CpE 213 – Final Exam Review Topics

The final is comprehensive, but emphasis will be on the following topics:

CH4. Timers/Counters

Hardware architecture
3 sources of input
    2 external
    1 internal (system clock)
Typical 8051 has 2 16-bit timer/counters
Timer control (sfr TCON = 0x88;)
    TR0, TR1
    TF0, TF1
Timer mode (sfr TMOD = 0x89;)
    Not bit addressable
    GATE
    $C/\overline{T}$
    M1, M0
        Mode 0 – 13 bit counter/timer
        Mode 1 – 16 bit counter/timer
        Mode 2 – 8 bit auto-reload
        Mode 3 – Split timer mode
Timer/counter setup routine
Review all examples and sample programs

CH6. Interrupts

Definition
Execution space
    Foreground
    Background – priority level 0 and priority level 1
Typical 8051 interrupts
    Two external – P3.2 and P3.3
    Two timer/counter – T0 and T1
    One serial port
IE 8-bit sfr
    EA
    EX0
    ET0
    EX1
    ET1
    ES
Interrupt priority
    High

- Low
- Set by sfr IP = 0xB8;

Polling sequence
Interrupt flags
- EX0
- EX1
- T0
- T1
- Serial (RI and TI)

Interrupt vectors
- ISR vector addresses
- Reset ISR
- Implementation of short ISR
- Implementation of long ISR

RETI inst
Interrupt setup routine
Interrupt servicing
Interrupt latency
- Best case
- Worst case with 1 priority 1 interrupt
- Worst case if more than 1 priority level 1 interrupt

Review all examples and sample programs

CH5. Serial Port Communication

UART (Universal Asynchronous Receiver/Transmitter)
- Full duplex
- I/O buffer – sfr SBUF=0x99;
- Baud rate
- 9 bit UART

SCON sfr (sfr SCON=0x98;)
- REN
- TI
- RI
- TB8
- RB8
- SM0, SM1

Serial port modes
- Mode0 – shift register
- Mode1 – 8 bit variable baud rate UART
- Mode2 – 9 bit fixed baud rate UART
- Mode 3 – 9 bit variable baud rate UART

Baud rate calculation
- Fixed modes
- Variable modes

Multiprocessor mode
Serial port setup routine
Review all examples and sample programs

Remarks

- 2-hour comprehensive exam.
- 50% from material covered in exams 1 and 2 and 50% from new material.
- Open book and open notes.
- All questions will be multiple-choice.
- Please bring a No. 2 pencil and an eraser.
- Calculators are allowed, but please use basic operations such as addition, subtraction, multiplication and division.
- Manage your time wisely!
- Attend the final review if at all possible. It will be from 4 to 6 pm on Wednesday Dec. 17th, in G31.
- Email me if you have any questions.