;------------------------------------------------------------------------------- ; ;Write 80387 ALP to find the roots of the quadratic equation. All the possible cases ;must be considered in calculating the roots

;-------------------------------------------------------------------------------

%macro display 1

mov rdi,formatpf ;address of format string

sub rsp,8

movsd xmm0,[%1] ;floating point number in print formatformatpf

mov rax,1 ;number of floating point numbers =1

call printf

add rsp,8 ;restore stack

%endmacro

extern printf

section .data

msg2 db 'The roots of the equation are :',10,0

formatpf db "%lf",10,0

a dq 1.0

b dq 3.0

c dq 1.0

d dq 1.0

c1 dq 4.0

c2 dq 2.0

c3 dq 100.0

section .bss

root1 rest 1

root2 rest 1

x1 resw 1

x2 resw 1

temp resq 1

sign resb 1

dpoint resb 2

%macro ext 0

mov rax,60,

mov rdi,0

syscall

%endm

%macro input 2

mov rax,0

mov rdi,0

mov rsi,%1

mov rdx,%2

syscall

%endm

%macro output 2

mov rax,1

mov rdi,1

mov rsi,%1

mov rdx,%2

syscall

%endm

global main

section .text

main:

finit

;calculation of b^2-4ac

fldz

fld qword[b]

fmul st0,st0

fld qword[a]

fmul qword[c]

fmul qword[c1]

fsub st1,st0

fstp qword[temp]

fst qword[d]

bt qword[d],63

jc e

fsqrt

fst qword[d]

;calculation of 1st root

fsub qword[b]

fdiv qword[a]

fdiv qword[c2]

fstp qword[x1]

call disp

display x1

;2nd root

fldz

fsub qword[b]

fsub qword[d]

fdiv qword[c2]

fdiv qword[a]

fstp qword[x1]

display x1

e:ext

disp:

push rbp

mov rdi,msg2

mov rax,0

call printf

pop rbp

ret

**OUTPUT :**

manu@ubuntu:~/mpfinals$ nasm -f elf64 -g -F stabs roots.nasm

manu@ubuntu:~/mpfinals$ g++ -o roots roots.o

manu@ubuntu:~/mpfinals$ ./roots

The roots of the equation are :

-0.381966

-2.618034