Mid-Term Practice Problems:

## Computer performance problems:

1. Performance of Machine A:
   1. Given the following table determine the average CPI.

|  |  |  |
| --- | --- | --- |
| Instruction | Clock Cycles per execution | # Of instruction |
| Add | 1 | 5 |
| Mul | 2 | 2 |
| Load | 3 | 2 |
| Store | 3 | 3 |

CPI:

* 1. If machine A takes 10nano seconds to execute for the program described above what is the clock cycle speed for machine A?

1. Design a program to take in the weight of the users backpack. If the weight of the backpack is less than 8 then output “A nice light pack”. Else if the weight is equal to 8 output “That’s the same as my pack”. Else output “That’s a heavy pack”.
2. Given the following C code convert to the analogous assembly code .

Graphical user interface, text

Description automatically generated

1. Negative array converter. Finish the provided code snippet to read through the given array and convert the zero values to 1, counting each time. Then output the final count.

.data

array: .word 1, 0, 3, 0, 0, 1, 5, 0, 7, 0, 6, 0 # 12 elements long

output: .asciiz "The count of negative elements converted is equal to: "

.text

li $s0, 0 #loop counter

li $s1, 0 #negative element counter

###YOUR CODE HERE###

la $a0, output

li $v0, 4

syscall

move $a0, $s1

li $v0, 1

syscall

\*\*Question 5 is a Challenge problem and not the norm of the mid-term\*\*\*

1. Design a program to calculate the n’th Fibonacci number starting with 0, 1 using the logic an  = an-1 + an-2 . Start by asking the user for the value of n, calculate the Fibonacci number and output those results.