**9.12 In general, what purpose does an interrupt serve? Stated another way, suppose there were no interrupts provided in a computer. What capabilities would be lost?**

(1) CPU and I/O devices work in parallel

(2) Handling hardware faults

(3) Realization of human-machine connection: During the work of the computer, if the user wants to intervene in the machine, such as checking the intermediate results of the calculation, understanding the working status of the machine, giving temporary commands to the machine, etc.. These functions are almost impossible to achieve in a computer without an interruption system.

(4) Achieve multi-channel program and time-sharing operation

(5) Achieve real-time processing

(6) Achieve the connection between the application and the operating system

(7) Linking the processors of a multiprocessor system

**9.7 What is polling used for? What are the disadvantages of polling? What is a better way to perform the same job?**

Polling refers to actively sampling the status of an external device by a client program as a synchronous activity. Polling is most often used in terms of input/output (I/O), and is also referred to as polled I/O or software-driven I/O.

Polling is a simpler method to execute, and is recommended for the early stages of design where the working of a peripheral is to be verified. It does not involve any priority. Also the code segment will always execute within a fixed time and in a fixed sequence. It is easy to debug and has no effect on the execution of other sections of code. There are no big memory management issues. There are no issues with stack.

Interrupts is a better way, due to the nature of Interrupts, there is less likelihood of events being missed. Also ISR code executes only if an event occurs and so there is less burden on the micro-controller. Another feature of Interrupts is priority where the response of the system to simultaneously occurring events can be controlled. Nested Interrupts allow the system to respond even in cases where an event occurs while a previous one is being responded to. Polling may miss such occurrences.

References:

<http://www.thinklikeamicro.com/PollVsInt.html>

<https://en.wikipedia.org/wiki/Polling_(computer_science)>

**Chapter 9 Calculation Exercise ”If my CPU runs at 4.0GHz, and on average takes 10 clock cycles to complete an instruction, how many instructions will be completed in the time it takes to type "MY CPU IS RUNNING NOW"? Assume it takes 5 seconds to type the message. Show your work and how you arrived at the solution”.**

Clock\_cycles = 1 / ( 4 \* 109 )s = 0.25 \* 10-9s

An\_instruction = 10 \* Clock\_cycles=2.5 \* 10-9s

Total\_time = 5s

5 / ( 2.5 \* 10-9 ) = 2 \* 109 instructions