ECPS 203

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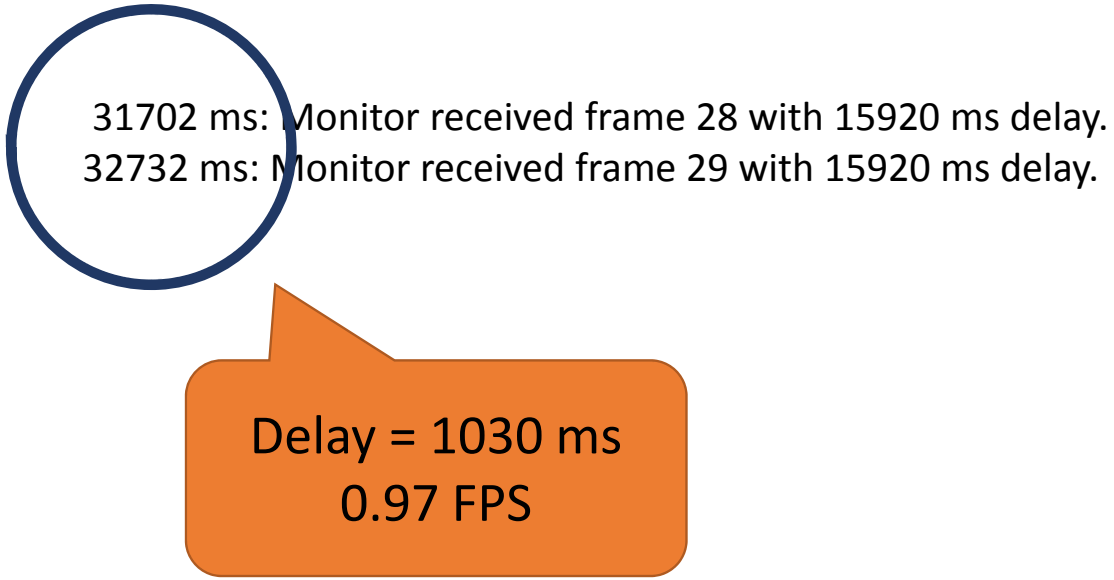
Agenda

- Assignment 9
    1. Throughput optimization

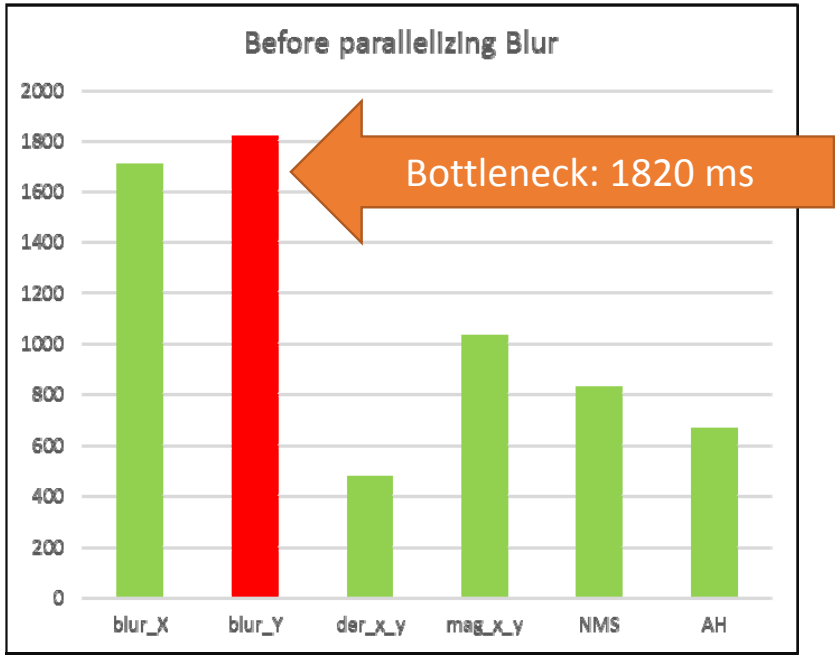
Throughput optimization

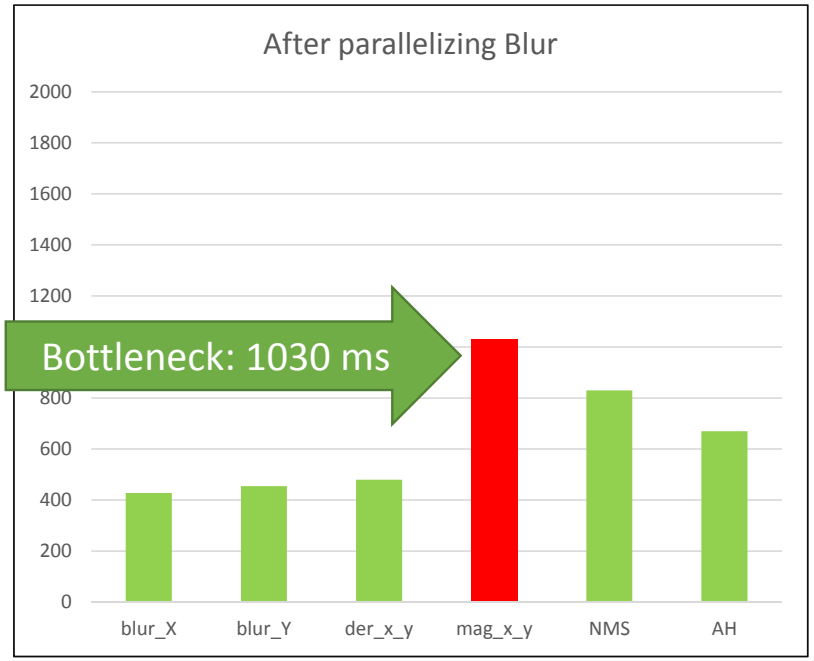
- Frames per second (FPS)
  - ➢1/(delay between two output frames)



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

Change the 4 variables to int type

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;
```

Submission

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