**The George Washington University**

School of Engineering & Applied Science

Electrical & Computer Engineering Department

**Instructor:** Prof. Louri **Semester:** Fall 2022

**Course:** [Computer Architecture & Design ECE 6005](https://blackboard.gwu.edu/webapps/blackboard/execute/courseMain?course_id=_371195_1) / [ECE 4535](https://blackboard.gwu.edu/webapps/blackboard/execute/courseMain?course_id=_371546_1)

**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

1. 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.