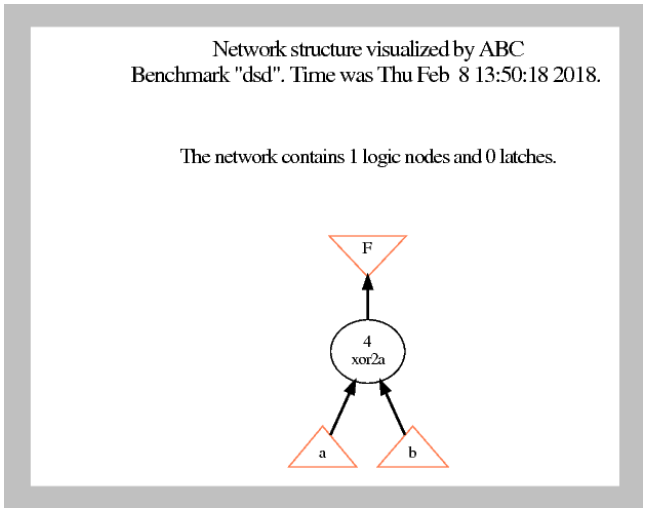
Feb 8th 2018

1. Benchmark circuits:
   a. ISCAS benchmarks: you can download ISCAS 85 and ISCAS 89 benchmarks here: https://ddd.fit.cvut.cz/prj/Benchmarks/ISCAS.7z
   b. EPFL benchmarks: https://lsi.epfl.ch/benchmarks
   c. IWLS 2005 benchmarks: http://iwls.org/iwls2005/benchmarks.html
2. Input library for ABC, I'm attaching two libraries that you can use for your experiments: 45nm.genlib and mcnc.genlib
3. Basic commands of ABC:
   a. Reading library: read/read_library name_of_lib
      Example: read mcnc.genlib
   b. Reading the input circuit: there are several formats such as read_blif, read_verilog, read_dsd, read_eqn, etc.
      Example 1: read_blif i10.blif (or just read i10.blif)
      Example 2: read_dsd a+b ('+' in this format of reading means XOR)
   c. Performing technology-independent optimizations: there are a few commands such as: resyn, resyn2, resysn3
   d. Performing technology mapping: command: map
   e. Showing/printing some statistics:
      - show -g: shows the circuit level network in a "*.ps" format. For example, after reading a+b using read_dsd command and performing mapping (map command), the "show -g" command will create a dsd.ps file that you can open it and see a small network containing an XOR gate, inputs and one output as shown bellow:



      - print_stats: prints the number of input/outputs, number of latches, #node, #edges, total area of the network after mapping, critical path delay, and the logical depth (meaning the longest path depth in terms of gate count)
      - print_delay: prints delay of some critical nodes.
4. Debugging hint: print the following line in the top of abc.h file after "#includes…"
   #define BLURT printf("This is line %d of function: %s\n", __LINE__,__func__)
   Note: abc.h located in src/base/abc folder

Now, in everywhere in the whole source code, if you write “BLURT;” in a separate line, after making and running the code, if the program reaches that line, you will see something like the following printed on the command line:
This is line 237 of function Abc_CommandPrintDelay
The line number and function name are just an example in the above line. Using this will help you debug the code that you will be adding to the body of ABC.

5. Source code hints:
    - The following two files are very important and kind of indexes to most of other functions in ABC. You can search most of the useful functions inside these two. The first one is for declaring functions, and the second one contains the top-level function of them. The reason I mentioned top-level is that, most of ABC’s functions call many others inside them, so, I called the highest level of those functions the top-level function.
      src/base/abc/abc.h
      src/base/abci/abc.c
    - **factoring**: we talked about factored form of Boolean expressions (remember that ALS paper which used approximate factored forms). The top-level function in ABC for this purpose is called “Abc_CommandRefactor” in src/base/abci/abc.c which calls “Abc_NtkRefactor” with source code located in \src\base\abci\abcRefactor.c. You can simply type “refactor” in the command line to apply the factoring operation on the nodes of the network that is read. You can go ahead and study the details of this function, to see how you can apply the approximation on the process of extracting factored form.
    - **Mapping**: the top function for mapping is Abc_CommandMap located in src/base/abci/abc.c. Inside this function another important function is called with name Abc_NtkMap, with source code in src/base/abci/abcMap.c. Inside this function several others are being called. The most important one is “Map_Mapping” with source code located in src/map/mapper/mapperCore.c. You may study these source codes to understand them better, to get ready to modify them and implement our ideas for ALS.
6. Searching files and functions inside ABC: like what you did in Lab2, if you want to search a keyword (such as name of a function) inside ABC, you can use “grep” command.
   Example: the following command “grep -rl Abc_NtkMap” commands return the following results which shows the name and location of the files containing “Abc_NtkMap” function:

```
src/base/abci/abcEspresso.c
src/base/abci/abcMap.o
src/base/abci/abcMap.c
src/base/abci/abcScorr.c
src/base/abci/abcScorr.o
src/base/abci/abc.o
src/base/abci/abc.c
src/base/cmd/cmd.o
src/base/cmd/cmd.c
src/base/main/mainFrame.c
src/base/main/mainFrame.o
src/base/abc/abcFunc.o
src/base/abc/abcFunc.c
src/base/abc/abc.h
```