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Experiment 9:

Basic Programming with 8087

Programme	:	BTech. CSE Core	Semester	:	Win 2021-22
Course	:	Microprocessor and Interfacing	Code	:	CSE2006
Faculty	:	Dr. Florence Gnana Poovathy J	Slot	••	L15+L16
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Exp. 09

Basic Programming with 8087



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Basic Programming with 8087

Aim: To calculate the Volume of Cone

Tool Used: Assembler - MASM611

Algorithm:

Step 1: First of all, mount the c drive using the command: mount c c:\masm611\bin

Step 2: After pressing **enter**, type **c**: and press enter.

Step 3: Now give a command, **<filename>.asm** for writing/editing the code and the write the code.

Step 4: A pop window appears; there we have to write out code(instructions) following the logic given below.

- (i) Four variables are defined, one to hold the value of the radius, another to hold the value of the constant 1/3, another one to store the value of height and the last one to store the value of the sphere's volume after calculation.
- (ii) The data is moved to DS register, via AX register.
- (iii) FINIT signals the initialization of 8087 commands and registers.
- (iv) The variable RAD is loaded onto stack top ST(0) via FLD.
- (v) A copy of it is stored in ST(4) via FST.
- (vi) The values stored in ST(0) and ST(4) are multiplied once, and stored at ST(0).
- (vii) The variable CONS is loaded onto stack top via FLD, while the value previously stored at ST(0) gets pushed to ST(1).
- (viii) Similarly HEIGHT variable value is loaded and multiplied
- (ix) The values in ST(1) and ST(0) are multiplied via FMUL, and stored at ST(0).
- (x) π is loaded onto stack top via FLDPI, and the already present values at ST(0) and ST(1) are pushed to ST(1) and ST(2) respectively.
- (xi) The values in ST(1) and ST(0) are multiplied by FMUL, and stored at ST(0).
- (xii) The calculated volume is then stored in the variable VOL via FST.

Step 5: Now give a command, **masm <filename>.asm** for running the code. The object file is created.

<u>Step 6:</u> Now give a command, **link <filename>.obj** to link the object file to library file present in the bin folder.

Step 7: Press ENTER four times.

Step 8: Write <filename>.exe

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PROGRAM:

```
CONE1.ASM
DATA SEGMENT
ORG 1000h
         RADIUS DD 2.9061
HEIGHT DD 4.5
         CONST DD 0.3333
         VOLUME DD 01 DUP(?)
DATA ENDS
CODE SEGMENT
ASSUME CS: CODE, DS:DATA
.8087
START:
         MOV AX, DATA
         MOV DS, AX
         FINIT
         FLD RADIUS
         FST ST(4)
FMUL ST(0), ST(4)
         FLD CONST
         FMUL
FLDP I
```

```
FMUL
FLD HEIGHT
FMUL
FST VOLUME
HLT
CODE ENDS
END START
```

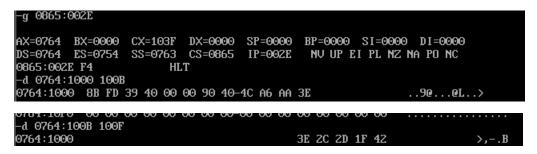
OUTPUT:

```
C:\>debug CONE1.exe
-u
0865:0000 B86407
0865:0003 BED8
                              MOV
                                       AX,0764
                              MOV
                                       DS,AX
                             WAIT
0865:0005 9B
0865:0006 DBE3
0865:0008 9B
                                       FINIT
                             WAIT
0865:0009 D9060010
                                       FLD
                                                 DWORD PTR [1000]
0865:000D 9B
0865:000E DDD4
0865:0010 9B
                             WAIT
                                       FST
                                                 ST(4)
                             WAIT
0865:0011 D8CC
                                       FMUL
                                                 ST, ST(4)
0865:0013 9B
0865:0014 D9060810
                             WAIT
                                       FLD
                                                 DWORD PTR [1008]
0865:0018 9B
                              WAIT
0865:0019 DEC9
0865:001B 9B
                                       FMULP
                                                 ST(1),ST
                              WAIT
0865:001C D9EB
                                       FLDPI
0865:001E 9B
                             WAIT
0865:001F DEC9
                                       FMULP
                                                 ST(1),ST
```

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REGISTER / MEMORY CONTENTS



We would get the result by reversing this ZC ZD 1F 4Z Actual = 42 1F 2D 2C

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Sample Input	Sample Output
Radius = 2.9061	Hexadecimal Result = 2C 2D 1F 42
Height = 4.5	Actual Result = 42 1F 2D 2C
	Result = 39.7941