

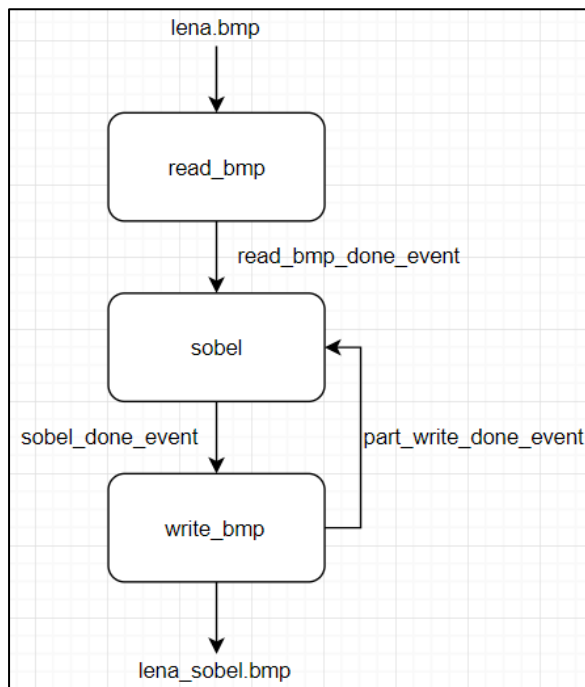
# Report hw1

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## 1. Problem requirements

- Convert "soble.c" C codes into SysyemC processes.
- Use SystemC datatype as possible for Calculation process.
- Process a quarter of the image at a time.
- Implement handshaking between processes.

## 2. Architecture



## 3. Implementation

- In the `my_sobel.h`, we declare the `My_sobel` class, some `sc_event` to handshaking, and register three functions, `"read_bmp()"`, `"sobel()"` and `"write_bmp()"` as SystemC processes.
- In the `my_sobel.cpp`, the function `"read_bmp()"` read data from `"lena.bmp"`, and use `sc_event` to notify process `"sobel()"`. The function `"sobel()"` calculate a quarter of the image at a time with offset by shifting half width of the image or half height of the image or shift both. After the calculation, use `sc_event` to notify process `"write_bmp()"`. At the beginning of the `"write_bmp()"`, a if function will check the left number of the quarter to calculate, if there is, use `sc_event` to notify process `"sobel()"` to calculate other quarter of the image until all quarter has been calculated. At last, use `sc_event` to notify process `"write_bmp()"` to write the result image.

- In the main.cpp, we define the main function where a My\_sobel is instantiated.
4. Additional feature
- Compared with the previous implementation of hw01, here use SC\_THREAD to register function.
  - Also in my\_sobel.cpp, implement function by using methods such as while(true) and notify(). The way is different from SC\_METHOD.
5. 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.
6. Results



7. Discussions and conclusions
- Learn to build a SystemC process.
  - Learn to use sc\_event to trigger other process.