# W7-Logical Instructions

1.Create run.sh file

Terminal: nano run.sh

#!/bin/bash

nasm -f elf ./$1.asm

ld -m elf\_i386 ./$1.o -o ./$1

./$1

2. Change Access permission for run.sh

Terminal: chmod 777 run.sh

3-1. Create file in Assembly Language code to run

Terminal : nano xor.asm

result = 0

section .text

global \_start

\_start:

mov eax,[var]

xor eax, eax ;XOR to clear register

mov [result], eax

mov eax,1

int 0x80

section .data

var DD 8 ;assign 8 to var

segment .bss

result resb 1 ;uninitialized variable

3-2. Run the result code with run.sh

Terminal: ./run.sh xor

3-3. GDB debugging and checking register process

gdb xor

layout asm

layout regs

watch (int) result

break \_start

run

stepi <execute step by step.>

A screenshot of a computer

Description automatically generated

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Description automatically generated

result is 0 after xoring the same number.

4-1. Create file in Assembly Language code to run

Terminal : nano test.asm

section .text

global \_start

\_start:

mov eax,[var]

test eax,1

jz even

mov dl,[var2] ;if odd, save <result = var \* 2> and display "Odd Number"

mul dl

mov [result], eax

mov eax,4

mov ebx,1

mov ecx,msg1

mov edx,len1

int 0x80

mov eax,1

int 0x80

even: ;if even, save <result = var/ 2> and display "Even Number"

mov bl,[var2]

div bl

mov [result], eax

mov eax,4

mov ebx,1

mov ecx,msg2

mov edx,len2

int 0x80

mov eax,1

int 0x80

section .data

var DD 8 ;assign value to var

var2 DD 2

msg1 db 'Odd Number', 0xa

len1 equ $ - msg1

msg2 db 'Even Number', 0xa

len2 equ $ - msg2

segment .bss

result resb 1 ;uninitialized variable

4-2. Run the result code with run.sh

Terminal: ./run.sh test

4-3. GDB debugging and checking register process

gdb test

layout asm

layout regs

watch (int) result

break \_start

run

stepi <execute step by step.>

A computer screen shot of a program

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If odd (var = 5), then multiple 2, save to result (10), and print “Odd number” on console.

A computer screen shot of a computer

Description automatically generated

A screenshot of a computer

Description automatically generated

If even (var = 8), then divide by 2, save to result (4), and print “Even number” on console.

\*\*\*Challenge:

1. For easy displaying the results, I tried to print result along with message, but not sure how to concatenate variable/number with strings.
2. After the TEST logical operation, I was about to print msg ahead of calculation, and then saving the result. Tried to put “mov eax,4….” before the multiplication and division. Since msg and calculation both using the same eax register, eax value overwritten for printing message. If do calculation after message output, the calculated result is not correct. Using different register should work, but not sure which register (eax, ebx, ecx, edx all used) should I use. Thus, here I just changed the order of calculation and print out message.