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ICS 312
Homework Solution #15
Due Date: October 08, 2009

Floating Point Instructions Homework Code

```
;; This program evaluates the volume of a sphere for an inputted radius. The  
;; volume of a sphere with radius r is given by  $\frac{4}{3}\pi r^3$  .
```

```
    include pcmac.inc  
    .model      small  
    .stack 100  
    .data  
four      dd 4.0  
three     dd 3.0  
prompt    db 0dh, 0ah, 'Enter the radius: $'  
result    db 0dh, 0ah, 'The volume of the sphere is: $'  
  
    .code  
prog      proc  
extrn     getfp : near  
extrn     putfp : near  
mov       ax, @data  
mov       ds, ax  
  
    _putstr prompt  
call      getfp          ; st0 = r  
fld       st             ; st0 = r, st1 = r  
fld       st             ; st0 = r, st1 = r, st2 = r  
fmul     ; st0 = r^2, st1 = r  
fmul     ; st0 = r^3  
fldpi    ; st0 = pi, st1 = r^3  
fmul     ; st0 = pi * r^3  
fld      four           ; st0 = 4.0, st1 = pi * r^3  
fmul     ; st0 = 4.0 * pi * r^3  
fld      three          ; st0 = 3.0, st1 = 4.0 * pi * r^3  
fdiv     ; st0 = 4.0 * pi * r^3 / 3.0  
_putstr  result  
call     putfp          ; pops fp stack and display st0
```

```

    _putch    0ah          ; prints a blank line

    mov      al, 0        ; return code of 0
    mov      ah, 4ch      ; function code for exit to os
    int     21h

prog  endp
     end      prog

```

Floating Point Instructions Homework Output

```

C:\WINDOWS\system32\cmd.exe
C:\Users\Jade\Desktop\ICS312~1\homework\hw15>dir
Volume in drive C has no label.
Volume Serial Number is 6C86-A0A6

Directory of C:\Users\Jade\Desktop\ICS312~1\homework\hw15
10/07/2009  01:25 AM    <DIR>          .
10/07/2009  01:25 AM    <DIR>          ..
10/07/2009  01:24 AM             1,585 hw15.asm
10/07/2009  01:19 AM             74,195 hw15.docx
10/07/2009  01:21 AM          107,788 Jade's ICS 312 hw15.pdf
02/28/2001  01:11 AM             8,227 Pcmac.inc
03/05/2001  10:43 PM             11,659 UTIL.DOC
02/28/2001  12:55 AM             8,863 UTIL.LIB
               6 File(s)          212,317 bytes
               2 Dir(s)  24,854,892,544 bytes free

C:\Users\Jade\Desktop\ICS312~1\homework\hw15>ml hw15.asm util.lib
Microsoft (R) Macro Assembler Version 6.14.8444
Copyright (C) Microsoft Corp 1981-1997.  All rights reserved.

Assembling: hw15.asm

Microsoft (R) Segmented Executable Linker  Version 5.60.339 Dec  5 1994
Copyright (C) Microsoft Corp 1984-1993.  All rights reserved.

Object Modules [.obj]: hw15.obj
Run File [hw15.exe]: "hw15.exe"
List File [nul.map]: NUL
Libraries [.lib]: "util.lib"
Definitions File [nul.def]:

C:\Users\Jade\Desktop\ICS312~1\homework\hw15>hw15.exe

Enter the radius: 2.0

The volume of the sphere is: 33.5103216383

C:\Users\Jade\Desktop\ICS312~1\homework\hw15>

```