

Solution: Decimal-to-Binary Conversion Program

Converts a a number between 0 and 255 to its binary equivalent and
outputs the binary number to the console.
Tests to make sure that the number is between 0 and 255 (0 to 1111 1111).

```
.text
main:   la $a0,crLf
        li $v0,4
        syscall
        la $a0,req      # Output request to
        li $v0,4        # input decimal number
        syscall        # between 0 and +255
        la $a0,crLf
        syscall
        move $t9,$0

        li $v0,5        # Number input
        syscall
        blt $v0,0,err   # Number size check
        bgt $v0,255,err

loop:   move $t0,$v0    # Move number to $t0
        move $t9,$v0    # Saving the number for print-out
        rol $t0,$t0,24  # Get in position to check first bit
go:     rol $t0,$t0,1    # Check to see if bit is 1 or 0
        andi $a0,$t0,1 # (checking MSB first)
        li $v0,1
        syscall

next:   addi $t5,$t5,1  # Add to counter
        beq $t5,8,done  # Counter = 8?
        j go

err:    la $a0,mis      # Error message if number not
        li $v0,4 # between 0 and 255
        syscall
        la $a0,crLf
        syscall
        j main

done:   la $a0,ans      # Print out answer
        li $v0,4
        syscall
        move $a0,$t9
        li $v0,1
        syscall
        la $a0,crLf
        li $v0,4
        syscall

        li $v0,10      # Done, so quit
        syscall

.data
req:    .asciiz "Input a decimal number between 0 and +255."
ans:    .asciiz " is the binary equivalent of "
crLf:   .asciiz "\n"
mis:    .asciiz "Error -- number is not within prescribed limits!"

# End of file, Decimal-to-Binary conversion Program#.
```