

**TA: Jade Cheng**  
**ICS 312**  
**Homework Solution #13**  
**Due Date: October 06, 2009**

**Using Macros Homework Code**

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```
;; This program asks the user how many numbers are to be added, and input the
;; user's response, which we will call n. Now go into a loop which is iterated
;; n times, and in each iteration asks the user to enter a number. The program
;; adds up n times and, finally output: The sum of the numbers enters is:
;; followed by the sum. Program does not limite the input numbers to be less
;; than 10. Program does not use any `int 21h` functions.
```

```
include pcmac.inc
.model small
.stack 100
.data
prompt1 db 0ah, 0dh, 'Enter a number to indicate the iteration times: $'
prompt2 db 'Your number: $'
result db 'Sum of your numbers is: $'

.code
prog proc
extrn putdec : near ; compile it with util.lib
extrn getdec : near
mov ax, @data
mov ds, ax

_putstr prompt1 ; print prompt for the iteration number
call getdec ; obtain user input number
mov cx, ax ; cx is used as the loop counter
mov bx, 0 ; bx is used to store the summation

startofloop:
cmp cx, 0 ; end loop if counter reaches 0.
je endofloop
dec cx ; decrement loop counter
_putstr prompt2 ; print prompt for each number to add
call getdec ; obtain user input number
```

```
        add     bx, ax      ; addes up to bx
        jmp     startofloop ; loop again.

endofloop:
        _putstr result      ; print out the result, which is in bx
        mov     ax, bx
        call    putdec
        _putch  0ah         ; print 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
```

## Using Macros Homework Program Output

```
C:\WINDOWS\system32\cmd.exe
C:\Users\Jade\Desktop\ICS312~1\homework\hw13>dir
Volume in drive C has no label.
Volume Serial Number is 6C86-A0A6

Directory of C:\Users\Jade\Desktop\ICS312~1\homework\hw13

10/07/2009  01:04 AM    <DIR>          .
10/07/2009  01:04 AM    <DIR>          ..
10/03/2009  04:17 PM             2,023 hw13.asm
10/07/2009  12:55 AM            100,222 hw13.docx
10/07/2009  12:55 AM            122,075 Jade's ICS 312 hw13.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)          253,069 bytes
             2 Dir(s)  24,855,343,104 bytes free

C:\Users\Jade\Desktop\ICS312~1\homework\hw13>ml hw13.asm util.lib
Microsoft (R) Macro Assembler Version 6.14.8444
Copyright (C) Microsoft Corp 1981-1997. All rights reserved.

Assembling: hw13.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]: hw13.obj
Run File [hw13.exe]: "hw13.exe"
List File [nul.map]: NUL
Libraries [.lib]: "util.lib"
Definitions File [nul.def]:

C:\Users\Jade\Desktop\ICS312~1\homework\hw13>hw13.exe

Enter a number to indicate the iteration times: 12
Your number: 2
Your number: 4
Your number: 6
Your number: 8
Your number: 10
Your number: 12
Your number: 14
Your number: 16
Your number: 18
Your number: 20
Your number: 22
Your number: 24
Sum of your numbers is: 156

C:\Users\Jade\Desktop\ICS312~1\homework\hw13>
```