Menoufia University
Faculty of Electronic Eng.
2nd year, CSE Dept.
CSE217
Microprocessor & App

Final exam (1st Term)
Time: 3 hours
Full mark = 60
Date: 2/1 /2020
Dr. Marwa A. Radad

Answer the following questions:

The first question:.....(10 Marks)

1- What are the three main tasks of a microprocessor?
2- Compare between real mode and protected mode operations. Show the role of segment registers in both modes.
3- Compare between Isolated I/O and Memory-mapped I/O.

The Second question:.....(11 Marks)

Complete the following sentences.

1- The parameters that affect the microprocessor evolutions are: _____, _____, _____, _____, _____.
2- _____is the first microprocessor that can operate in protected mode.
3- ____, ____and_____are special purpose registers.
4- _____is a part of memory system that contains device drivers.
5- ____ is a status flag that checked by the instruction "JE".
6- ____ is a control flag that is used in debugging.
7- GDTR is _____register that contains: _____.
8- The size of local descriptor table is____byte, it contains_____descriptor.
9- "LEA BX, LIST;" is equivalent to the instruction_____.
10- _____,_____,_____are instructions that alter IP register.
11- CALL instruction in FAR procedure will PUSH ____,____into the stack.
12- Write an instruction to swap the contents of AX, BX: _____
13- _____is a ROM device that can be erased by Ultraviolet light.
14- Strobed Input/Output use _____signals to operate I/O devices.

The Third question:.....(8 Marks)

1- Assume DS= 4200H, SI= 1C00H, AX=0000H and DS:[SI]= AAFFH. Draw the contents of registers and memory after the execution of the two instructions "CLD; LODSW;". Show on your figure the linear addresses of data assuming Real mode operation.
2- Code a descriptor that describes a memory segment that begins at location 01000000H and ends at location 09FFFFFFH. This memory segment is a code segment that can be read with the highest privilege level. The descriptor is for an 80386 microprocessor. Fig 1 shows the descriptor and its access right byte format.

The Fourth question:.....(11 Marks)

1- What is the addressing mode of the following instructions:
   (a) MOV AL, ES:[2000H] (b) MOV DX, LIST[BX][DI]
2- Compare between the following instructions:
   (a) SHR AL, 1 <==> SAR AL, 1 (b) INC AL <==> ADD Al, 1
3- What are the contents of AX, BX registers after the execution of the following code segments:

(a)
```
MOV AX, AAAAH;
MOV BX, AAAAH;
NOT AX;
NEG BX;
```

(b)
```
MOV AL, 88H;
MOV BL, 88H;
MOVZX AX, AL;
MOVSX BX, BL;
```

(c)
```
MOV AX, BBBBH;
MOV BX, AAAAH;
CMP AX, BX;
CMOVAE BX, AX;
```

4- Write an assembly program that read each element of 10bytes array ARR1[] in AL, then call the procedure "ABS", then save the value in ARR2[]. Write "ABS" as a far procedure that calculate the absolute value of AL then return.

The Fifth question:.....(20 Marks)

1- Design the 8088 memory system which has 16K-byte ROM starts at address FC000H to FFFFFH using PROM (4K x 8) .The PROM chips have two control signals $\overline{OE}$, $\overline{CS}$. Use Dual 2-to-4 line decoder, each half of the decoder has a single active low enable pin.

2- Draw an interface circuit to show 82C55 connected to 8088 via the 8-bit addresses B0H-B1H-B2H-B3H. Implement the address decoding using 3-to-8 decoder. The decoder has three control signals G1, $\overline{G2A}$, $\overline{G2B}$. Fig2 shows the data sheet of 82C55.

   a. Program 82C55 to operate in mode 0 so that port A and port B works as output ports and port C as input port.
   b. Connect 8 common anode LEDs to port A
   c. Write an assembly program to operate the LEDS as a down-ward counter (from FF to 00).

3- Use the same 82C55 in question number (2) with the same addresses. *You don't have to draw the interface circuit again.*

   a. Program 82C55 to operate in mode 1 so that port A works as input port and port B works as output port.
   b. Connect a Keyboard to the Port A as in fig.3 The Keyboard has an output signal DAV (Data Available)to indicate a key is pressed and 8-bit data output pins contain the ASCII code of the pressed key.
   c. Write a program that reads data from the keyboard each time a key is typed. Store ehe ASCII codes in buffer BUF.

Fig4 shows the strobed input signals of 82C55.

With my best wishes

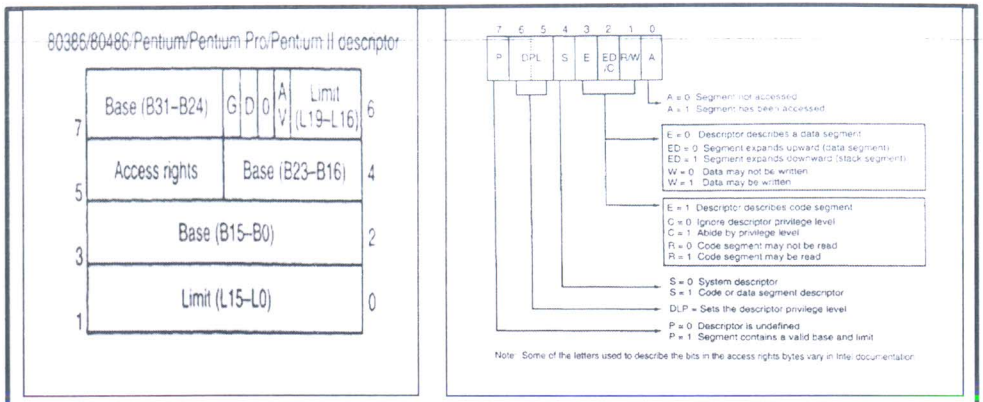

Fig. 1 The 80386-Pentium descriptor and its access right byte format.

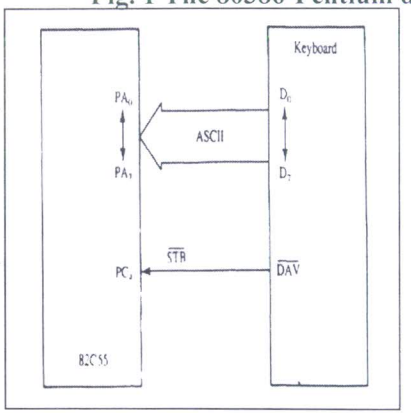

Fig3 82C55 connected to a keyboard

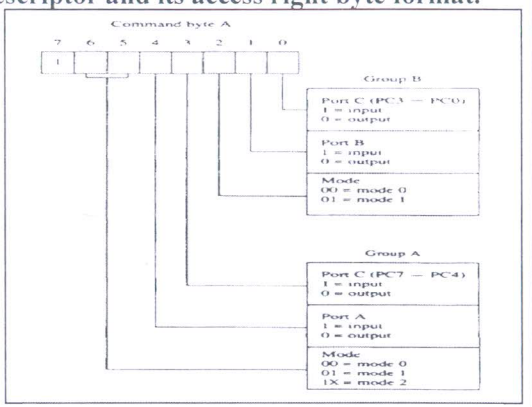

Fig2 82C55 data sheet

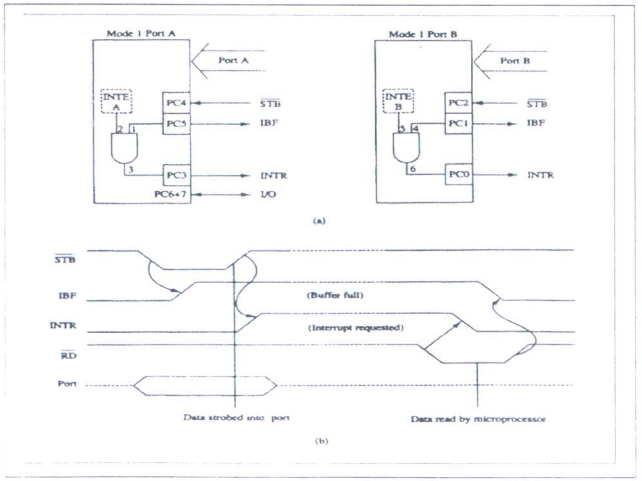

Fig4 82C55 strobed Input signals