Computer Architecture Lab

Write an MIPS assembly program that checks if a 32-bit number is a palindrome.

.data

msg:.asciiz "Enter any number : "

Yes:.asciiz "This is a palindrome number.\n"

No:.asciiz "This is not a palindrome number.\n"

.text

main:

#print msg string

li $v0,4

la $a0,msg

syscall

#input a value that you want to check

li $v0,5

syscall

move $t0,$v0

#move the input value in a register as original

move $t1,$t0

#two temp register are declared here

li $t3,0

li $t4,0

loop:

#loop for making reverse number for input number

beq $t0,0,ans #check that if (input value ==0) then control goes to ans block

rem $t3,$t0,10 #remainder = (input value%10)

mul $t4,$t4,10 #reverse=(reverse\*10)+remainder

add $t4,$t4,$t3

div $t0,$t0,10 #input value=(input value/10)

j loop #control goes to loop again

ans:

bne $t1,$t4, nooption #if (original != reverse) then it's not palindrome and control goes to nooption block

#print 'yes' string

li $v0,4

la $a0,Yes

syscall

j exit #control goes to exit block

nooption:

#print 'no' string

li $v0,4

la $a0,No

syscall

exit:

#Successfully termination

li $v0,10

syscall

1. Write a program in MIPS that reverse a number using MIPS. The number and number of digits will be given from the input.
2. Write a C program to check if two given non-negative integers have the same last digit.
3. Write a program to find the common factors of two integers.

Example:

Common factors of 15 and 25

Let us check the factors of the two numbers, i.e., 15 and 25.

15 = 1, 3, 5, 15

25 = 1, 5, 25

We can see that both 15 and 25 have 5 as the common factor.

Common Factors of 12 and 18

First, we need to write all the factors of 12 and 18.

Factors of 12 = 1,2,3,4,6, 12

Factors of 18 = 1,2,3,6,9, 18

Clearly, we can see that the common factors between 12 and 18 are 1,2,3 and 6.

Common Factors of 8 and 24

Let us find the factors of 8 and 24.

Factors of 8 = 1,2,4,8

Factors of 24 = 1,2,3,4,6,8,12,24

So, we can see here that the common factors of 8 and 24 are 1,2,4 and 8.

1. Write a MIPS assembly language program to read a square matrix from console in column-major order, but print in row-major order.
2. Write a MIPS assembly language program to generate Fibonacci Number.
3. Write a MIPS assembly language program to check if two given non-negative integers have the same last digit.
4. Write a MIPS assembly language program to find the factorial of a given number.
5. Write a MIPS assembly language program to count the frequency of each element of an array.
6. MIPS assembly language Program to Count Number of Digits in an Integer.
7. Implement Linear Search Algorithm using MIPS.