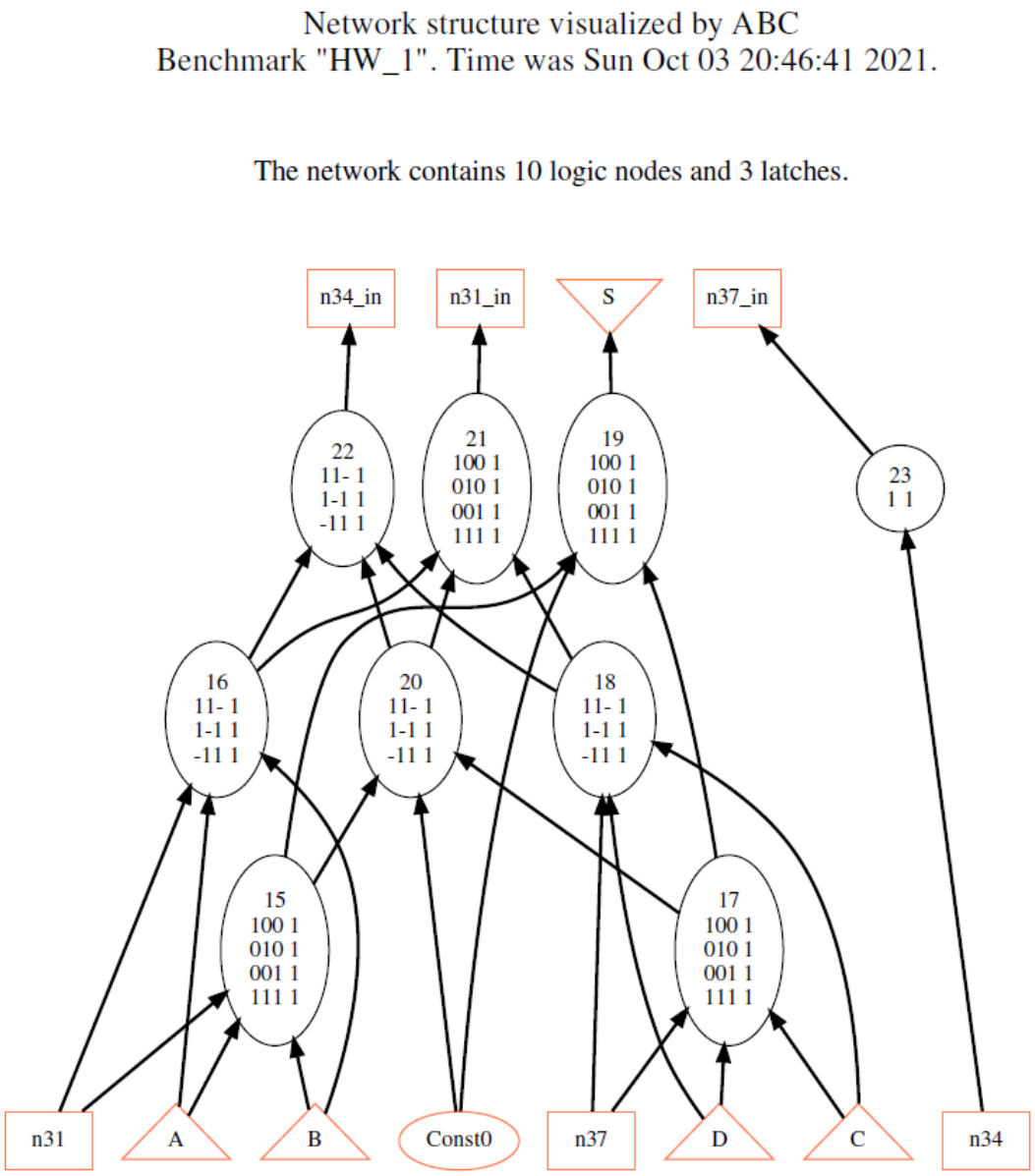
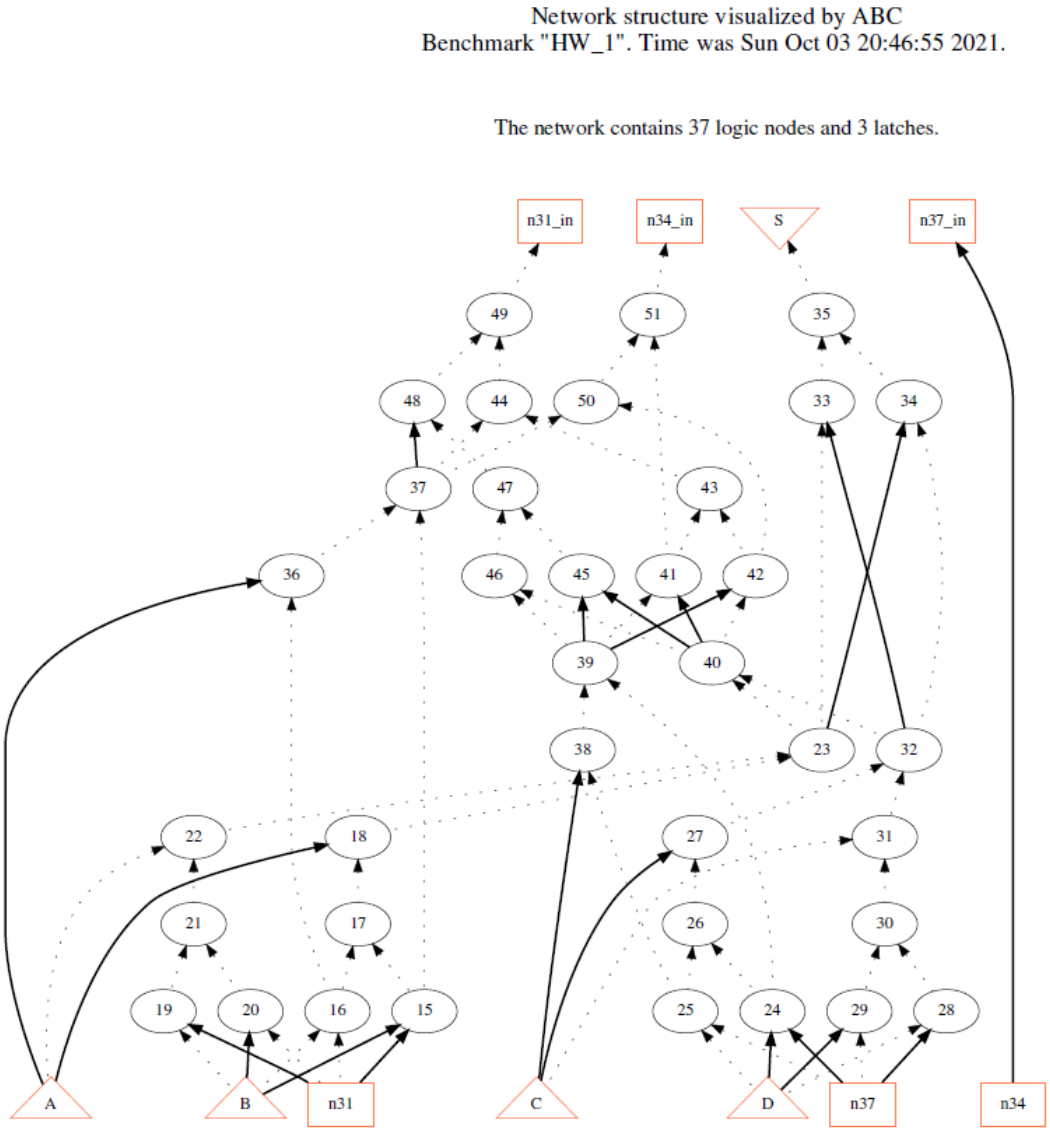
1 [Using ABC]

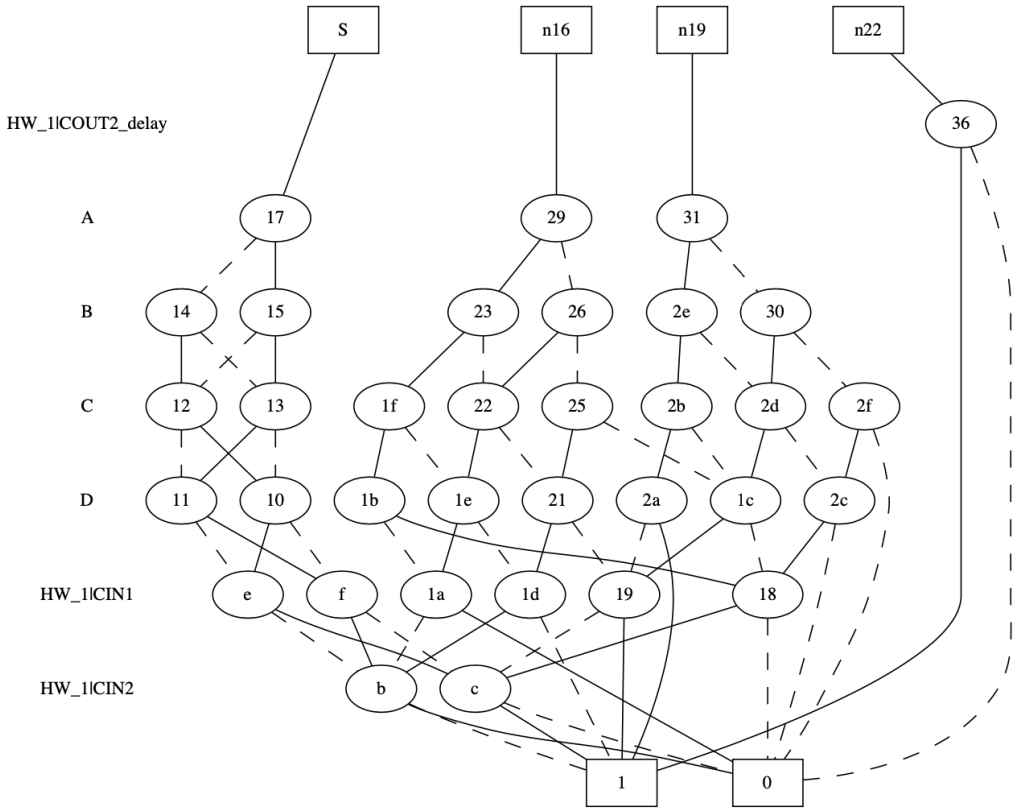
visualize the network structure (command “show”)



Visualize the AIG (command “show”)



Visualize the BDD (command “show bdd -g”



2 [ABC Boolean Function Representations]

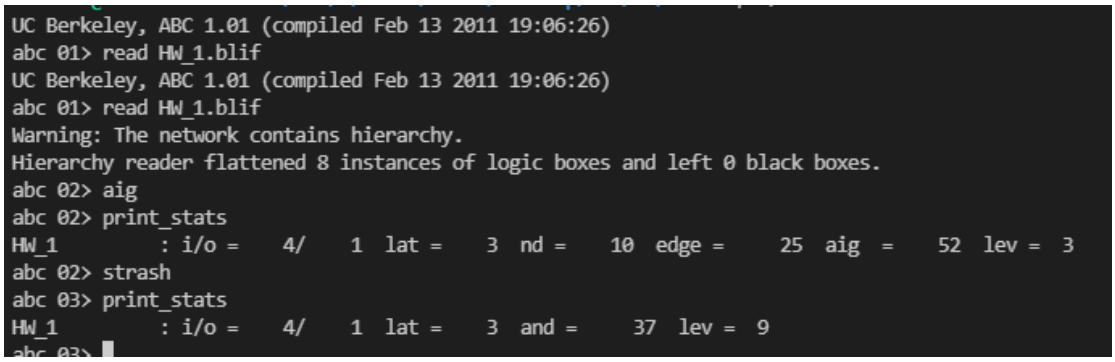
(a) Compare the following differences with the four-number serial adder example.

1. logic network in AIG vs. structurally hashed AIG

ANS:

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

“strash”: Transforms the current network into an AIG by one-level structural hashing. The resulting AIG is a logic network composed of two-input AND gates and inverters represented as complemented attributes on the edges. Structural hashing is a purely combinational transformation, which does not modify the number and positions of latches.

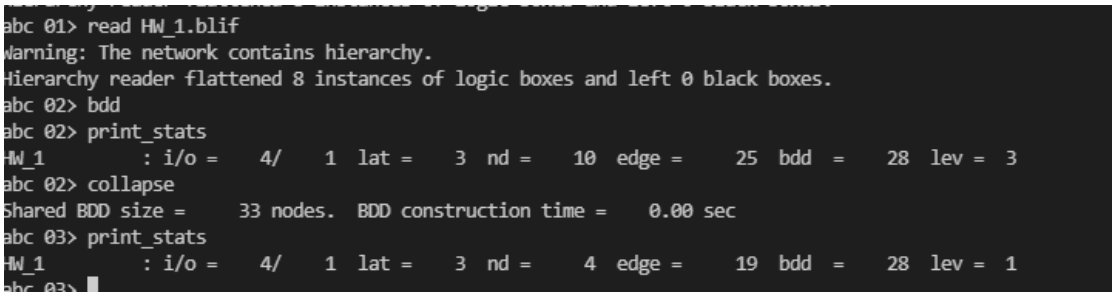


2. logic network in BDD (by command “bdd”) vs. collapsed BDD (by command “collapse”)

ANS:

“bdd”: Only converts local functions of the nodes to BDDs.

“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. Collapsing is performed by building global functions using BDDs and is, therefore, limited to relatively small circuits. After collapsing, the node functions are represented using BDDs.



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

ANS:

Command “logic”