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Lab 6: Integer multiplication and division

# Objectives:

* Know how the integer multiplication works
* Know how the integer division works
* The usage of LO and Hi registers
* The instructions of mult and div

# Introduction:

We learned in previous labs how to multiply by the powers of 2 and how to divide of powers of 2 ,but in this lab we will learn how to multiply and divide by other numbers and how this operations work in MIPs and MARs.

# Tasks:

Task1 Requirement: return the number of bank notes

Approach: firstly, the best way to do this task is by reminder division and this what MARs excel at by dividing the number and storing the result in the 2 registers LO and HI since we interested in the reminder we use the HI register and find the number of specific notes

Task2 Requirement: finding the factorial of number

Approach: as it is known, the best approach for this task is using loop that multiply the number by its predecessor number and this what I used multiplying then storing the value in LO then multiplying and subtract n by 1 again until we reach the 0 then stop the loop.

Q) what is the maximum value of n such that n! can fit in 32 bit register ?

A) **12** ,since the maximum value of 32 bit register is around 4 billion and 13! is 6 billion and 12! Is around 0.5 billion

# Conclusion:

Firstly, we learned the definitions and the difference between the integer division and multiplication in MIPs , then learned some important instructions, and learned to do reminder division in assembly and how it possible then tried live example.