The George Washington University
School of Engineering & Applied Science
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Instructor: Prof. Louri **Semester:** Fall 2022
Course: Computer Architecture & Design ECE 6005 / ECE 4535

Lab Assignment 4

1) The compiled file of jpeg, stringsearch and blowfish could be found in .zip file, all of which has two executable file, one with O0 optimization and another one without.
2) Since the debug memory trace file of jpeg and blowfish is so big that the process of generate it could make my PC die and this assignment has the same mechanism for these three testbench, so I only did with stringsearch. String_0.txt and string_3.txt are debug output file, debug2din.py is the python program used for transforming debug output file to trace file for dineroIV. The string_0.din and string_3.din are the trace file for dineroIV.
3) The shell script optimum_cache.sh is used for find the optimum cache design of string_0.din and string_3.din. the result is optimum_cache.txt:

    Trace:/home/ead/yihui/Downloads/gem5/lab4/lab4/stringsearch/string_0.din
    Optimal Cache type:u
    Optimal Cache size:4'KB'
    Optimal Block size:256
    Optimal Associativity:16
    Optimal Replacement policy:l
    Optimal Miss rate:0.0407

    Trace:/home/ead/yihui/Downloads/gem5/lab4/lab4/stringsearch/string_3.din
    Optimal Cache type:u
    Optimal Cache size:4'KB'
    Optimal Block size:256
    Optimal Associativity:16
    Optimal Replacement policy:l
    Optimal Miss rate:0.0407

4) The comparison.sh is used for simulate the computer of using default setting and optimized setting from dineroIV, the comparison.txt is the result comparison:

Optimazation: 0
Setup: Default
Sim Seconds:0.031262
Sim Ticks:31262120000

Optimazation: 0
Setup: Optimum
Sim Seconds:0.001188
Sim Ticks:1187606000

Optimazation: 3
Setup: Default
Sim Seconds:0.021773
Sim Ticks:21773404000

Optimazation: 3
Setup: Optimum
Sim Seconds:0.001004
Sim Ticks:1004229000

From the result we could see that the optimized executable file has better efficiency and the computer that using optimized cache design has better efficiency.