

ECPS 203

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Agenda

- Assignment 9
 1. Throughput optimization

Throughput optimization

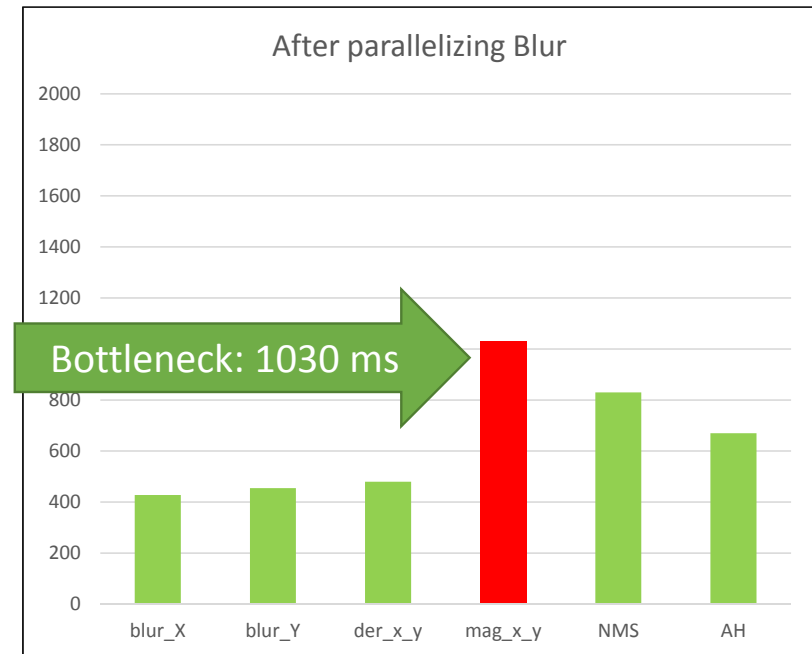
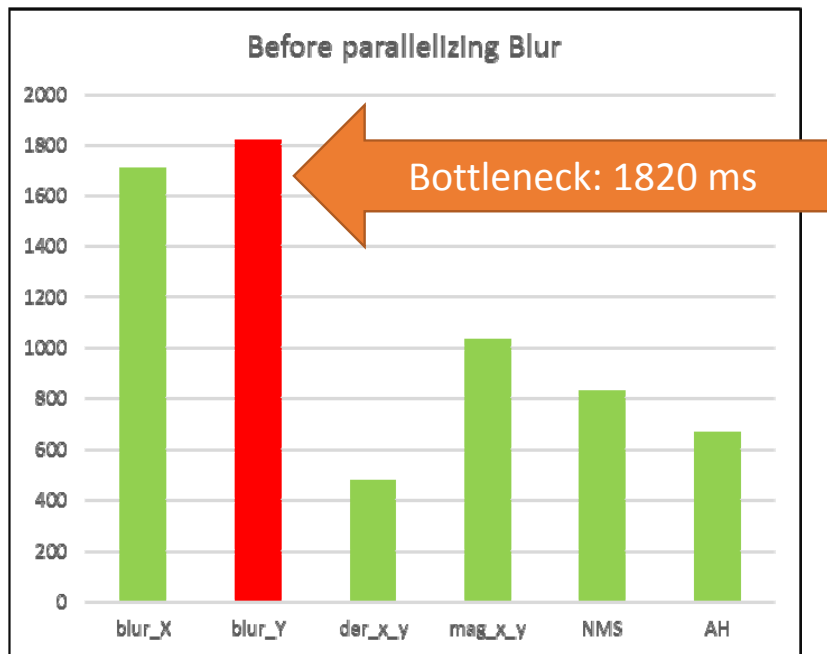
- Frames per second (FPS)
 - $1/(\text{delay between two output frames})$

31702 ms: Monitor received frame 28 with 15920 ms delay.
32732 ms: Monitor received frame 29 with 15920 ms delay.

Delay = 1030 ms
0.97 FPS

Throughput optimization

- We want to optimize the FPS
- FPS is determined by the longest stage in the pipeline



Throughput optimization

1. Use higher optimization level of the compiler on the target board
 - -O3
 - And other options shown in the instruction
 - For example:
g++ Canny.cpp -o Canny -O3 (and other options here)
2. Back annotate the time measurement to your SystemC model
 - Change the value in the wait statements

Throughput optimization

2. Optimize non_max_supp stage

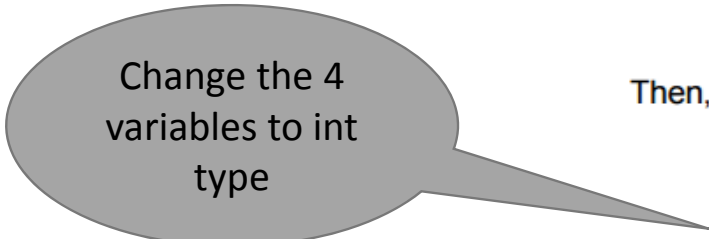
- It will become the bottleneck after the previous step
- Replace floating-point arithmetic with fix-point
- Back annotate the timing into your model

Locate the following two lines of code:

```
xperp = -(gx = *gxptr) / ((float)m00);  
yperp = (gy = *gyptr) / ((float)m00);
```

Then, comment those lines out and insert the following replacement statements:

```
gx = *gxptr;  
gy = *gyptr;  
xperp = -(gx<<16)/m00;  
yperp = (gy<<16)/m00;
```



Change the 4
variables to int
type

Submission

- Final model: Canny.cpp
- Result: Canny.txt