**Scenario**

You are an electrical technician working in an electronics company which working in the field of embedded microprocessor systems. Your manager asked you to work on some particular situations to select the proper interfaces between the microprocessor and the external circuits and systems. Then asked you to design, build, program and test an interface for an interface for an external device to a microprocessor- based system.

**Task 1:**

Evaluate and choose programmable interface devices for one of the following particular situations:

1. It is required interface the microprocessor system to the personal computer to send the system ID.
2. It is required interface the microprocessor system to key pad consisting of 8 switches.
3. It is required interface the microprocessor system to LCD screen 2 line x 16 characters.

**P3.1**

**Note:**

**You assessor will choose one case from the above list to work on.**

**Task 2:**

Design, build, program and test an interface for an external device to a microprocessor system for one from the following cases.

1. It is required interface the microprocessor system with and ADC.
2. It is required interface the microprocessor system with DAC.
3. It is required interface the microprocessor system so that it can produces a binary count increasing every 1 sec and displays the count on a led array.
4. It is required interface the microprocessor system with external signal so that if this signal becomes low the memory location 5100H will be loaded by 01H value.

**P3.2**

**Note:**

**You assessor will choose one cases from the above list to work on.**

**Task 3:**

It is required to interface a microprocessor system to your laptop using UART serial interface. The microprocessor system used can operate serially only at TTL levels (0 and 5 volts) while your laptop has USB ports only. How you can interface both together?

You have to:

* Define the problem.
* Propose your solution.
* Justify your proposed solution.
* Give your final conclusion.

**M1.3**

**Task 4:**

The microprocessor interfacing may be serial or parallel. It is required to design a parallel port interface with Z80 microprocessor family to output 55 Hex, validate your design be using your simulator software then evaluate the results obtained from your design.

**D1.2**

**Task 5:**

It is required to count the total number of products on a production line for a certain time. Give your ideas of how to do that? And take your decision for the best solution in your opinion.

**D3.1**

**Task 6:**

The microcontroller is defined as a microcomputer (Microprocessor system with peripherals) on one chip.

1. It is required to make a project to:

* Interface a microcontroller with your laptop using UART.
* Send your name to your laptop from the microcontroller.

1. Use your software simulator to interface the microcontroller with 7 segments and write a program code to make a repeated random counter.

**Your answer must include the following:**

* **Your proposed steps for the task.**
* **The time schedules for the steps you have proposed.**

**D2.2**