

Logic Synthesis & Verification, Fall 2011

National Taiwan University

Programming Assignment 1

Due on 2011/10/05 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 multiplier.
- (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 by email to instructor:

- 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 list the **ID number**, **type**, and **fanin ID numbers** for each object 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 multiplier example above.

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

2 **Programming Assignment 1**

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 by email to instructor:

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