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Roll : CE001
ID : 22ceueg082
Lab : 2

Q1) Write an ALP to do addition of three floating point numbers using 8087 instruction set.

Test case data: x = 3.5 y = 5.0 z = 2.2

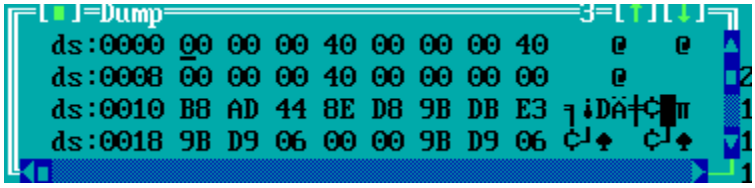
Code)

```
data segment
a dd 2.0
b dd 2.0
c dd 2.0
d dd ?
data ends

code segment

assume cs:code , ds:data
start:
mov ax, data
mov ds, ax
finit
fld a
fld b
fld c
fadd
fadd
fst d
int 03h
code ends
end start
```


Valid ST(0) 2
Valid ST(1) 2
Valid ST(2) 2
Empty ST(3)
Empty ST(4)
Empty ST(5)
Empty ST(6)
Empty ST(7)
im=1 ie=0
dm=1 de=0
zm=1 ze=0
om=1 oe=0
um=1 ue=0
pm=1 pe=0
iem=0 ir=0
pc=3 cc=1
rc=0 st=5
ic=0


80486 IPTR=00000 OPCODE=000 OPTR=00000
Valid ST(0) 4
Valid ST(1) 2
Empty ST(2)
Empty ST(3)
Empty ST(4)
Empty ST(5)
Empty ST(6)
Empty ST(7)
im=1 ie=0
dm=1 de=0
zm=1 ze=0
om=1 oe=0
um=1 ue=0
pm=1 pe=0
iem=0 ir=0
pc=3 cc=1
rc=0 st=6
ic=0

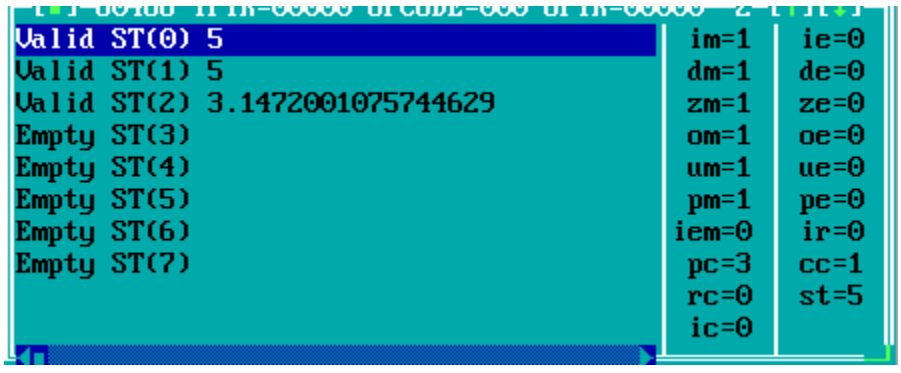

Valid ST(0) 6
Empty ST(1)
Empty ST(2)
Empty ST(3)
Empty ST(4)
Empty ST(5)
Empty ST(6)
Empty ST(7)
im=1 ie=0
dm=1 de=0
zm=1 ze=0
om=1 oe=0
um=1 ue=0
pm=1 pe=0
iem=0 ir=0
pc=3 cc=1
rc=0 st=7
ic=0

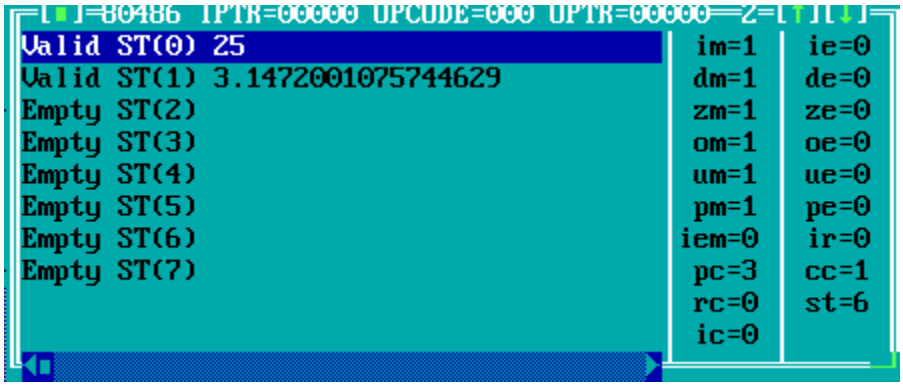

Dump
ds:0000 00 00 00 40 00 00 00 40 @ @
ds:0008 00 00 00 40 00 00 00 00 @
ds:0010 B8 AD 44 8E D8 9B DB E3
ds:0018 9B D9 06 00 00 9B D9 06

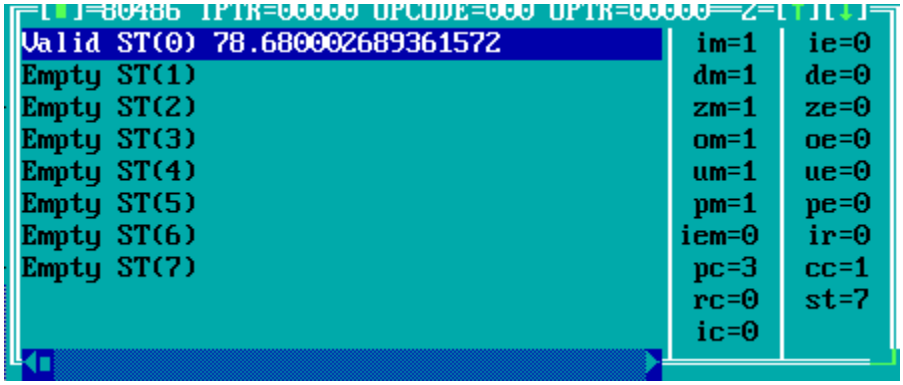
Q2) Write an ALP to find area of a circle using 8087 instruction set.
Test case data: Pi = 3.1472 radius = 5.0

Code)

```
data segment
pi dd 3.1472
r dd 5.0
res dd ?
data ends

code segment

assume cs:code , ds:data
start:
mov ax, data
mov ds, ax
finit
fld pi
fld r
fld r
fmul
fmul
fst res
int 03h
code ends
end start
```





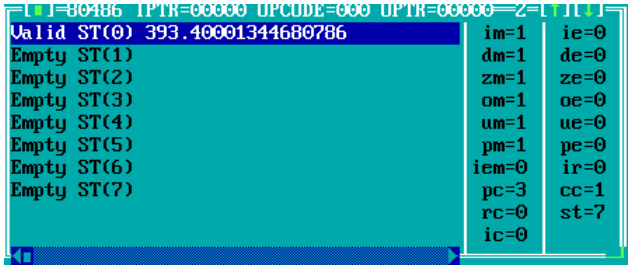


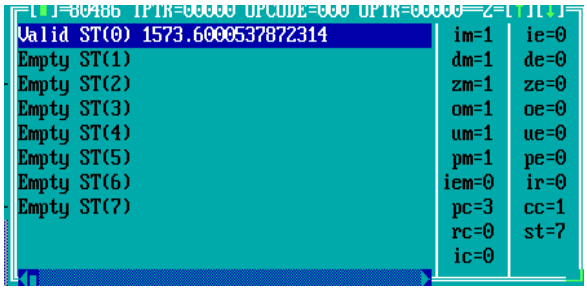
Q3) Write an ALP to find the volume of sphere using 8087 instruction set.
Test case data: Pi = 3.1472 radius = 5.0

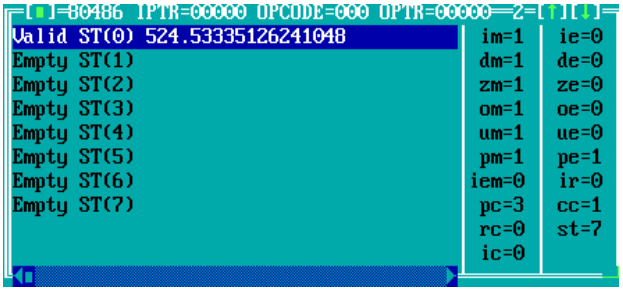
Code)

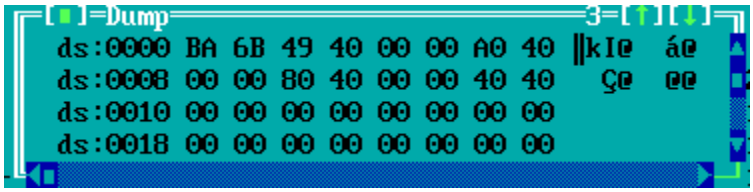
```
data segment
pi dd 3.1472
r dd 5.0
c dd 4.0
c2 dd 3.0
res dd ?
data ends

code segment
```

```
assume cs:code , ds:data
start:
mov ax, data
mov ds, ax
finit
fld r
fmul r
fmul r
fmul pi
fmul c
fdiv c2
fst res
int 03h
code ends
end start
```





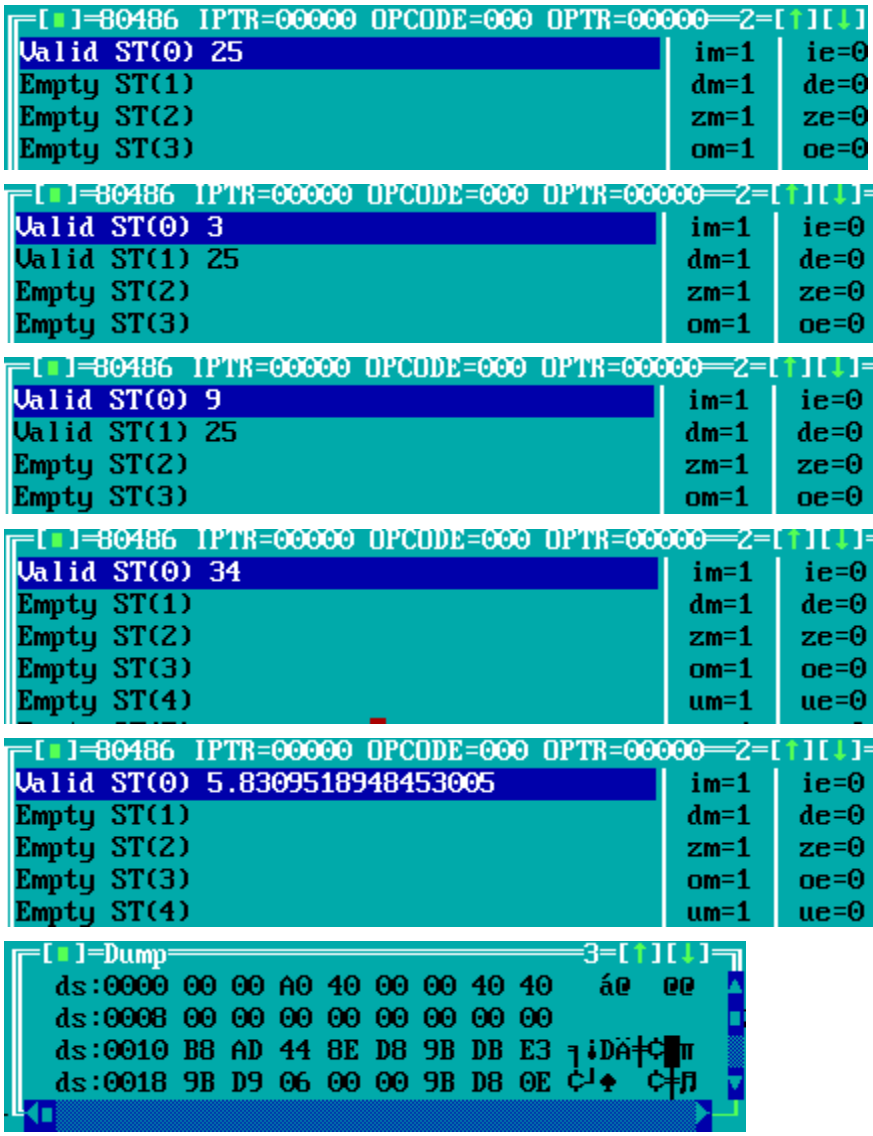




4. Write an ALP to find c = sqrt(a^2 + b^2) .
Test case data: a = 5.0 b = 3.0

Code)

```
data segment
a dd 5.0
b dd 3.0
res dd ?
data ends

code segment

assume cs:code , ds:data
start:
mov ax, data
mov ds, ax
finit
fld a
fmul a
fld b
fmul b
fadd
fsqrt
fst res
int 03h
code ends
end start
```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Valid ST(0) 25
Empty ST(1)
Empty ST(2)
Empty ST(3)
im=1 ie=0
dm=1 de=0
zm=1 ze=0
om=1 oe=0
[■]=80486 IPTR=00000 OPCODE=000 OPTR=00000 2=[↑][↓]
Valid ST(0) 3
Valid ST(1) 25
Empty ST(2)
Empty ST(3)
im=1 ie=0
dm=1 de=0
zm=1 ze=0
om=1 oe=0
[■]=80486 IPTR=00000 OPCODE=000 OPTR=00000 2=[↑][↓]
Valid ST(0) 9
Valid ST(1) 25
Empty ST(2)
Empty ST(3)
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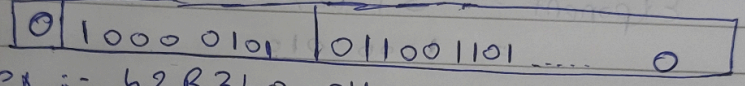
dm=1 de=0
zm=1 ze=0
om=1 oe=0
[■]=80486 IPTR=00000 OPCODE=000 OPTR=00000 2=[↑][↓]
Valid ST(0) 34
Empty ST(1)
Empty ST(2)
Empty ST(3)
Empty ST(4)
im=1 ie=0
dm=1 de=0
zm=1 ze=0
om=1 oe=0
um=1 ue=0
[■]=80486 IPTR=00000 OPCODE=000 OPTR=00000 2=[↑][↓]
Valid ST(0) 5.8309518948453005
Empty ST(1)
Empty ST(2)
Empty ST(3)
Empty ST(4)
im=1 ie=0
dm=1 de=0
zm=1 ze=0
om=1 oe=0
um=1 ue=0
[■]=Dump 3=[↑][↓]
ds:0000 00 00 A0 40 00 00 40 40 á@ @@
ds:0008 00 00 00 00 00 00 00 00
ds:0010 B8 AD 44 8E D8 9B DB E3 ╕¡DÄ╪¢█π
ds:0018 9B D9 06 00 00 9B D8 0E ¢┘♠ ¢╪♫

i). Convert 89.625 to IEEE single precision.

89.625 → 1011001.101

Sign bit → 0

1.011001101×2^6



Hex :- 42B34000H

ii) Convert 89.625 to IEEE double precision format

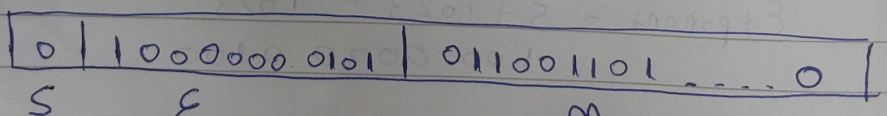
89.625 → 1011001.101

Sign bit → 0

1.011001101×2^6

Exponent = 6 + 1023 = 1029 → 10000000101

~~1011001101~~



Hex :- 2056800000000000H

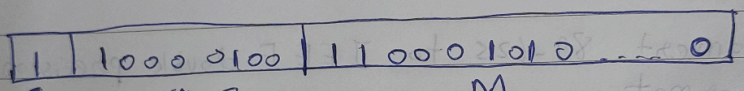
iii) Convert -56.625 to IEEE 754 single precision

56.625 → 00111000.101

Sign bit → 1

Normalized :- 1.11000101×2^5

Exponent = 5 + 127
= 1000 0100



Hex:- C2628000H

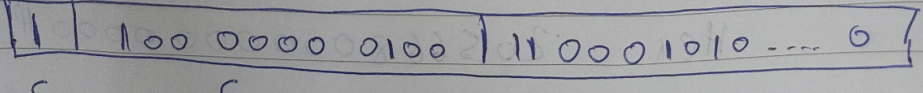
iv) Convert -56.625 to IEEE double precision

-56.625 → 00111000.101

Sign bit → 1

Normalized :- 1.11000101×2^5

Exponent = 5 + 1023 = 1028
100 0000 0100



Hex:- C04CA0000000000H