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EXPERIMENT - 6

AIM

1. Design and implement an 8086 - 8087 assembly language program to determine the volume of a sphere with radius R.

SOFTWARE

- DOSBox
- TASM (assembler)
- TLINK (linker)
- TD (Debug)

ALGORITHM

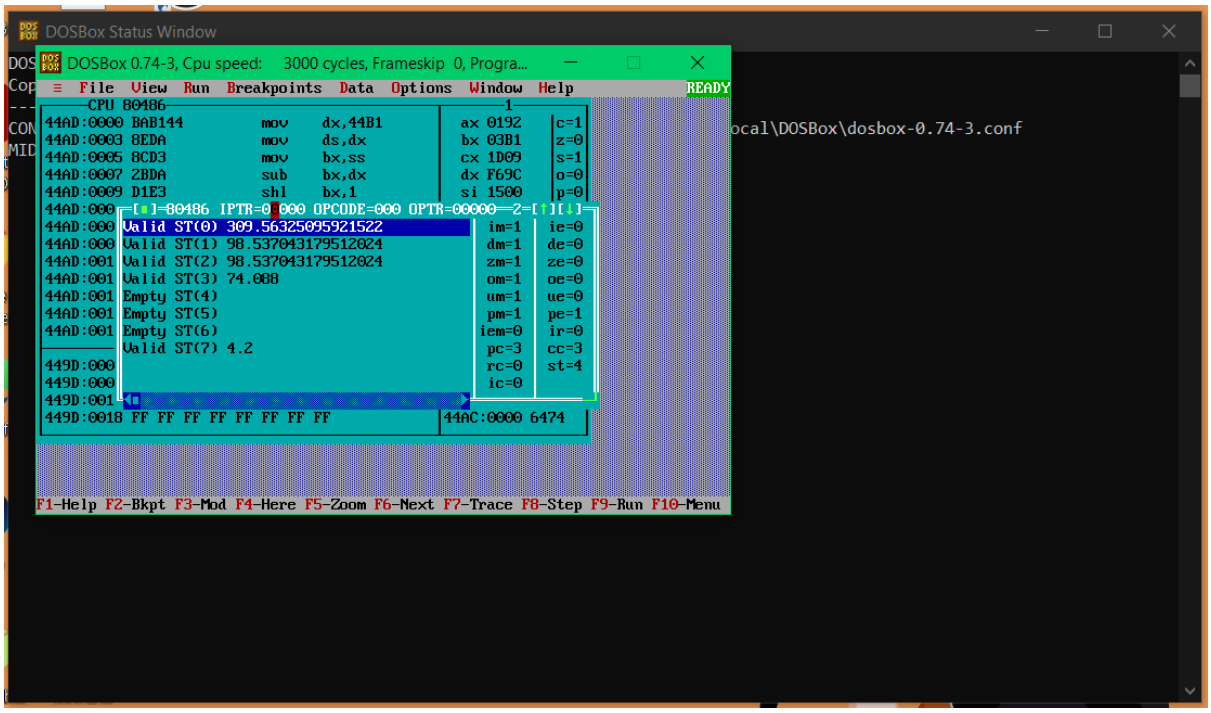
1. Initialize data segment
2. Initialize 8087
3. Load radius into stack
4. Calculate R^3
5. Multiply R^3 with 1.33 i.e. (4/3) and pi to get volume
6. Store the result in memory

CODE

```
.model small
.data
        R DT 4.2                ;radius of sphere
        MULTIPLIER DD 1.33      ;4/3 constant
        volume DD ?
.code
.startup
        MOV AX,@data
        MOV DS, AX
        FLD R                   ;load radius in stack
        FST ST(4)               ;copy to st4
        FMUL ST(0), ST(0)       ;r^2
        FMUL ST(0), ST(4)       ;r^2 * r = r^3
        FLD ST(1)               ;shift this to st1 i.e r^3
        FLD MULTIPLIER          ;This will load at st0
        FMUL ST(0), ST(2)       ;multiply r^3 with 4/3
        FST ST(1)
        FLDPI                   ;multiply ST(0) with Pi
        FMUL ST(0), ST(1)
        FST volume
        mov ah, 4ch
        int 21h

END
```

- **OUTPUT**



Volume = 4/3 * pi * 4.2^3 = 310.18

CONCLUSION

In this program we have learnt how to work with 8087 math co-processor and write code for the same.