

Assignment 5

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Roll No: 76

Batch: A4

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

CODE:

```
extern printf, scanf
```

```
%macro write 2
```

```
    push rbp
```

```
    mov rax, 0
```

```
    mov rdi, %1
```

```
    mov rsi, %2
```

```
    call printf
```

```
    pop rbp
```

```
%endmacro
```

```
%macro scan 2
```

```
    push rbp
```

```
    mov rax, 0
```

```
    mov rdi, %1
```

```
    mov rsi, %2
```

```
    call scanf
```

```
    pop rbp
```

```
%endmacro
```

```
%macro printfloat 2
```

```
    push rbp
```

```
    mov rax, 1
```

```
    mov rdi, %1
```

```
        movsd xmm0, %2
```

```
    call printf
```

```
    pop rbp
```

```
%endmacro
```

```
section .data    m1 db "%lf", 0    m2 db "%s", 0
```

```
msg1 db 10, "Enter the values of a, b, and c: ", 0
```

```
msg2 db 10, "The roots are: ", 0    linebreak db
```

```
10, 0 ; Line break character
```

```
section .bss
```

```
a resb 8    b
```

```
resb 8    c
```

```
resb 8    temp
```

```
resw 1
```

```
    t1 resb 8
```

```
t2 resb 8    t3
```

```
resb 8    t4
```

```
resb 8    r1
```

```
resb 10    r2
```

```
resb 10
```

```
section .text
```

```
global main
```

```
main:
```

```
write m2,  
msg1    scan  
m1, a    scan  
m1, b    scan  
m1, c
```

```
finit  
    fld qword[b]  
fmul st0, st0    fstp  
qword[t1]
```

```
    fld qword[a]  
fmul qword[c]  
mov word[temp], 4  
fmul word[temp]  
fstp qword[t2]
```

```
    fld qword[t1]  
fsub qword[t2]  
fstp qword[t4]
```

```
    fld qword[t4]  
Fabs    Fsqr  
fstp qword[t1]
```

```
    fld qword[b]  
Fchs    fstp  
qword[t2]    fld  
qword[a]    mov
```

qword[temp], 2

fimul

word[temp]

fstp qword[t3]

cmp qword[t4], 0

je equal_root

fld qword[t2]

fadd qword[t1]

fdiv qword[t3]

fstp qword[r1]

equal_root: fld

qword[t2] fsub

qword[t1] fdiv

qword[t3] fstp

qword[r2]

write m2, msg2 printfloat

m1, [r1] write m2, linebreak ;

Line break printfloat m1, [r2]

write m2, linebreak ; Line break

mov rax, 0

ret

OUTPUT:

A screenshot of a virtual machine running Fedora Linux. The window title is "fedora37 [Running] - Oracle VM VirtualBox". The menu bar includes File, Machine, View, Input, Devices, and Help. Below the menu is a toolbar with "Activities" and "Terminal" icons, along with the date and time "May 23 23:50". The terminal itself shows a user prompt "prajwalsonaje@fedora~" followed by several commands: "git init ass_6.asm", "nasm -f elf64 ass_6.asm", "gcc -o ass_6 ass_6.o", and ". ./ass_6". After pressing Enter, it prompts "Enter the values of a, b, & c:" and receives input "-1", "12", and "4.0000003.000008". The final command prompt is "prajwalsonaje@fedora ~\$".

fedora37 [Running] - Oracle VM VirtualBox

File Machine View Input Devices Help

Activities Terminal May 23 23:50

prajwalsonaje@fedora~

```
[prajwalsonaje@fedora ~]$ git init ass_6.asm  
[prajwalsonaje@fedora ~]$ nasm -f elf64 ass_6.asm  
[prajwalsonaje@fedora ~]$ gcc -o ass_6 ass_6.o  
[prajwalsonaje@fedora ~]$ . ./ass_6
```

Enter the values of a, b, & c:

-1
12
4.0000003.000008[prajwalsonaje@fedora ~]\$