

MTCS 102 (P) : Lab assignments

Note: Make a folder after your registerNo. Name the assignment submission as **regNo_AssignX** where X is 1 , 2 , 3 etc.

Assignment 1: SE 1 [10+10=20 Marks]

In Lab 1 you will experiment with Instruction Mix of a program. Consider the following categories of instructions. Refer to the "Instruction tables.pdf" document, page 143 (http://www.agner.org/optimizfe/instruction_tables.pdf) to arrive at approximate Clock Cycles for the specific category of instructions of Intel Pentium.

SE 1 (a) For any 2 Trace benchmark sets , compute the instruction mix and hence the average CPI. Refer to <https://www.cis.upenn.edu/~cis501/previous/fall2013/homework/trace-format.html> ; where there is a sample C file which can be used for your Lab assignment.

Instruction Categories

All ALU instructions

Loads-stores

Conditional branches:

 Taken

 Not taken

 Jumps

FP multiply

FP add

FP divide

Load-store FP

Other FP

Your report should contain the Code developed and a table like below. Describe how you went about doing the experiment.

Table 1: Instruction Mix(Frequencies of Instruction categories)

S.No	Category	DataSet1	DataSet2	Comment
1	All ALU	x%	L%	Any comment?
2	Load&Store	Y%	M%	
	
	Average CPI	V1	V2	

Hint:

From the trace, classify the micro-ops into the following categories:

Loads: If a micro-op's load/store field is 'L', it is a load, else if...

Stores: If a micro-op's load/store field is 'S', it is a store, else if...

Unconditional branches: If a micro-op's target PC field is not zero and its flags field is '-', it is an unconditional branch,
else if...

Conditional branches: If a micro-op's target PC field is not zero and its flags field is 'R', it is a conditional branch, else...

Other: Otherwise, the micro-op is an "other" instruction (which includes adds, shifts, multiplies, etc.)

SE 1 (b) Plot a histogram of the percentage of each type of instruction (x-axis is labeled with each of these five types; the y-axis is percentage of all micro-operations). The height of all bars should sum to 100%.