Homework 2 Analysis Report

HPC Spring 2016

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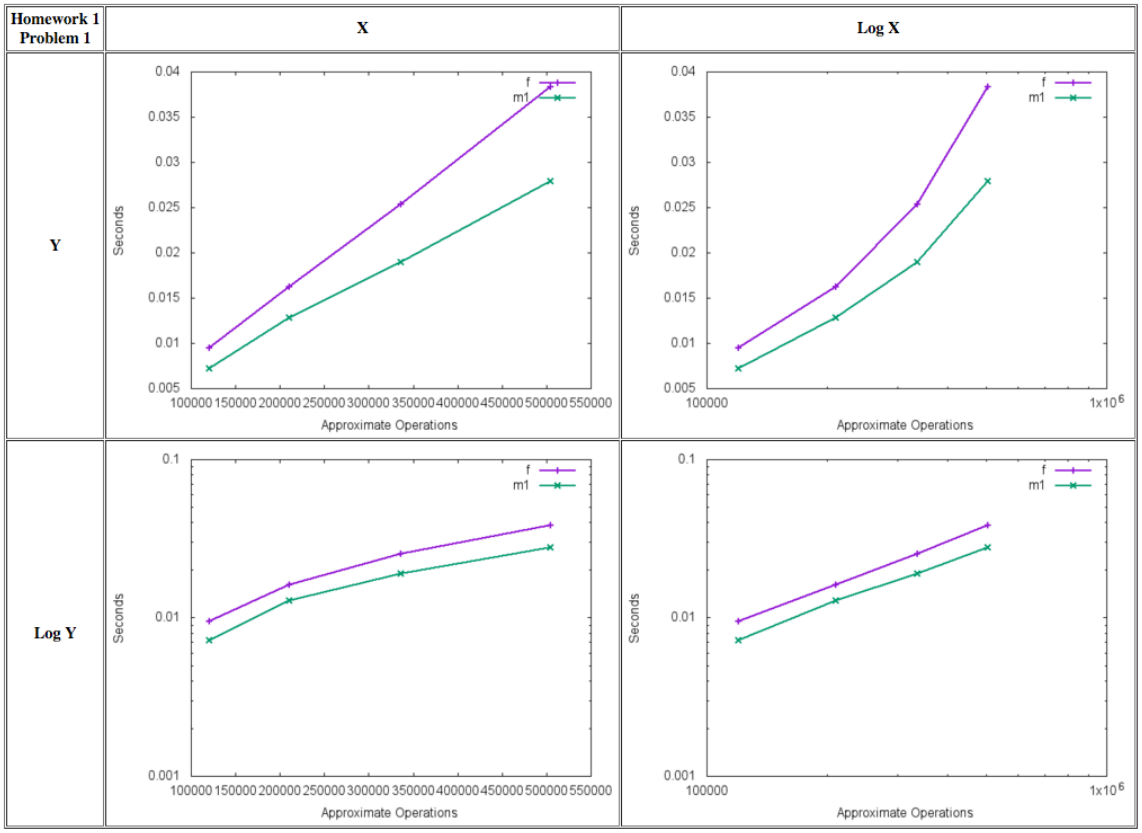
Iteration #1:

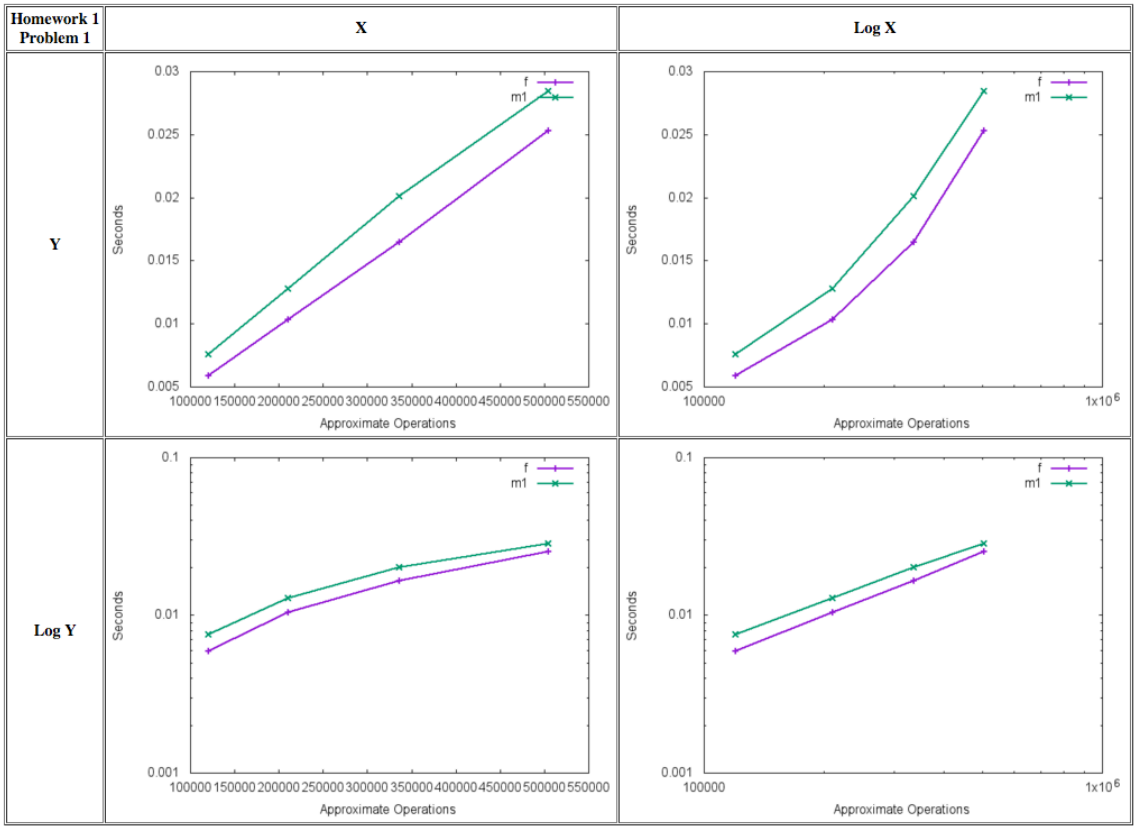


real	`0m15.854s`
user	`0m15.807s`
sys	`0m0.027s`

Techniques:

- Increment result matrix element directly (no accumulator)
- i < size( ) calls in all for loops

Iteration #2:



real	**0m13.116s**
user	**0m13.059s**
sys	**0m0.031s**

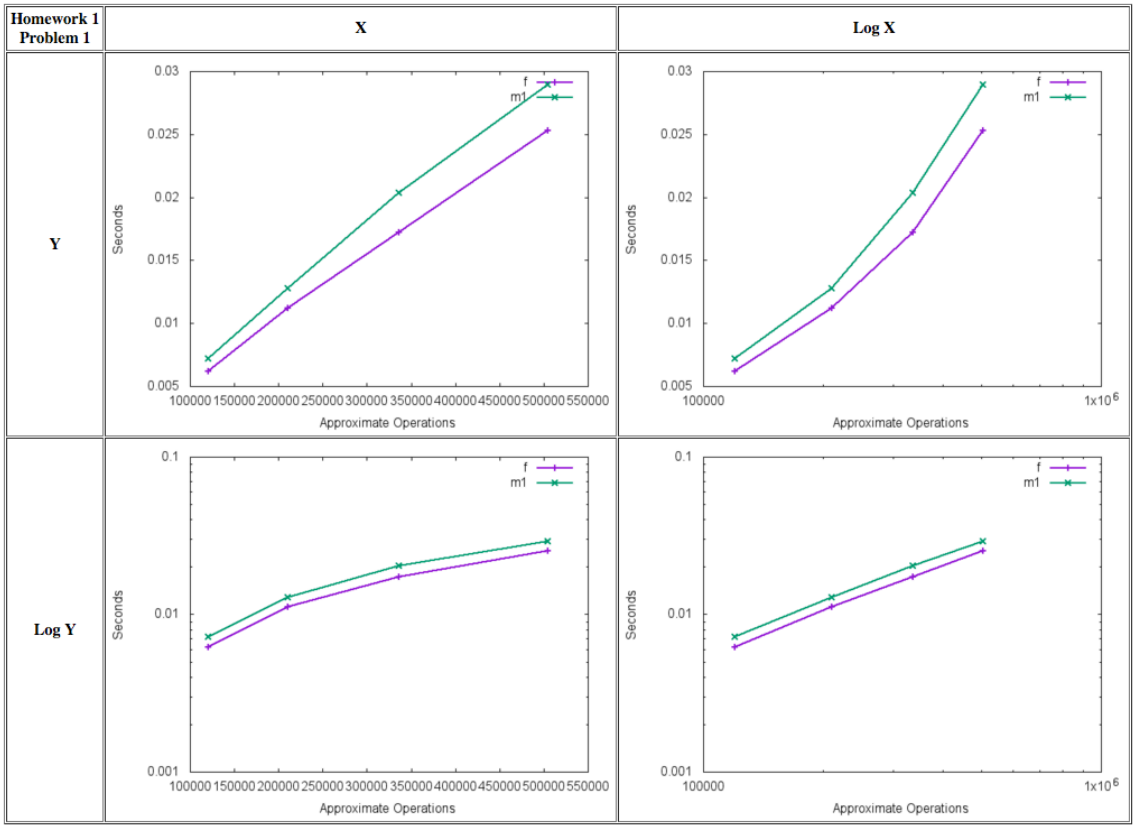
Techniques:

- sum accumulator in register
- no function call in for loop every time. i < var

Analysis:

These small changes made a significant difference in the timing vs the boost timing. However, I am unsure why this is not reflected in the charts.

Iteration #3:



real	**0m13.026s**
user	**0m12.987s**
sys	**0m0.022s**

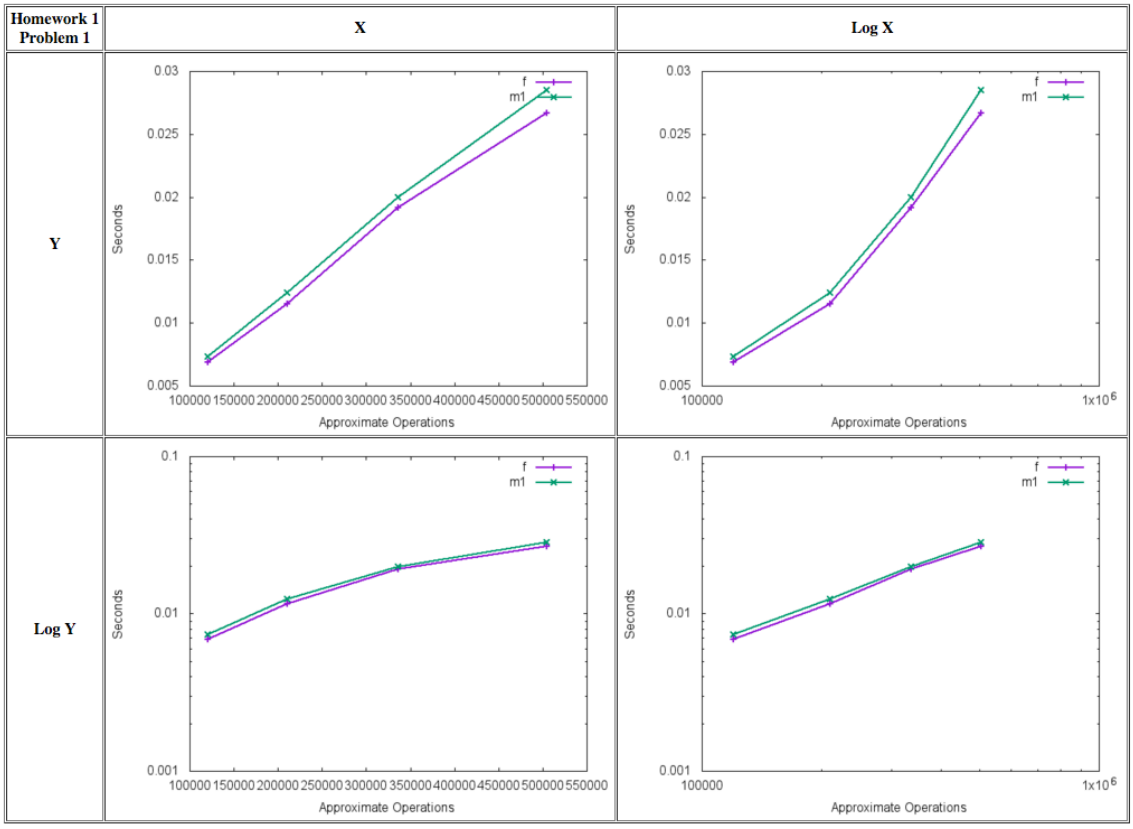
Technique:

- Transpose rhs matrix using boost method

Analysis:

Transposing the matrix using the boost method decreased the timing by a little bit, but not much.

Iteration #4:



real	**0m13.133s**
user	**0m13.080s**
sys	**0m0.031s**

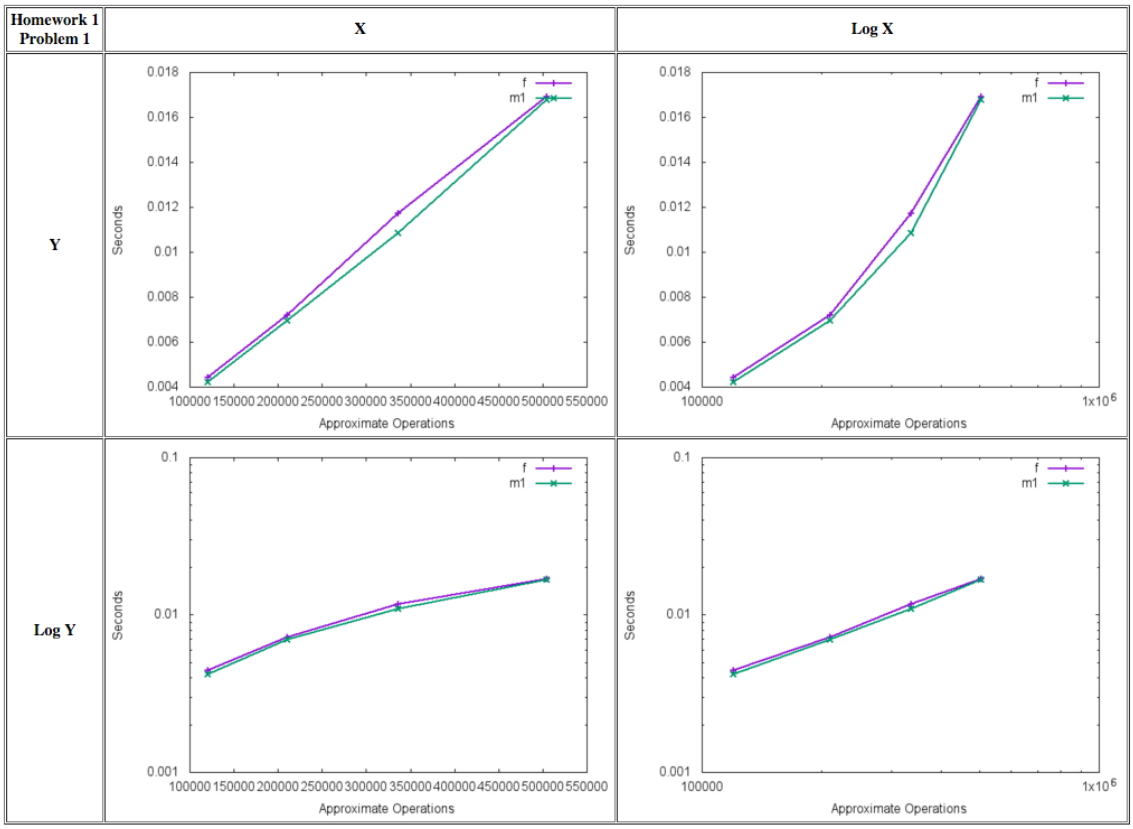
Technique:

- Manually transpose matrix- no difference really

Analysis:

Transposing the matrix manually made no significant difference in the timing from not transposing at all.

Iteration #5:



With boost transpose:

real	**0m7.690s**
user	**0m7.662s**
sys	**0m0.015s**

With manual transpose:

real	**0m7.585s**
user	**0m7.562s**
system	**0m0.013s**

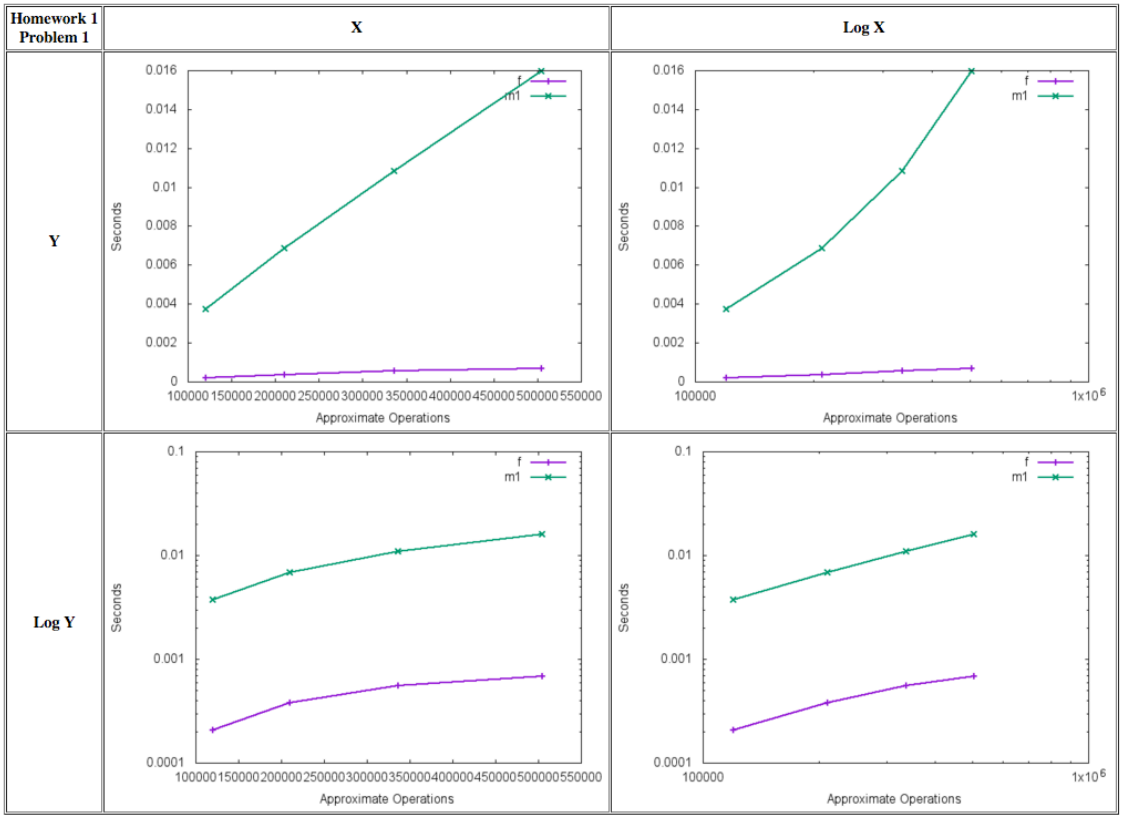
Technique:

- Threw optimization flag on there -O3

Analysis:

The optimization flag significantly decreased both methods with transposes, almost by 50%. The manual transpose is now the quicker method. This may be because my manual transpose is possibly simpler, enabling the compiler to do more optimization.

Iteration #6:



real	**0m3.927s**
user	**0m3.882s**
sys	**0m0.018s**

Technique:

- Changed all boost matrix referencing to pointer lookups

Analysis:

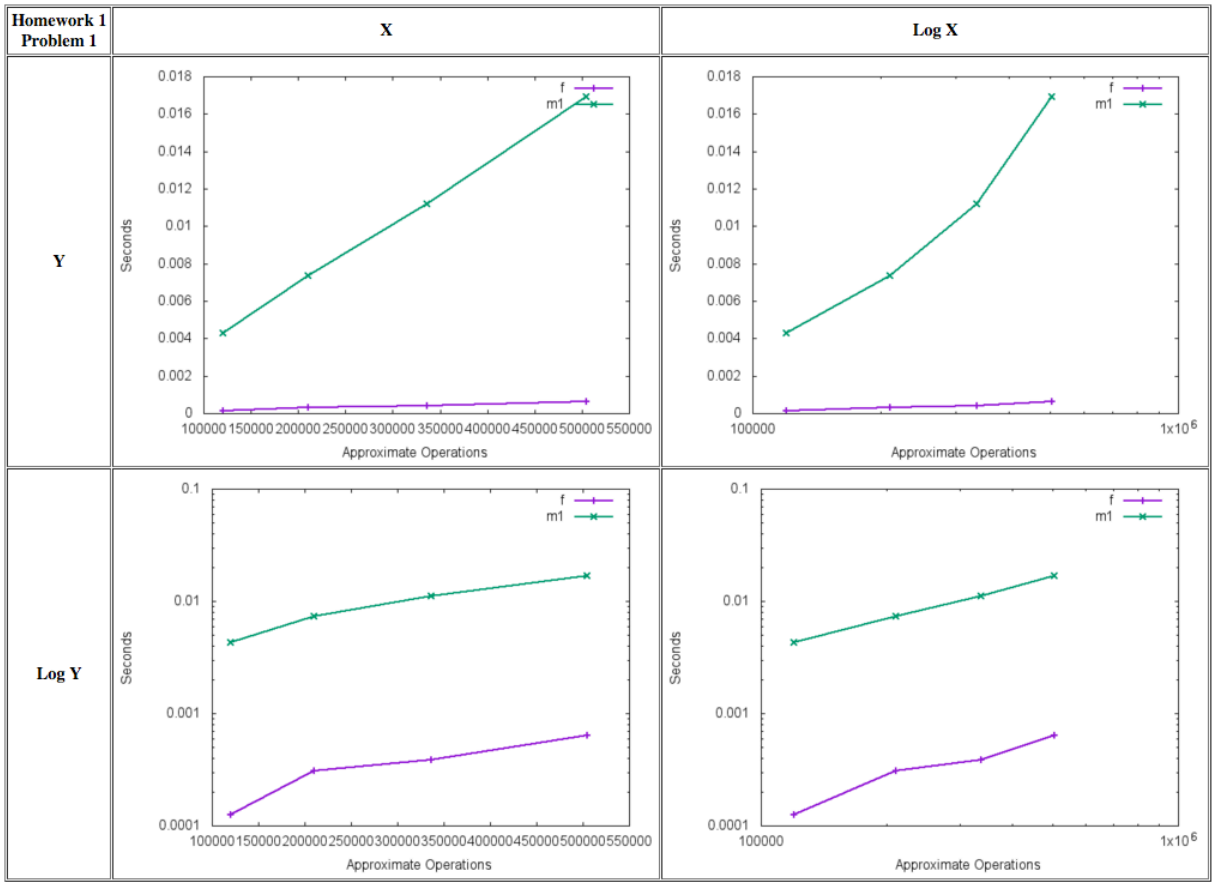
The boost matrix method of looking up has more memory accesses and depends on other classes to do work:

```
const_reference operator () (size_type i, size_type j) const {

return data () [layout_type::element (i, size1_, j, size2_)];

}
```

Iteration #7:



real	0m4.123s
user	0m4.080s
sys	0m0.014s

Technique:

- Used pointers in my manual transpose of rhs matrix

Analysis:

No significant difference from before. It is hard to tell if actual slowdown or about the same.