**1. What is a Watchdog Timer? Why is it a good practice to stop it at the beginning of MSP430 Programs?**

Special timer used as a safety device. It resets if it does not receive a signal generated by the program every X time units.

**2. Compare Parallel and Serial I/O interfaces. What are the advantages and disadvantages of using each?**

Parallel interface means that all the bits composing a single word are communicated simultaneously, so they would need one wire per bit. In the early days, parallel interfaces were more popular due to the ability of transmitting information on multiple wires. Its disadvantage is that In modern technology, wires can electromagnetically interfere with each other, also the timing of signals must be the same which can be difficult with faster connections.

Serial interfaces require only one wire to transfer the information since they send information one bit at a time. Serial is more economically appealing, as it requires on a single wire. In the early days, using serial was a problem as it was slow to transmit using only a single wire due to slow speeds.

**3. What is the difference between a buffered input and a latched input?**

Buffered Input: They do not hold input data and the CPU can only read input present at that instant

Latched Input: Hold the data until it is read by the CPU, after which they are usually cleared and ready for another input

**4. Explain each of these concepts: OpCode, Operand, Addressing mode**

OpCode: The most significant one, also known as the operating code which defines the operation to be performed.

Operand: Which is the data or registers used in the instruction

Addressing mode: That is the way in which an operand defines the data, for example, an RTN expression may have Rn or (Rn). Operand in both is Rn but the data or datum is found in different places.

**5. What is contained in the source file?**

assembly instructions

Directives: These are used to control the assembly process and not executed by the CPU

Instructions

Comments

Macro directives: Allow to group a set of assembly instructions into only one line. This simplifies the source for human view

**6. What is the purpose of the linker?**

the linker combines the file with previously assembled object files and libraries to generate the final executable file

**7. What are the three types of CPU instructions? Briefly explain each of them.**

Data Transfer

Arithmetic-Logic

Program Control

**8. How do JUMP instructions affect the contents of program counter?**

The contents of the program counter change when a jump instruction is executed so that the flow of the program is altered