

**TA: Jade Cheng**  
**ICS 312**  
**Homework Solution #16**  
**Due Date: October 13, 2009**

**Video Text Homework Code**

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```
;; This program draws a large red square (color code 4) in the text mode.
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```
    .model      small
    .stack     100
    .data
count  dw      ?           ; a loop counter
x      db      29         ; starting column
y      db      6          ; starting row
    .code
prog  proc
      mov      ax, @data
      mov      ds, ax
      mov      ah, 0h     ; clear up screen
      mov      al, 3h
      int      10h
      mov      ah, 2h     ; cursor function
      mov      dl, [x]    ; starting column
      mov      dh, [y]    ; starting row
      mov      bh, 0      ; page 0
      int      10h
      mov      ah, 9h     ; display
      mov      cx, 1      ; draw one char at the top left corner
      mov      bl, 4      ; color attribute code
      mov      al, '+'    ; draw a '+'
      int      10h
      mov      ah, 2h     ; cursor function
      inc      dl         ; next column
      int      10h
      mov      ah, 9h     ; display
      mov      cx, 20     ; draw a length of 20 for the top edge
      mov      al, '-'    ; draw '-'s
      int      10h
      mov      ah, 2h     ; cursor function
```

```

    add     dl, 20      ; go to the top right corner
    int     10h
    mov     ah, 9h      ; display
    mov     cx, 1      ; draw one char at the top right corner
    mov     al, '+'     ; draw a '+'
    int     10h
    mov     ah, 2h      ; cursor function
    sub     dl, 21     ; back to the starting column
    inc     dh          ; next row
    int     10h
    mov     [count], 10

sides:
    cmp     [count], 0 ; draw 'count' times of '|'s
    je     done_sides
    dec     [count]    ; decrement loop counter
    mov     ah, 9h      ; display
    mov     cx, 1      ; draw one char at a time
    mov     al, '|'     ; draw '|'s
    int     10h
    mov     ah, 2h      ; cursor function
    add     dl, 21     ; go to the right edge side
    int     10h
    mov     ah, 9h      ; display
    mov     cx, 1      ; draw one char at a time
    mov     al, '|'     ; draw '|'s
    int     10h
    mov     ah, 2h      ; cursor function
    inc     dh          ; go to the next row
    mov     dl, [x]    ; back to the left column
    int     10h
    jmp     sides

done_sides:
    mov     ah, 9h      ; display
    mov     cx, 1      ; draw one char at the bottom left corner
    mov     al, '+'     ; draw a '+'
    int     10h
    mov     ah, 2h      ; cursor function
    inc     dl          ; go to the next column
    int     10h
    mov     ah, 9h      ; display
    mov     cx, 20     ; draw a length of 20 for the bottom edge
    mov     al, '-'     ; draw '-'s

```

```

    int     10h
    mov     ah, 2h      ; cursor function
    add     dl, 20      ; go to the bottom right corner
    int     10h
    mov     ah, 9h      ; display
    mov     cx, 1       ; draw one char at the bottom right corner
    mov     al, '+'     ; draw a '+'
    int     10h
    mov     ah, 1       ; wait for a key to be pressed
    int     21h
    mov     ax, 4c00h   ; 4c in ah is dos exit fn with return code in al
    int     21h
prog    endp
    end     prog

```

## Video Text Homework Output

```

C:\WINDOWS\system32\cmd.exe
C:\Users\Jade\Desktop\ICS 312 fall 2009\homework\hw16>dir
Volume in drive C has no label.
Volume Serial Number is 6C86-A0A6

Directory of C:\Users\Jade\Desktop\ICS 312 fall 2009\homework\hw16
11/14/2009  05:26 PM    <DIR>          .
11/14/2009  05:26 PM    <DIR>          ..
11/14/2009  05:20 PM                3,681 hw16.ASM
11/14/2009  05:24 PM               56,034 hw16.docx
10/07/2009  01:31 AM               77,711 Jade's ICS 312 hw16.pdf
           3 File(s)              137,426 bytes
           2 Dir(s)  24,452,452,352 bytes free

C:\Users\Jade\Desktop\ICS 312 fall 2009\homework\hw16>ml hw16.ASM
Microsoft (R) Macro Assembler Version 6.14.8444
Copyright (C) Microsoft Corp 1981-1997.  All rights reserved.

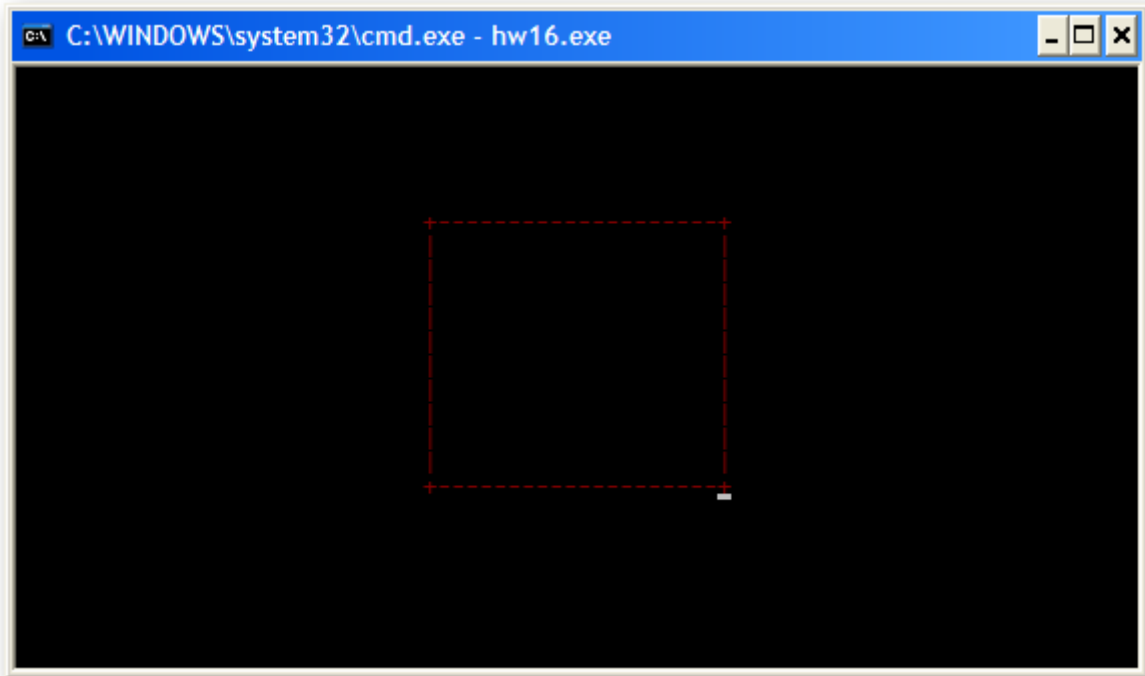
Assembling: hw16.ASM

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

Object Modules [.obj]: hw16.obj
Run File [hw16.exe]: "hw16.exe"
List File [nul.map]: NUL
Libraries [.lib]:
Definitions File [nul.def]:

C:\Users\Jade\Desktop\ICS 312 fall 2009\homework\hw16>hw16.exe

```



Clicking any key:

