CPE 185 / EEE 174
SU 2022 MIDTERM 01

MIDTERM 01 - 1st attempt

1. For a 12-bit resolution ADC. What is the maximum value that will be returned from a ADC read function?

   2^{12} = 4096 = 0 to **4095**

2. For a 8-bit resolution ADC. What is the minimum value that will be returned from a ADC read function?

   2^{8} = 256 = **0** to 255

3. If you have a ADC that has a bit resolution of 6-bits. What range would it represent?

   2^{6} = 64 = **0 to 63What is the hexadecimal encoding for "JGE" for a jump back 12 bytes?**

4. The ASCII codes for space, space, carriage return, line feed, end of string in decimal are:

   32, 32, 13,10, 36

5. The number of nibbles in a byte are:

   2 nibbles = 1 byte nibble = 4 bits byte = 8 bits

6. AND'ing 10Hex and 2FHex will result in which of the following Hex numbers?

   0001 0000
   0010 1111 (AND)
   0011 1111 = **3F**

7. The number of nibbles in a byte are:

   2 nibbles = 1 byte nibble = 4 bits byte = 8 bits

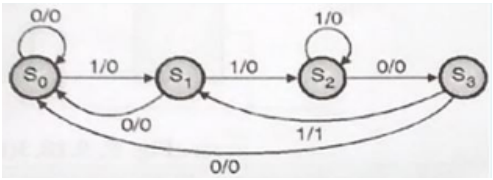
8. How many bytes are in an INT?

   4 bytes

9. Which one of the following are not true about pointers?
   a. Are used when passing by reference
   b. A pointer is a variable which contains the address in memory of another variable
   c. Are used when passing by value
   d. Declaring a pointer variable should look like the following: int * p

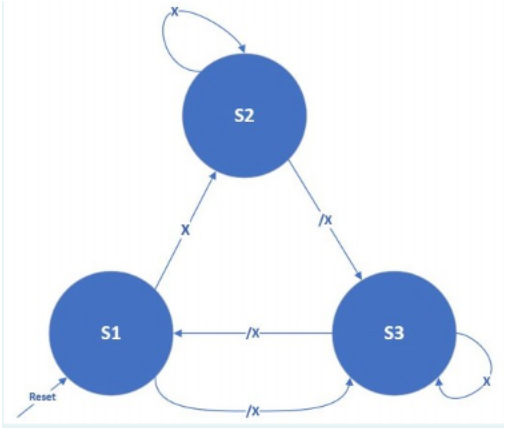
10. What is an example of a pre compiler statement?
    a. #include
    b. A Macro
    c. All of the answers
    d. #define

11. How many states are there for the state diagram?



2^{4} = **16**

12. If reset = 1 and X = 1, then reset = 0 after 1 transfer of current to next state. What will the current state after two transfers of next state to current state?



S2

13. What is the voltage for IO output for a "ON" signal for TTL logic levels?
    a. **Between 0V to 5V**
    b. Around 1.0V
    c. None of the answers
    d. Between 1.5V to 1.9V
    e. All of the answers
    f. Between 2.7V to 5V
14. What is the voltage for IO input for an "ON" signal for TTL logic levels?
    a. Between 0V to 0.8V
    b. All of the answers
    c. **None of the answers**
    d. Around 0V
    e. Between 0V to 5V
    f. Between 2V to 5V
15. 36 decimal would be what value in hexadecimal?
    36 = 0010 0100 = **24**
16. How many bits would be required from 0 to 255?
    $256 = 2^8$ -> **8 bits**
17. Given:
    AX=FF00 BX=3534 CX=0000 DX=0180 SP=FFEE BP=0000 SI=0000 DI=0000
    DS=1D72 ES=1D72…
    What is the signed decimal value of the number in the AX register?
    FF00 = 1111 1111 0000 0000
    0000 0000 1111 1111 +1
    0000 0001 0000 0000 = **-256**
18. With this a short sequence of code: **7413EBA3CD167D213C04EBF0EB15**. All of the instructions are a word long. The third instruction operator is:
    CD16 -> **INT** instruction

19. What is the hexadecimal encoding for adding BX with CX and storing the result in BX?
    Instruction format = 0000 000w:11 reg1 reg2
    w=1 reg1=011 reg2=001
    0000 0001 1101 1001
    0 1 D 9
20. How many address lines would be required to address 1MB directly?
    2^{20} = 1 048 576 = 1MB ANSWER: **20**
21. In x86 architecture, ALU stands for which of the following?
    Arithmetic Logic Unit
22. Given:
    AX=FFE0 BX=3534 CX=0000 DX=0180 SP=FFEE BP=0000 SI=0000 DI=0000
    DS=1D72 ES=1D72…
    1D72:010F 7D18 JGE 0128
    How many bytes in decimal will the processor jump if the conditions for a jump are met?
    24 or 18??
23. Given:
    AX=0353 BX=0534 CX=0000 DX=0180…
    ID72:0109 7D06 JGE 0118
    What will the IP value be after a "t" command is executed in DOS Debug?
    010B
24. What is the hexadecimal encoding for "JGE" for a jump from IP address 010C to IP address 114 bytes?
    7D06
25. What is the hexadecimal encoding for "JGE" for a jump back 12 bytes?
    7DF2
26. Determine the contents of register BL after the following instructions have been executed:

Program Listing
MOV BL, E2H
MOV CL, 08H
ROL BL, CL

    E2H = 1100 0101 CL: 8 times -> 1100 0101 : **E2Hex**
27. Determine the contents of register BL after the following instructions have been executed:

Program Listing
MOV BL, E2H
MOV CL, 04H
ROL BL, CL

    E2H = 1100 0101 CL: 4 times -> 0010 1110 : **2EHex**

28. In adding 3+3 through a 4 bit integer unit. The state of the OF and CF flags after the add instruction would be:

    OF = 0, CF = 0

29. The acronym PWM used in microcontrollers, is defined as:

    Pulse Width Modulation

30. What does ADC refer to?

    Analog Digital Converter

31. In adding 5+5 through a 4 bit integer unit. The state of the OF and CF flags after the add instruction would be:

    OF = 1, CF = 0

32. What are the contents of BX after this program has been run:

	Memory location	Contents	Memory location	Contents
MOV CX, 00FFh				
MOV BX,[550E]	5514	24	F23F	24
AND CX, [BX]	5513	D8	F23E	D8
MOV DX, 11h	5512	00	F23D	24
MOV CX,[5512]	5511	21	F23C	D8
MOV BX, 5511h	5510	00	F23B	00
SUB DX, [BX]	550F	F2	F23A	21
AND BX, FF00	550E	39	F239	00

5511h = 0101 0101 0001 0001
AND FF00 = 1111 1111 0000 0000
0101 0101 0000 0000 = **5500h**

MIDTERM 01 - 2nd Attempt

1. For a 8-bit resolution ADC. What is the maximum value that will be returned from a ADC read function?

   2^{10} = 256 = 0 to **255**

2. For a 10-bit resolution ADC. What is the minimum value that will be returned from a ADC read function?

   2^{10} = 1024 = **0** to 1023

3. If you have a ADC that has a bit resolution of 12-bits. What range would it represent?

   2^{12} = 4096 = **0 to 4095**

4. The ASCII codes for space, space, carriage return, line feed, end of string in **hexadecimal** are:

   20 20 0D 0A 24

5. The number of bits in a nibble are:

   1 nibble = **4** bits

6. AND'ing 1FH and 02H will result in which of the following?

   0001 1111
   0000 0010 (AND)
   0000 0010 = **02 Hex**

7. The number of nibbles in a word are:

   4

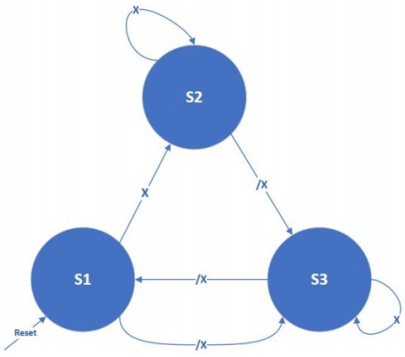
8. How many bytes are in a char?

   1 byte

9. What should we uses pointers?
   a. **All of the answers except "none"**
   b. When you trying to pass by reference
   c. When passing a large sized structure or data type
   d. Access certain address in memory
   e. None of the answers

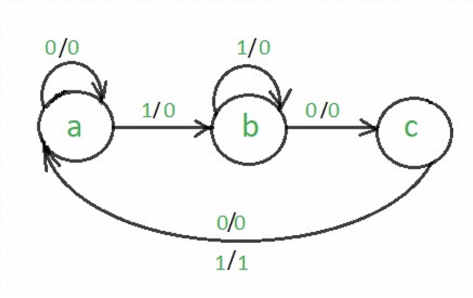
10. What should we use pre compiler statements?
    a. **All of the answers**
    b. Remove blocks of code for debugging
    c. Create simple functions like #define getmax(a,b) ((a)>(b)?(a):(b))
    d. Create Constants

11. If the reset input is high what state would be the next state?



ANSWER: **S2**

12. Below is a finite state machine diagram of a sequence detector. What sequence does it detect?



Answer: **101**

13. What is the voltage for IO output for a "OFF" signal for TTL logic level?
    None of the answers
14. What is the voltage for IO output for a "ON" signal for CMOS logic level?
    Around 5V
15. 24 decimal would be what value in hexadecimal?
    24 dec = 0001 1000 = **18** Hex
16. Hex F2 in base 2 equals
    F2 = **1111 0010**
17. The instruction MOV CX, [DADD] is what addressing mode?
    Immediate
18. Which of the following DOS Debug instructions would be used to change the AX register to 010C?
    RAX = 010C
19. Which of the following Debug instructions would be used to change the IP register to 0110?
    RIP **RIP=[0110] ??**
20. How many address lines would be required to address 64 MB directly?
    2^{26} = 67 108 864 = 64 MB Answer: **26**
21. In x86 architecture, BIU stands for which of the following?
    Bus Interface Unit
22. Given:
    AX=FFE0 BX=3534 CX=0000 DX=0180 SP=FFEE BP=0000 SI=0000 DI=0000
    DS=1D72 ES=1D72…
    1D72:010D 7DF6 JNL 0116
    How many bytes in decimal will the processor jump if the conditions for a jump are met?
    -10
23. Given:
    AX=2247 BX=0000 CX=0000 DX=0000 SP=FFEE BP=0000 SI=0000 DI=0000…
    … ID72:0106 EB0F JMP 011F
    What will the IP value be after a "t" command is executed in Debug?
    011F
24. What is the hexadecimal encoding for "JMP" for a jump back 12 bytes?
    EBF2
25. What is the hexadecimal encoding for "JGE" for a jump from IP address 010C to IP address 114 bytes?
    7D06

26. What are the contents of DX after this program has been run:

	Memory location	Contents
MOV DX, 11h	5514	24
MOV CX,[5512]	5513	D8
MOV BX, 5511h	5512	00
SUB DX, [BX]	5511	21
AND BX, FFFF	5510	00

FFF0h

27. Determine the contents of register BL after the following instructions have been executed:

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MOV BL, E2H
MOV CL, 08H
ROL BL, CL

E2H = 1100 0101 CL: 8 times -> 1100 0101 : **E2Hex**

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MOV CX,[5512]	5511	21	F23C	D8
MOV BX, 5511h	5510	00	F23B	00
SUB DX, [BX]	550F	F2	F23A	21
AND BX, FF00	550E	39	F239	00

5500h

30. What does ADC refer to?

Analog Digital Converter

31. A moore output on a finite state machine is determined by the current state and input

FALSE

32. In adding 5+5 through a 4 bit integer unit. The state of the OF and CF flags after the add instruction would be:

OF = 1, CF = 0

33. Moore's law has accurately predicted the growth rate in the number of transistors per die for the last 40 years. What is the rate?

Doubling every 18-24 months

34. The term “polling” refers to which of the following?
    a. **All of the answers**
    b. When a program determines if the IO is a input or output
    c. When a program ask the IO to give it information
    d. When the program actively sampling the status of a IO
35. What is the advantage of Assembly Language over C language?
    a. Hand assembly coding is much faster in C
    b. C is transportable to other microprocessor architectures
    c. **The Assembler creates much faster executable code**
    d. All of the answers
    e. C does not need a compiler to be assembled in to an executable program
36. What high level language(s) is(are) the Raspberry PI programmed in?
    Python
37. The acronym PWM used in microcontrollers, is defined as:
    Pulse Width Modulation