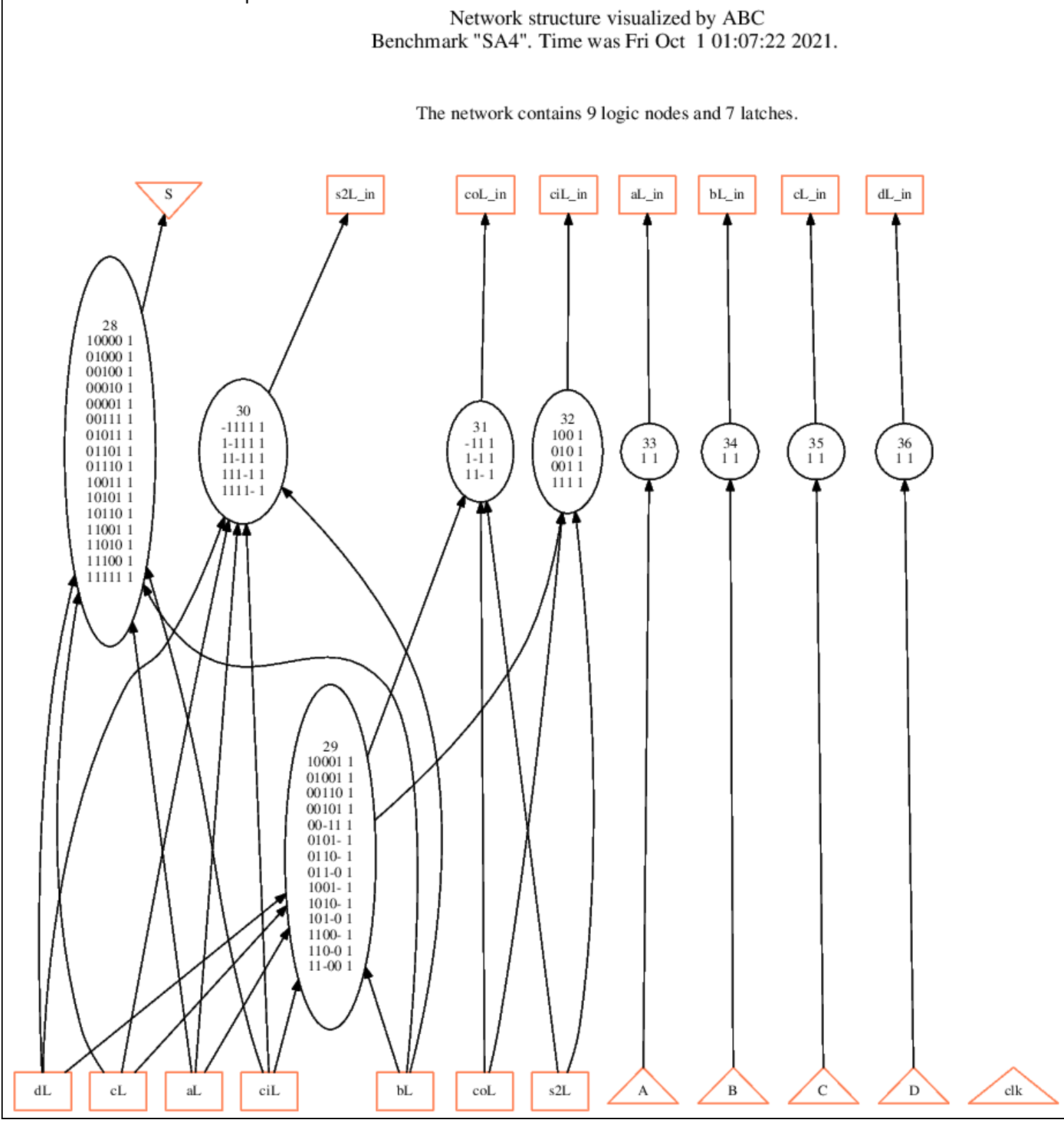
(a) SA4.blif is the blif file, which is a serial adder adding 4 numbers.

(b)

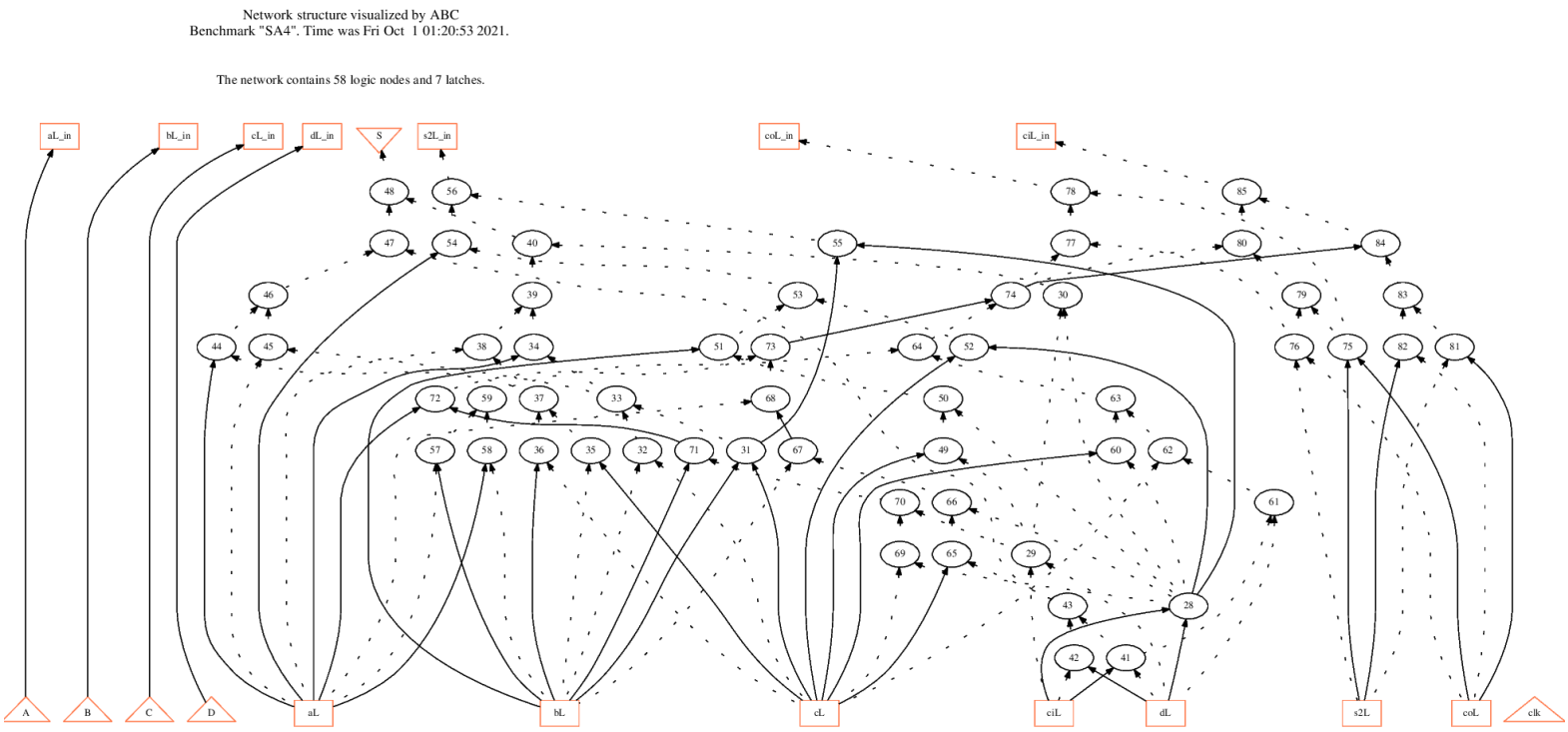
The statistics

```
abc 01> read lsv_fall_2021/pa1/SA4.blif
abc 02> print_stats
SA4                       : i/o =    5/    1  lat =    7  nd =    9  edge =    25  cube =    46  lev = 2
```

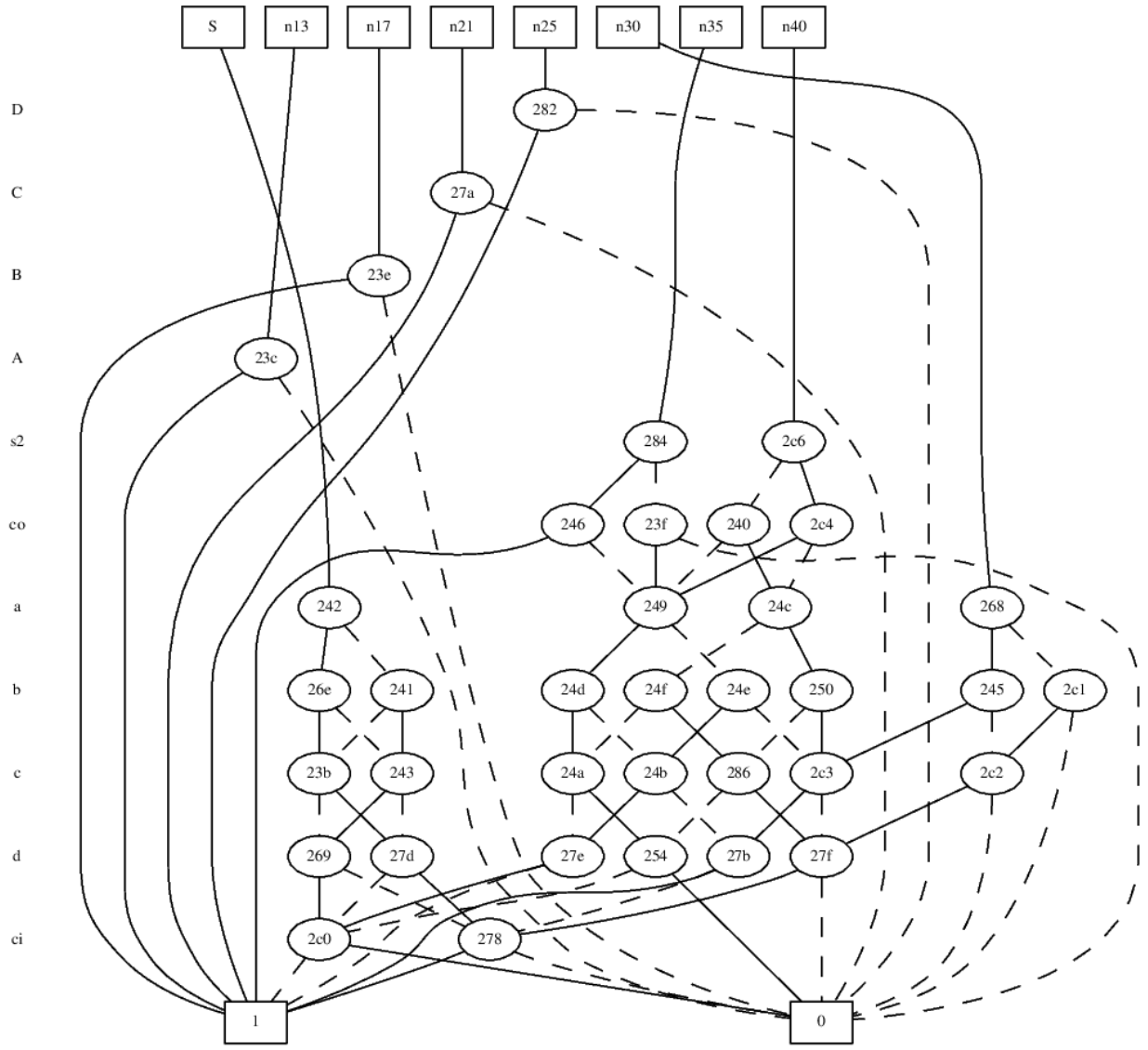
Result of “show” after step 3



Result of “show” after step 5



Result of “show bdd -g" after step 7



Part2

(a)

1.

Command “aig” converts local functions of the nodes to AIGs.

Its network from command “show” is still the single-output-cover form from the blif file.

After command “aig,” the statistics shows that 46 cubes become 68 aigs.

```
abc 01> read lsv_fall_2021/pa1/SA4.blif
abc 02> print_stats
SA4                         : i/o =    5/    1  lat =    7  nd =     9  edge =     25  cube =    46  lev = 2
abc 02> aig
abc 02> print_stats
SA4                         : i/o =    5/    1  lat =    7  nd =     9  edge =     25  aig  =    68  lev = 2
```

Command “strash” would transforms the current network into an AIG by one-level structural hashing; the resulting logic network is composed of two-input AND gates.

After command “strash,” the statistics show that nd, edge, and aig become and and lev.

```
abc 01> read lsv_fall_2021/pa1/SA4.blif
abc 02> print_stats
SA4                         : i/o =    5/    1  lat =    7  nd =     9  edge =     25  cube =    46  lev = 2
abc 02> aig
abc 02> print_stats
SA4                         : i/o =    5/    1  lat =    7  nd =     9  edge =     25  aig  =    68  lev = 2
abc 02> strash
abc 03> print_stats
SA4                         : i/o =    5/    1  lat =    7  and =     58  lev = 10
```

2.

Command “bdd” Converts local functions of the nodes to BDDs.

After command “aig,” the statistics shows that cubes are converts to bdds.

```
abc 01> read lsv_fall_2021/pa1/SA4.blif
abc 02> print_stats
SA4                         : i/o =    5/    1  lat =    7  nd =     9  edge =     25  cube =    46  lev = 2
abc 02> bdd
abc 02> print_stats
SA4                         : i/o =    5/    1  lat =    7  nd =     9  edge =     25  bdd  =    28  lev = 2
```

Command “collapse” recursively composes the fanin nodes into the fanout nodes resulting in a network, in which each CO is produced by a node, whose fanins are CIs.

After command “collapse,” the number of nd, edge, bdd, and lev changed. The lev is reduced from 2 to 1.

```
abc 01> read lsv_fall_2021/pa1/SA4.blif
abc 02> print_stats
SA4                         : i/o =    5/    1  lat =    7  nd =     9  edge =     25  cube =    46  lev = 2
abc 02> bdd
abc 02> print_stats
SA4                         : i/o =    5/    1  lat =    7  nd =     9  edge =     25  bdd  =    28  lev = 2
abc 02> collapse
abc 03> print_stats
SA4                         : i/o =    5/    1  lat =    7  nd =     8  edge =     28  bdd  =    34  lev = 1
```

(b) Command “logic” can transform the AIG into a logic network with the SOP representation of the two-input AND-gates.