HW04
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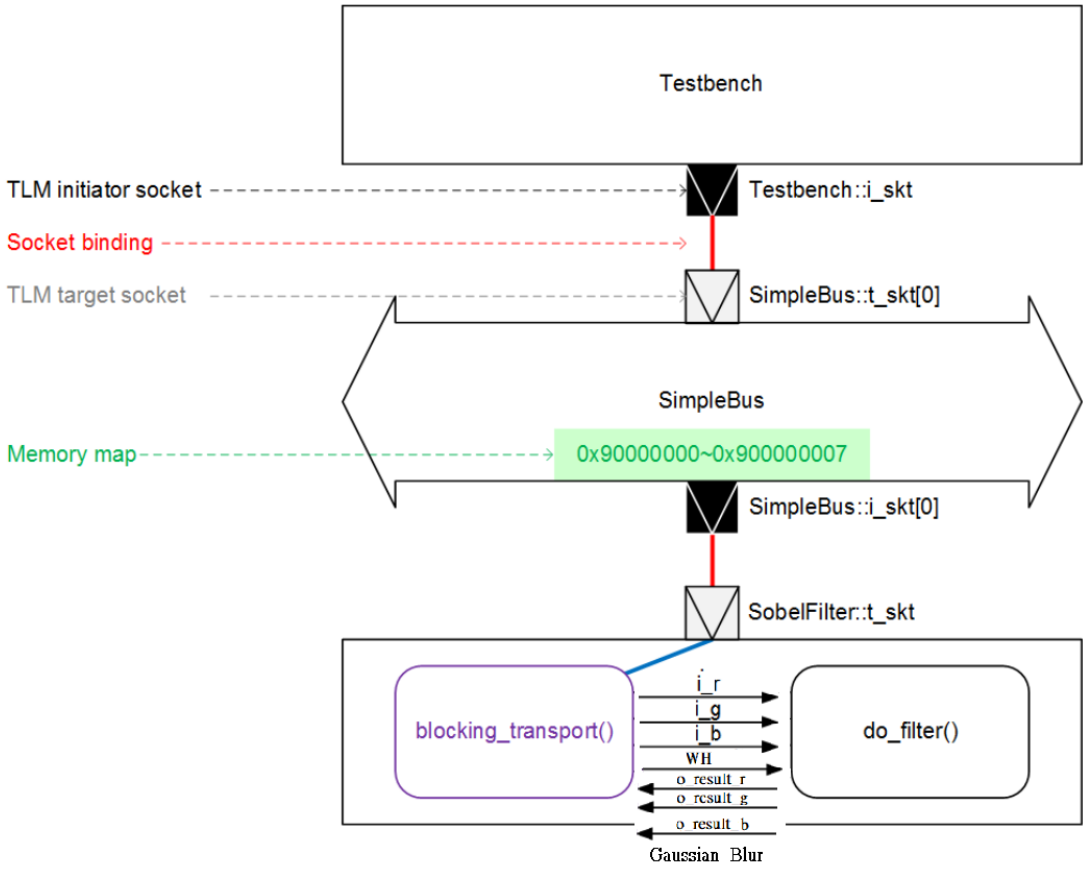
problem

In this homework we will wrapped the Gaussian blur and testbench modules with TLM 2.0 sockets. In this homework we will connect the Gaussian blur and testbench modules through **TLM bus**.

Solution algorithms

SystemC processes

A Gaussian blur with TLM bus
Architecture shown below:



Gaussian_Blur.cpp do filter and blocking transport with sc_module and Testbench.cpp do read/write file with sc_module and mapping address with SimpleBus.h, then mapping address will set in MemoryMap.h, they all connect with socket
In Initiator.cpp do read, write to socket

the situation of connect with socket

```
25    Testbench tb("tb");
26    SimpleBus<1, 1> bus("bus");
27    bus.set_clock_period(sc_time(CLOCK_PERIOD, SC_NS));
28    Gaussian_Blur Gaussian_Blur("Gaussian_Blur");
29    tb.initiator.i_skt(bus.t_skt[0]);
30    bus.setDecode(0, Gaussian_MM_BASE, Gaussian_MM_BASE + Gaussian_MM_SIZE - 1);
31    bus.i_skt[0](Gaussian_Blur.t_skt);
```

mapping address

```
8   const int Gaussian_MM_BASE = 0x90000000;
9   const int Gaussian_MM_SIZE = 0x00000008;
10  const int Gaussian_MM_MASK = 0x00000007;
```

MemoryMap.h

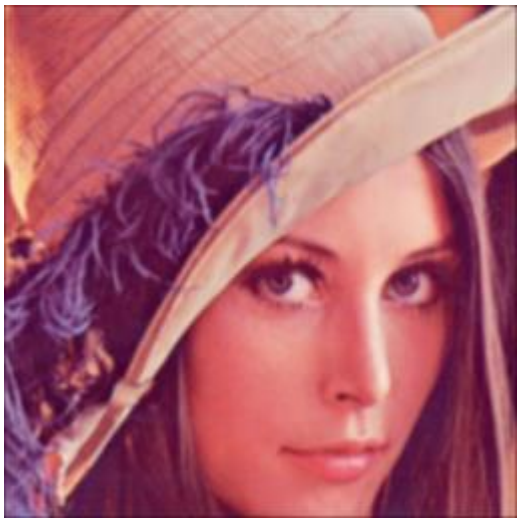
write to socket / read from socket must add above address

```
initiator.write_to_socket(Gaussian_MM_BASE + Gaussian_B_FILTER_R_ADDR, mask, data.uc, 4);
```

Experimental results

Before filter

After filter



Number of pixel:

```
pixel : 65536

Info: /OSCI/SystemC: Simulation stopped by user.
Simulated time == 655365 ns
[100%] Built target run
```

Discussions and conclusions

Before this homework I do lab03 and lab04 to learn the architecture of TLM, and this homework I learn about TLM bus architecture and coding in C and systemC. I think TLM is very useful to transport data. I derive much benefit in this class, thanks.