Computer Organization 2 Mid-Term

Instruction Block

# Question 1:

## 

## Part a)

For two computers Machine X and Machine Y we have, for a given program. The following instruction tables indicating the number of instructions in the program, and the number of clock cycles each instruction takes. Find the **Average Cycles per Instruction** for each machine.

|  |  |  |
| --- | --- | --- |
| Machine X | | |
| Instruction | # in program | Clock cycles per |
| ALU | 50% | 1 |
| Load | 30% | 2 |
| Store | 20% | 2 |

|  |  |  |
| --- | --- | --- |
| Machine Y | | |
| Instruction | # in program | Clock cycles per |
| ALU | 50% | 2 |
| Load | 30% | 3 |
| Store | 20% | 3 |

Average CPI Machine X: Average CPI Machine Y:

## Part b)

Knowing the CPI and having the same number of instruction. If Machine X’s clock cycle speed is one fifth of Machine Y. Which machine will execute faster? By how much?

# Question 2:

Given the following code segment (in C) write the analogous assembly code to produce the same logic and output.

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Description automatically generated

# Question 3:

Write assembly code to ask a user for an input then using a loop, calculate the sum from zero to the number. (Example: and input of 5 would be 5+4+3+2+1 to get 15)

# Question 4:

Finnish the following code segment.  
The goal is to scan down the parallel arrays. At each index multiply the two values and output the result to the terminal.

.data

arr\_1: .word 10, 2, 3, 7, 8, 4, -4, 3

arr\_2: .word 1 , 8, 15,3,-4, 7, 3, -1

space: .asciiz " "

.text