

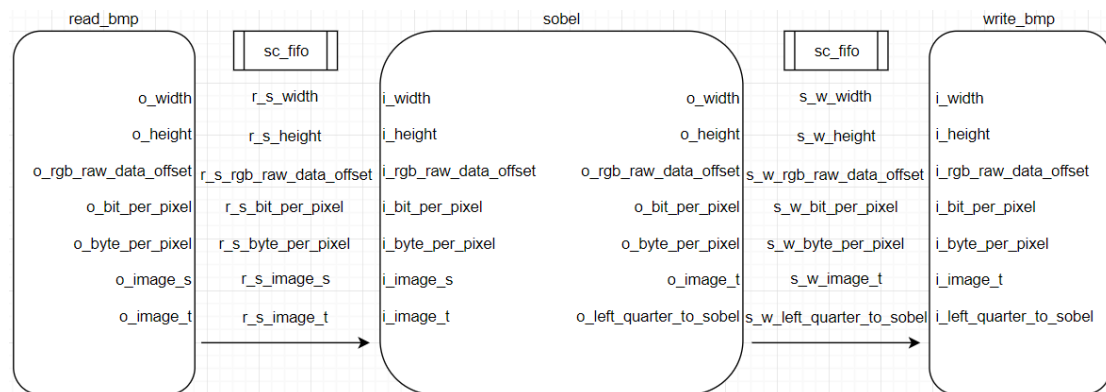
Report hw2

106061565 黃俊憲

1. Problem requirements

- Implement a fixed-point sobel algorithm with SystemC datatypes and Modules.
- Modules are connected with SystemC channels and ports.
- Two versions: one with FIFO channel and the other with signal channel.
- There will be a top module making connections between sub-modules.
- Implement handshaking between Input and Calculation modules, and also Calculation and Output modules.

2. Architecture



3. Implementation

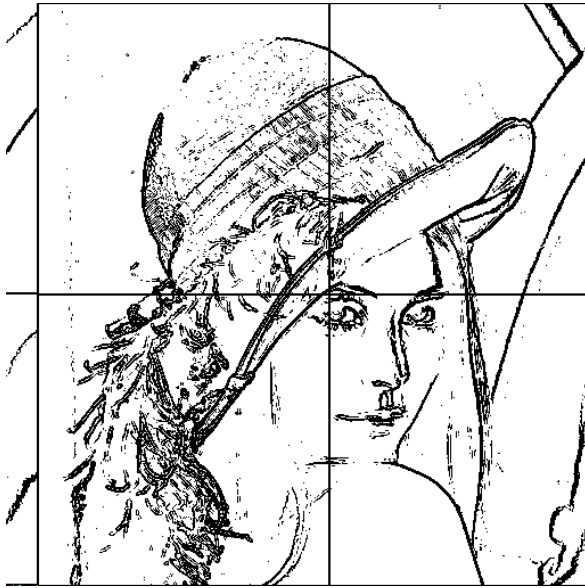
- In `top.h`, declare some `sc_fifo`, `sc_event`, and define the ports of the submodule to connect to the declared `sc_fifo`.
- In three header file, `read_bmp.h`, `sobel.h`, `write_bmp.h`, declare the ports of the submodule. For example, if it is the output of the port, which is declared as `sc_fifo_out`.
- In `read_bmp.cpp`, when some data are ready to pass to another submodule, use `write()` to pass the data to the corresponding port declared in the `read_bmp.h`.
- In `sobel.cpp`, use `read()` to get the data which are passed from `read_bmp` module.

4. Compile and Run

- Edit the "Makefile" to perform a sequence of commands to build an application.
- Type "make" in the command line to generate executable file.
- Make sure the file "lena.bmp" is present in the current folder.
- Type `./sobel.exe` in the command line to generate output picture.

- Type "display lena_sobel.bmp &" in the command line to show output picture.

5. Results



6. Discussions and conclusions

- Learn to declare sc_fifo, submodule ports.
- Learn to use sc_fifo to connect submodule.
- Learn to write the data through the ports to sc_fifo.
- Learn to read data through the ports from sc_fifo.