Logic Synthesis & Verification, Fall 2010

National Taiwan University

Programming Assignment 1

Due on 2010/10/06 before lecture

1 [Using ABC]

(a) Use BLIF manual
(`http://www.eecs.berkeley.edu/∼alanmi/publications/other/blif.pdf`)
to create a BLIF file representing a two-bit full adder.

(b) Perform the following steps to practice using ABC
(`http://www.eecs.berkeley.edu/∼alanmi/abc/`):

1. read the BLIF file into ABC (command "`read`")
2. check statistics (command "`print_stats`")
3. visualize the network structure (command "`show`")
4. convert to AIG (command "`strash`")
5. visualize the AIG (command "`show`")
6. convert to BDD (command "`collapse`")
7. visualize the BDD (command "`show_bdd`"; note that `show_bdd` only shows the first PO; command "`cone`" can be applied in combination to show other POs)

Items to turn in:

1. the BLIF file
2. a screenshot of your ABC execution steps
3. the results of "`show`" and "`show_bdd`"

2 [Programming ABC]

Write a procedure in ABC environment to iterate over the objects of the network and for each object list its **ID number** and **type** on a separate line. Integrate this procedure into ABC, so that running command "`test`" would invoke your code, and print the result. Compare the print-out of the new command "`test`" with the result of command "`show`" for the full-adder example above.

Comment 1: For commands "`show`" and "`show_bdd`" to work, please download the binary of software "dot" from GraphVis webpage (`http://www.graphviz.org`) and put it in the same directory as the ABC binary or anywhere else in the path.

Comment 2: Make sure GSview and Ghostscript are installed on your computer. (`http://pages.cs.wisc.edu/∼ghost/gsview/`)

Programming help:

Example of code to iterate over the objects

```
void Abc_NtkCleanCopy( Abc_Ntk_t * pNtk )
{
  Abc_Obj_t * pObj;
  int i;
  Abc_NtkForEachObj( pNtk, pObj, i )
    pObj->pCopy = NULL;
}
```

Example of code to create new command "test"

Call the new procedure (say, `Abc_NtkPrintObjs`) from `Abc_CommandTest()` in file "`\src\base\abci\abc.c`"

```
int Abc_CommandTest( Abc_Frame_t * pAbc, int argc, char ** argv)
{
  ⋮
  Abc_NtkPrintObjs( pNtk );
  ⋮
}
```

Items to turn in:

1. your codes of `Abc_CommandTest` and `Abc_NtkPrintObjs`
2. a screenshot of ABC running your new command "`test`" on the adder example