CSE360 – Computer Interfacing

Assignment - 01

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1. *Suppose we want to design a coal mining system where we want to detect the temperature and humidity of the coal mine with the help of sensors. After detecting the values we want to display it on the screen/monitor. Identify what type of interfacing takes place and the mechanism of the interfacing during the whole process of detecting the values and displaying it on the screen/monitor.*

Answer to the Question number 01

We know, a peripheral device as the device which is connected with the computer but is not a part of the computer itself. The interaction of peripheral devices with computers is known as computer interfacing. The peripheral devices are normally attached to the computer for the purpose of sharing data or instructions.

There are three types of peripheral devices. They are,

1. Input devices
2. Output devices
3. Input/Output devices

To design a coal mining system, we will need computer interfacing, and we will need both software and hardware interfacing.

In the coal mine, we will use temperature and humidity sensors, which will take data from it's surroundings. It is an example of external interfacing.

Then, we will need a calibration circuit. Since sensors do not have microcontrollers, they cannot provide digitalized data. Calibration circuit will translate the analogue data into digital data. These data will be sent to the microcontrollers.

Upon receiving the digitalised data, the microcontroller will send instructions to the software drivers, thus initializing hardware-software interfacing. In addition, the driver will send instructions to the monitor, an hardware interface, thus occurring software-hardware interfacing.

2. *Many modern devices are using USB Type C nowadays. Compare it with its predecessor USB types and explain the reason for its use.*

Answer to the Question number 02

USB (Universal Serial Bus) is an industry standard that specifies cables, connections, and protocols for connecting, communicating, and powering computers, peripherals, and other computers. Over the years, there has been many types and iterations of USB. Currently, USB Type – C seems to be the dominant USB. It is emerging as the industry standard due to its' high data transfer rate, faster electricity transfer rate, amongst other benefits.

The key benefit of USB type C is that it is compliant with USB 3.1 requirements, which means it employs more efficient data encoding and can transport material at up to 10Gbps in both directions. This is twice as much as USB 3.0 is capable of. Backward compatibility implies that USB Type-C will function with all existing USB 2.0 and 3.0 devices, but at slower rates.

USB Type-C also enables for speedier electrical flow, allowing devices like phones to charge more quickly. The majority of USB 3.0 chargers still deliver 2.1 Amps of power. However, with a 5 Amp output, USB Type-C can charge smartphones two or three times faster than they can now.

Few reasons to use USB Type C over other USB types:

a. USB Type C has a slimmer design that fits into a port no matter which direction it's flipped, designed to replace A, B, mini, and micro USB connections all at once.
b. A 100-watt, 20-volt connection is far more powerful than the older port and can handily power even larger devices.
c. Support for power delivery to charge up devices on either end (with the right cables) and charge larger devices.
d. Support for video delivery at much higher quality, including transmitting 4K video to a screen.
e. Support for alternate modes that allow for lots of different adapters for specific connections like HDMI or VG — or older types of USB connections.
f. Potential compatibility with Thunderbolt 3 connections means a USB-C port can double as a Thunderbolt 3 port with extra hardware.

Thunderbolt has enabled things like faster charging speeds, laptop computers to connect with external GPU (Graphics Processing Units) which were unimaginable even a few years ago. USB Type C has made life simpler for the average user since most of the newest technological products like laptops, smartphones only come with USB Type – C ports, so an user can use only one USB Type – C cable to charge multiple devices.