SE 1 [10+10=20 Marks] In [Lab 1](https://lms.sssihl.edu.in/mod/lti/view.php?id=57825)  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/optimize/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://acg.cis.upenn.edu/milom/cis501-Fall12/traces/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%.