Shammah Thao

7/29/20

CPE 185

Homework #5

5.1 The extended ASCII character set includes those characters and symbols with ASCII codes between 80H and FFH. Modify Program 5.1 to print only these extended characters. Provide a complete program listing of your solution with comments.

```
Mov ax, 0002 ;BIOS service 0

Mov a1,2       ;Video mode 2

int 10

Mov ah, 2      ;BIOS service 2

Mov dx, 0a00

Mov bh, 0      ;Page 0

Int 10         ;Home cursor

Mov ax, 0e80 ;BIOS service OE

Mov a1,80 ;First character is 80H

int 10       ;Print character

inc a1       ;Next

jnz 0113     ;More characters? Loop again

int 20       ;When AL=O program is done
```

5.2 Study the program listing shown in Figure 5-26. Behind each program line, add a meaningful comment. You may find it useful to enter the program into memory using DEBUG and run it. You should see the ASCII character set printed in bright green on a blue background (Hint:Refer to Appendix B. 1and B.3 for descriptions of the BIOS services and color codes used). Now answer the following questions about this program.

```
Mov ah, 0 ;BIOS service 0

Mov a1,2 ;Video mode 2

int 10       ;Set video mode and clear screen

Mov ax, 0920 ;Service 9, ASCII space

Mov bl, la ;Bright green on blue

Mov cx, 7d0 ;Fill screen (80 x 25)
```

```
int 10 ;Set screen color
Mov ah, 2 ;BIOS service 2
Mov dx ,0a00 ;Row 10, column 0
Mov bh, 0 ;Page 0
int 10 ;Set cursor
Mov ah, 0e  ;BIOS service OE
Mov a1,0     ;First character is 0
int 10 ;Print character
inc a1 ;Next
Cmp a1,80 ;Done?
jnz 011d ;No: loop again
int 20 ;Yes: back to DOS
```

(a) What video mode does the program set?

Video mode 2: 80 x 25 16-color text.

(b) Which instruction defines the screen colors?

mov bl,la (1 = blue background, A = bright green text).

(c) What is the purpose of the instruction MOV CX,07DO? Try loading smaller numbers into CX and note the effect

The screen has 80 x 25 = 2000 characters = 07DOH. This instruction causes all of these locations to be written with the character in AL (space) in the specified color.

(d) What is the effect of changing the MOV AX,0920 instruction to MOV AX,0924?

The '$' symbol is written to the entire screen (instead of a space).

(e) What change is required to display the ASCII characters in red on a white background?

Change the mov bl,la to mov b1,74.

5.3 Determine the contents of registers AL, AH, BL, and BH after the following instructions have executed.

```
MOV AX, EA7BH
MOV EX, AX
AND AL,3CH
OR AH, OFH
```

XOR BL, FOH

NOT' BH

AL=38H; AH=EFH; BL=8BH; BH=15H

5.6 Write a program to display the two packed BCD numbers in register AX. Example: AX = 12348, video display shows 1234. Provide a complete program listing of your solution with comments. (Hint: Call Program 5.2 as a subroutine twice; replace the INT 20H at the end of Program 5.2 with RET).

```
mov dx, ax ;Save original number
mov al, dh ;Get most significant BCD numbers
call 010e ;Convert and display
mov al, dl ;Get least significant BCD numbers
call 010e ;Convert and display
int 20 ;Return to DOS

;Program 2 Begins Here (address 010e)
Mov bl ,al ;Save original number
and al,f0 ;Force bits 0-3 low
Mov cl,4 ;Four rotates
ror al,cl ;Rotate MSD into LSD position
add a1,30 ;Convert to ASCII
Mov ah, 0e ;BIOS service OE
int 10 ;Display character
Mov al,bl ;Recover original number
and al,0f ;Force bits 4-7 low
add a1,30 ;Convert to ASCII
int 10 ;Display character
ret ;Return to calling program
```

5.7 Refer to the listing for Program 5.3 in Figure 5-10. Assume the user enters the problem: 28+ 79=. Determine the contents of the following just before the JNC instruction in 0139 executes:

(a) SI

(b) Byte Ptr [SI+ 1]

(c) Word Ptr [SI+ 2]

(d) Word Ptr [SI +5]

(e) AX

(f) BH

(g) CL

(h) DX

(i) CF

4-Digit BCD Adder	
I. Add AX and BX	
A. Add the LSDs without carry	
1. Add AL and BL and adjust the result for decimal	add al,bl daa
2. Save result	mov cl,al
B. Add the MSDs plus carry	
1. Move BH to BL and AH to AL	mov bl,bh mov al,ah
2. Add with carry AL and BL and adjust for decimal	adc al,bl daa
C. Assemble the result in AX	
1. Move MSD result to AH	mov ah,al
2. Move LSD result to AL	mov al,cl
II. Return to DOS	
A. INT 20H	int 20