سازمان سما

وابسته به دانشگاه آزاد اسلامی

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درس ششم:

The Ins and Outs of a Computer

Part I- Writing Development: Cause and effect

- یک پاراگراف میتواند به کمک بیان جملاتی به صورت *سبب و اثر* (Cause and effect) توسعه داده شود. یعنی پس از ذکر جمله عنوان، چیزهایی که از آن سبب می شود، و اثر هر مسبب را میتوان توسط جملاتی که به دنبال آن می آیند ذکر نمود.

- البته همواره یک رابطه سببی بین جمله اول پاراگراف و جملات متعاقب آن وجود دارد. به عبارت دیگر، جملاتی که بعد از جمله نخست پاراگراف ظاهر میشوند می توانند لیستی از اثرها یا لیستی از سبب های ناشی از جمله اول باشند.

- به دو شیوه کلی می توان یک پاراگراف را به کمک Cause and effect توسعه داد:

  ✓ **Group 1. Sentence connectors**

  ✓ **Group 2. Conjunctions**

Group 1. Sentence connectors :

✓   A user touches the screen**; as a result**, a change in the electrical current appears.

                                       ;consequently,

                                       ; therefore,

                                       ; because of this,

                                       ; hence,

Group 2. Conjunctions:

✓   A user touches the screen**, so** a change in the electric current appears.

✓   A change in the electric current appears**, for** a user touches the screen.

Part II-Vocabulary

Peripheral (n)   وسیله جانبی

- (of a device) able to be attached to and used with a computer, although not an integral part of it.

Interpret (v)   تفسیر کردن

- Explain the meaning of (information, words, or actions)

Implement (v)   اجراکردن

- Put (a decision, plan, agreement, etc.) into effect

Serial (adj)   پیاپی

Computing (of a device) involving the transfer of data as a single sequence of bits. For example, **serial port**.

Portion (n)   بخش، تکه

- A part of a whole; an amount, section, or piece of something

Equivalent (adj)   معادل

- Equal in value, amount, function, meaning

Resistive (adj)   مقاوم

- Able to withstand the action or effect of something

Emulate (v)   تقلید کردن

- to copy something achieved by someone else. *Children often copy their parents or older siblings*

Part III– Reading

INPUT AND OUTPUT DEVICES

Section 1: Pre-reading Questions

- What Do you think about the input and output devices in a computer?

- What are the effects of having touch screens in high-tech devices?

- Is a touch screen an input device or output one? Provide your reasons adequately.

Section 2: Reading Passage

 The computer will be of no use unless it is able to communicate with the outside world. In simple terms, input devices bring information INTO the computer and output devices take information OUT of a computer system. These input/output devices are also known as peripherals since they surround the CPU and memory of a computer system.

In computer engineering, the term I/O is used to describe any program, operation or device that transfers data to or from a computer and to or from a peripheral device. Every transfer is an output from one device and an input into another. Devices such as keyboard and mice are input-only devices while devices such as printers are output-only. A writable DVD device is both an input and an output.

احاطه کردن

Some commonly used Input/Output devices are listed in the table below.

Input Devices	Output Devices
Keyboard	Monitor
Mouse	GPS (Global Positioning System)
Joystick	Printer
Scanner	Plotter
Light Pen	Speaker

Note that the designation of a device as either input or output depends on the perspective. Mouse and keyboard take physical movement as input that the human user outputs and convert it into signals that a computer can understand. The output from these devices is input for the computer. Similarly, printers and monitors take input signals that a computer outputs. They then convert these signals into representations that human users can see or read. For a human user, the process of reading or seeing these representations is receiving input. These interactions between computers and humans are studied in a field called a human–computer interaction.

اطلاق، تخصیص   -   نقطه دید   -   نماد

In a computer architecture, the combination of the CPU and main memory is considered the brain of a computer, and from that point of view, any transfer of information from or to that combination, for example to or from a disk drive, is considered I/O. An I/O interface is required whenever the processor drives the I/O device. The interface must have a necessary logic to interpret the device address generated by the processor. Handshaking should be implemented by the interface using appropriate commands (like BUSY, READY, and WAIT), and the processor can communicate with an I/O device through the interface. If different data formats are being exchanged, the interface must be able to convert serial data to parallel form and vice-versa. There must be provision for generating interrupts and the corresponding numbers for further processing by the processor if required.

بالعكس   –   قيد، دليل

1. Addressing I/O devices

The CPU and its supporting circuitry provide either memory-mapped I/O or Port-mapped I/O. Memory mapped I/O is mapped into the same address space of main memory, and is accessed in the same way. Port-mapped I/O uses a separate, dedicated address space and is accessed via a dedicated set of microprocessor instructions. A computer that uses memory-mapped I/O accesses hardware by reading and writing to specific memory locations, using the same assembly language instructions that a computer would normally use to access memory. Port-mapped I/O requires the use of instructions, which are specifically designed to perform I/O operations.

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اختصاصی   -   مدار بندی، مدار

</div>

If you use a microprocessor or microcontroller that does not support port-mapped I/O, then you have to use memory mapped I/O. Microprocessors that support port-mapped I/O include Intel x86 and compatible processors, and also the Zilog Z80 and Intel 8080. Microprocessors that do not support port-mapped I/O (and hence require the use of memory-mapped I/O) include the Motorola 6800 and the MOS Technology 6502.

The advantage of port-mapped I/O is that it makes for neater code and requires fewer external components to implement I/O. However, it adds to the complexity and pins count of the microprocessor itself. A number of I/O devices are introduced in the next section.

سازگار   —   منظم، تمیز

2. Keyboard

A 'keyboard' is a human interface device, which is represented as a layout of buttons. Each button, or key, can be used to either input a linguistic character to a computer, or to call upon a particular function of the computer. Traditional keyboards use spring-based buttons, though newer variations employ virtual keys, or even projected keyboards. Figure 1 shows a traditional computer keyboard. Computer keyboards have different portions, each of which contains keys for a specific task.
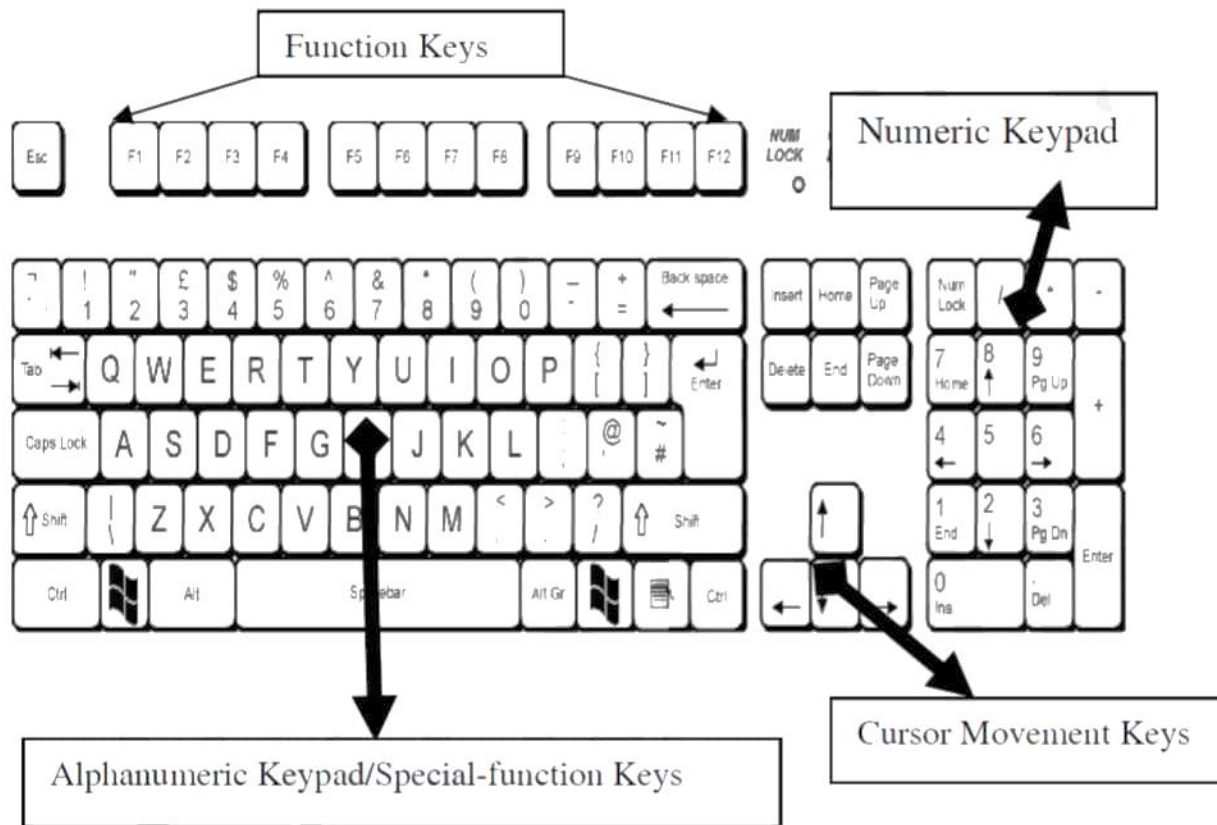
طرح، نمايه   –   فراخواندن – متداول

Figure 1: The Keyboard

2.1 Inside the Keyboard

A keyboard is a lot like a miniature computer. It has its own processor and circuitry that carries information to and from that processor. A large part of this circuitry makes up the key matrix. The key matrix is a grid of circuits underneath the keys. In all keyboards (except for capacitive models), each circuit is broken at a point below each key. When you press a key, it presses a switch, completing the circuit and allowing a tiny amount of current to flow through. The mechanical action of the switch causes some vibration, called bounce, which the processor filters out. If you press a key, the processor recognizes it but it is not the equivalent of pressing a key repeatedly.

بسیار ریز، مینیاتور   -   مشبک - زیر، در زیر

When the processor finds a circuit that is closed, it compares the location of that circuit on the key matrix to the character mapping its read-only memory (ROM). A character map is basically a comparison chart or look up table. It tells the processor the position of each key in the matrix and what each keystroke or combination of keystrokes represents. For example, the character map lets the processor know that pressing the "*a*" key by itself corresponds to a small letter "a", but the *Shift* and *a* key pressed together correspond to a capital "A."
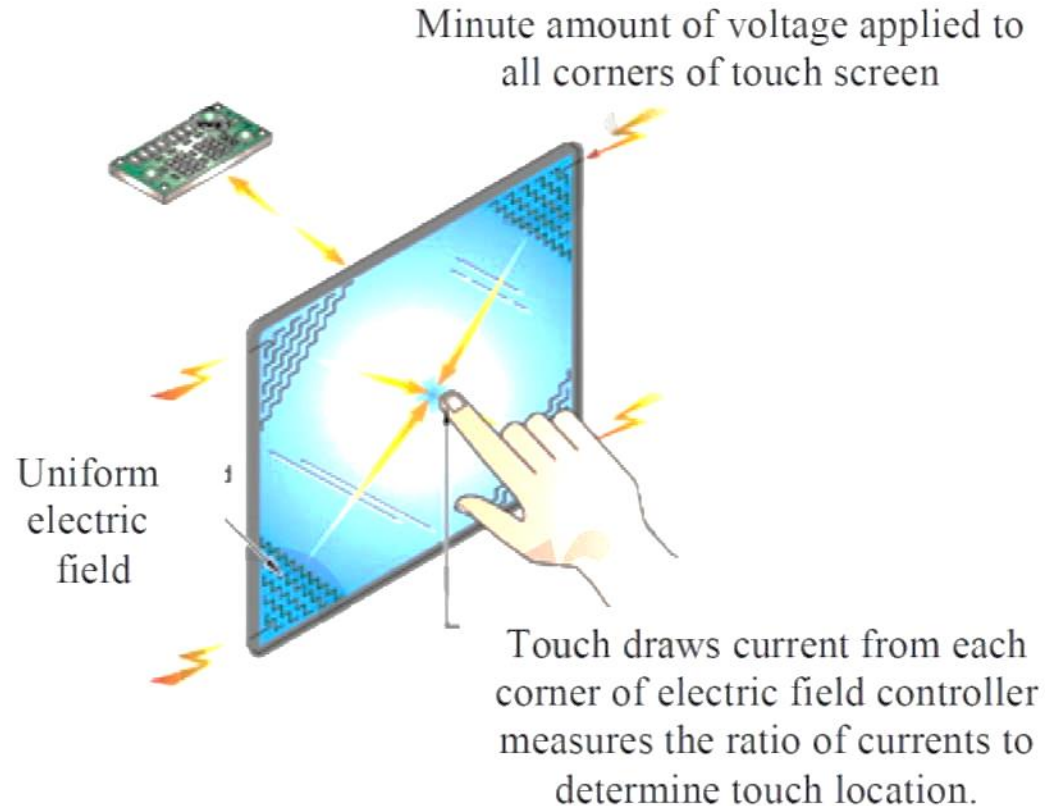
A computer can also use separate character maps, overriding the one found in the keyboard. This can be useful if a person is typing in a language using letters that do not have English equivalents on a keyboard with English letters. People can also set their computers to interpret their keystrokes as though they were typing on a Dvorak keyboard even though their actual keys are arranged in a QWERTY layout.

جایگزین کردن   -   ضربه کلید   —   جستجو(در جدول یا لغت نامه)

3. Touch screen

Touch screens are touching sensitive displays, which can detect location of touches within the touch sensitive display. There are three basic systems that are used to recognize a person's touch:

1. Resistive
2. Capacitive
3. Surface acoustic wave

Minute amount of voltage applied to all corners of touch screen

Uniform electric field

Touch draws current from each corner of electric field controller measures the ratio of currents to determine touch location.

The resistive system consists of a normal glass panel that is covered with a conductive and a resistive metallic layer. These two layers are separated by thin space, and at the top a scratch-resistant layer is placed. An electrical current runs through the two layers while the monitor is operational. When a user touches the screen, it causes a change in the electrical current, which is identified as a touch event and sent to the controller present inside the circuit board for processing. Once the coordinates are known, a special driver translates the touch into something that the operating system can understand, similar to the computer mouse "click".

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ضد خش   -   باریک   -   رسانا

</div>

In the capacitive system, a layer that stores electrical charge is placed on the glass panel of the monitor. The human body also carries electric charge. When a user touches the monitor with his/her finger, some of the charge is transferred to the user, so the charge on the capacitive layer decreases. The circuit measures this fluctuation of current, which is present at each corner of the display. The computer calculates, from the relative differences in charge at each corner, exactly where the touch event takes place and then relays that information to the touch-screen driver software.

On the monitor of a surface acoustic wave system, two transducers (one receiving and one sending) are placed along the X and Y axes of the monitor's glass plate. Ultrasonic waves pass over the screen. When the screen is touched, the object or user absorbs a portion of the wave. This change in the ultrasonic waves registers the position of the touch event and sends this information to the controller for processing.

جذب کردن   –   نوسانات

4. Flash Memory

Flash memory, which is a storage device, is an electronic non-volatile computer storage device that can be electrically erased and reprogrammed. It was developed from electrically erasable programmable read-only memory (EEPROM) technology. There are two main types of flash memory, which are named after the NAND and NOR logic gates. The internal characteristics of the individual flash memory cells exhibit characteristics similar to those of the corresponding gates. Whereas EEPROMs had to be completely erased before being rewritten, NAND type flash memory may be written and read in blocks (or pages), which are generally much smaller than the entire device. The NOR type allows a single machine word (byte) to be written or read independently.

نشان دادن، به نمایش گذاشتن   -   نام گذاری شدن به واسطه   -   غیر فرار

The NAND type is primarily used in main memory, memory cards, USB flash drives, and similar products, for general storage and transfer of data. The NOR type, which allows true random access and therefore direct code execution, is used as a replacement for the older EEPROM and as an alternative to certain kinds of ROM applications, whereas NOR flash memory may emulate ROM primarily at the machine code level. Flash memory has a grid of columns and rows with a cell that has two transistors at each intersection, and a thin oxide layer separates them. One of the transistors is known as a floating gate, and the other one is the control gate. The floating gate's only link to the row, or word line, is through the control gate. As long as this link is in place, the cell has a value of 1. Changing the value to a 0 requires a curious tunneling process.

تقاطع   –   اساسا، در درجه اول   –   دیگر، ثانوی

5. Tunneling

Tunneling is used to alter the placement of electrons in the floating gate. An electrical charge, usually 10 to 13 volts, is applied to the floating gate. The charge comes from the column, or bit line, enters the floating gate and drains to the ground. This charge causes the floating-gate transistor to act like an electron gun. The excited electrons are pushed through and trapped on the other side of the thin oxide layer, giving it a negative charge. These negatively charged electrons act as a barrier between the control gate and the floating gate.

خالی شدن   -   تفنگ الکترونی   -   گیر کردن، به دام افتادن   -   مانع

Part IV- Reading comprehension

Mark each statement as T (True), F (False), or NG (Not Given) to the information in the reading comprehension passage.

1. The peripherals in a computer are called inputs and outputs.

2. Keyboards and mice, like printers, are input devices.

3. CPU is not considered the main part of a computer, as it is the main memory.

4. The port-mapped I/O creates a neater code and needs fewer external parts to do I/O.

5. The comparison between input and output devices was thoroughly discussed.

6. Contact bounce inside the keyboard is a vibration made by a mechanical action.

7. A layer storing electrical charge on the glass panel of the monitor is called resistive system.

8. Two transistors are called a control gate and a tunneling process.