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Assignment: Lab 1 Cache Simulator

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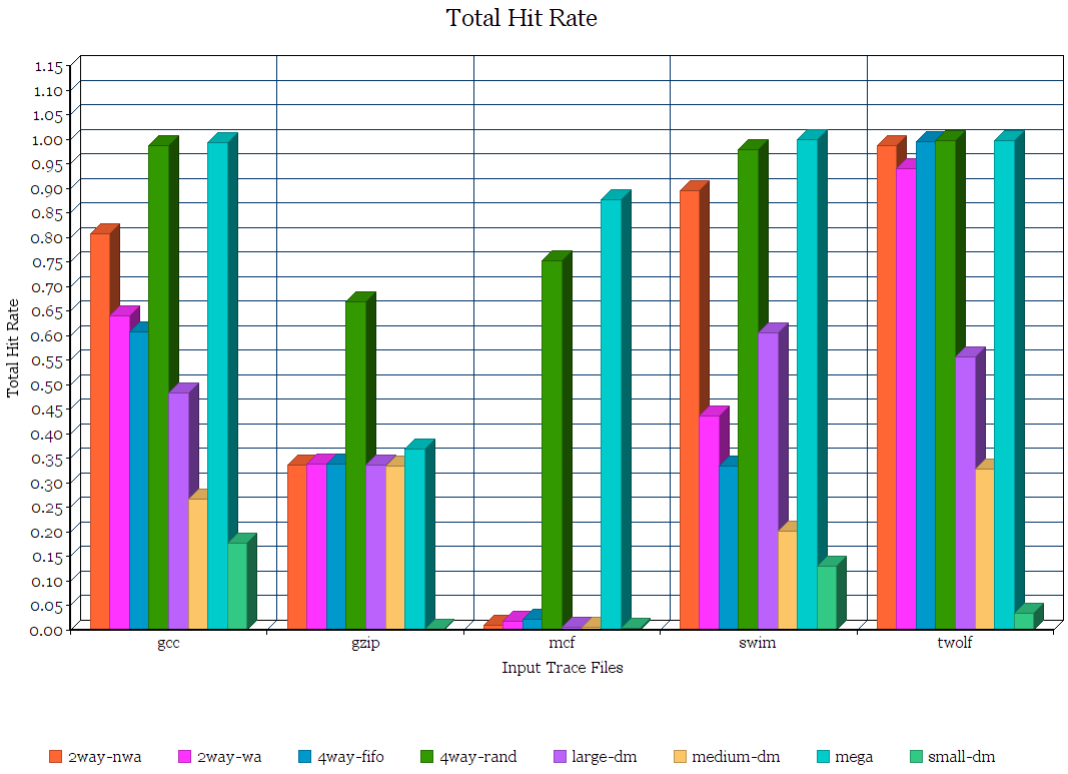
Introduction

Below is an analysis of the rendered graphs from Total Hit Rate and Average Memory Access Time data. There could have been some errors in the generation of these graphs (and therefore in the), programming of the cache simulator) as some data appears to be overly skewed. However the trends for both graphs seem clear, so the conclusions which we can draw from these graphs should be correct.



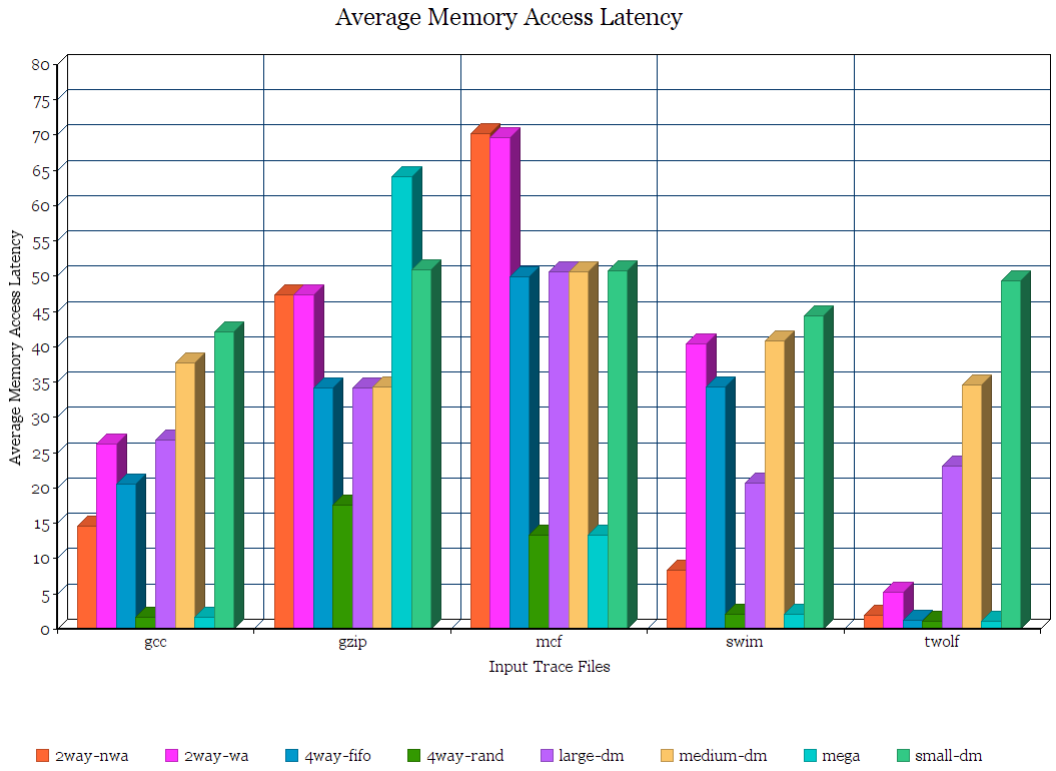
Total Hit Rate

Above is a graph of Total Hit Rate for all of the trace files, run with each configuration file. From the graph we see that 4-way-rand probably has the best trace performance, as it's average total hit rate is 0.876, which translates to 87.6%. The trace file that rendered the worst total hit rate was most likely small-dm. Analyzing its total hit rate, we find it to have an average

of 0.070, or 7.0% total hit rate. The other traces performed between these two extremes. The configuration which appears to represent the average of all the others is large-dm. Therefore if one were to be picking a configuration based on this data alone, they would most likely choose large-dm.

We observe the same general trend from left to right for each respective configuration. Looking at the performance of the trace files as a whole, gzip appears to be the most constant; the average total hit rate of the gzip group of configurations is 34.0%. The worst performance of the trace files appears to be mcf, which has an average of 21.2%. twolf seems to be the best overall trace performance. The average value of twolf is 48.0%, which is indeed better than gzip and mcf.

Now we analyze the Average Memory Access Latency graph.



Memory Access Latency

Above is a graph of Average Memory Access Latency for all of the trace files, run with each configuration file. From the graph, it appears that small-dm has the worst average memory access latency, with a calculated average of 30.6. This is much worse than our data for 4way-rand, which has an average of 4.54. The other trace files seem to fluctuate up and down, except medium-dm appears to have the most constant performance in all circumstances. This does not follow the trend of the others however, as again it seems like large-dm is the most average case of all the

other configurations. If one were wanting to choose the most efficient configuration in respect to memory latency, they would most likely choose large-dm.

Looking at trends in traces, we find that mcf again has the worst overall performance. The overall average memory latency for mcf is 46.1, which is much higher compared with twolf, with an overall average memory latency of 14.7. The general slop of this graph appears to follow a bell-curve, which is most likely a coincidence from the orginization of data. However we do see a general shape for the individual configurations inside each trace.

Conclusion

Looking at our results for both the Total Hit Rate and Average Memory Access Time, it appears that the best performing configuration for all categories would be large-dm, and the best performing trace would be twolf. Analyzing the worst performing configuration, we see that this would most likely be small-dm, and the worst performing trace is would be mcf.