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ICS 312
Homework Solution #10
Due Date: September 29, 2009

Program Code

```
; program4 - This program calls a subroutine to evaluate X - Y + Z.

.model small
.stack 100

.data
X dw 18
Y dw 20
Z dw 10
prompt db 'Calling a subroutine to evaluate 18 - 20 + 10 = $'

.code
prog proc
    mov ax, @data
    mov ds, ax

    lea dx, prompt ; print out prompt.
    mov ah, 9h
    int 21h

    mov dx, X ; use registers to store params.
    mov bx, Y
    mov cx, Z
    call sub1 ; call subroutine.

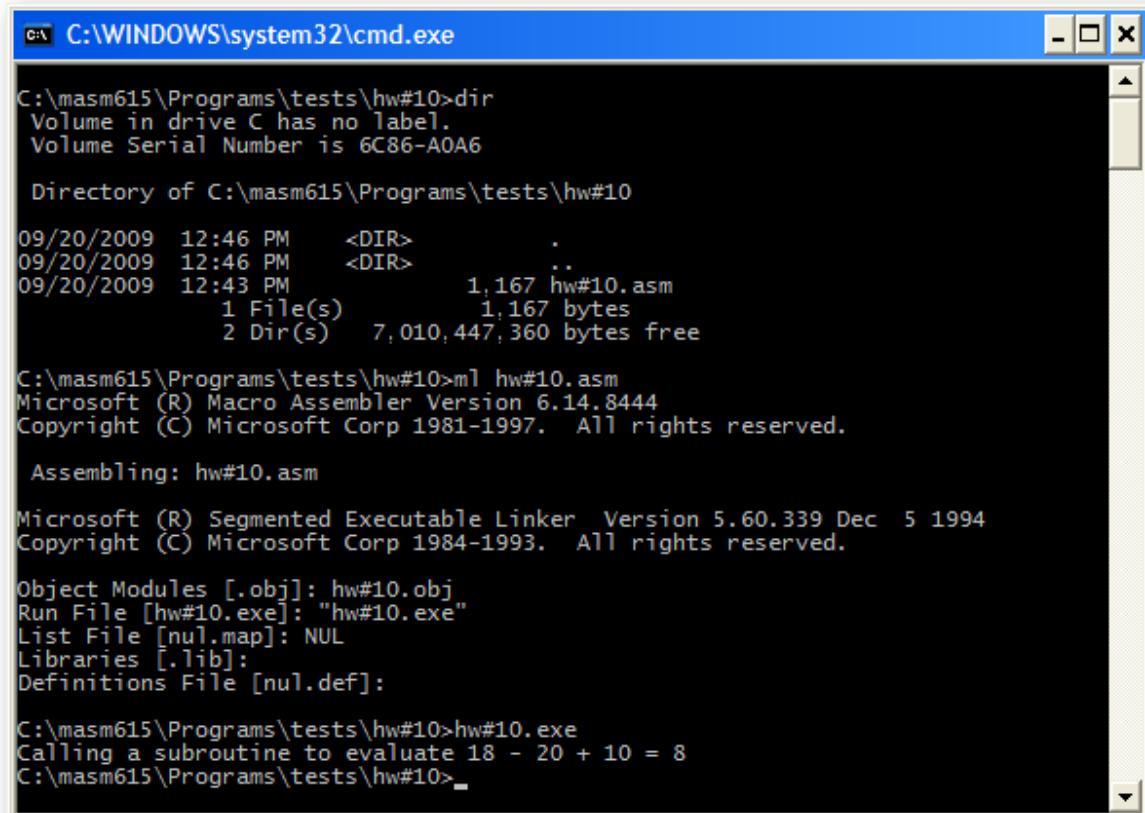
    add dl, '0' ; convert digit to char, print out.
    mov ah, 2h
    int 21h

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

```
prog    endp

sub1   proc
        sub      dx, bx          ; dx = X - Y.
        add      dx, cx          ; dx = X - Y + Z.
        ret
sub1   endp
end    prog
```

Program Output



The screenshot shows a Windows Command Prompt window titled "C:\WINDOWS\system32\cmd.exe". The command entered is "dir" which lists the contents of the directory C:\masm615\Programs\tests\hw#10. The output shows a single file "hw#10.asm" with a size of 1,167 bytes. The next command entered is "ml hw#10.asm" which starts the Microsoft Macro Assembler. The output shows the assembly process, including the linking step where it creates "hw#10.exe" from "hw#10.obj". Finally, the command "hw#10.exe" is run, which outputs the result of the assembly: "Calling a subroutine to evaluate 18 - 20 + 10 = 8".

```
C:\masm615\Programs\tests\hw#10>dir
Volume in drive C has no label.
Volume Serial Number is 6C86-A0A6

Directory of C:\masm615\Programs\tests\hw#10

09/20/2009  12:46 PM    <DIR>      .
09/20/2009  12:46 PM    <DIR>      ..
09/20/2009  12:43 PM           1,167 hw#10.asm
                           1 File(s)     1,167 bytes
                           2 Dir(s)   7,010,447,360 bytes free

C:\masm615\Programs\tests\hw#10>ml hw#10.asm
Microsoft (R) Macro Assembler Version 6.14.8444
Copyright (C) Microsoft Corp 1981-1997. All rights reserved.

Assembling: hw#10.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]: hw#10.obj
Run File [hw#10.exe]: "hw#10.exe"
List File [nul.map]: NUL
Libraries [.lib]:
Definitions File [nul.def]:

C:\masm615\Programs\tests\hw#10>hw#10.exe
Calling a subroutine to evaluate 18 - 20 + 10 = 8
C:\masm615\Programs\tests\hw#10>
```