Basic Computer Components and Type of input and output

1- Computer function

The basic function performed by a computer is execution of a program, which consists of a set of instructions stored in memory. The processor does the actual work by executing instructions specified in the program. This section provides an overview of the key elements of program execution. In its simplest form, instruction processing consists of two steps: The processor reads (fetches) instructions from memory one at a time and executes each instruction. Program execution consists of repeating the process of instruction fetch and instruction execution. The instruction execution may involve several operations and depends on the nature of the instruction instruction

Instruction Fetch and Execute

- At the beginning of each instruction cycle, the processor fetches an instruction from memory. In a typical processor, a register called the program counter (PC) holds the address of the instruction to be fetched next. Unless told otherwise, the processor always increments the PC after each instruction fetch so that it will fetch the next instruction in sequence (i.e., the instruction located at the next higher memory address). The fetched instruction is loaded into a register in the processor known as the instruction register (IR). The instruction contains bits that specify the action the processor is to take. The processor interprets the instruction and performs the required Action

- *The program fragment shown adds the contents of the memory word at address 940 to the contents of the memory word at address 941 and stores the result in the latter location*. Three instructions, which can be described as three fetch and three execute cycles, are required:

1. The PC contains 300, the address of the first instruction. This instruction (the value 1940 in hexadecimal) is loaded into the instruction register IR and the PC is incremented. Note that this process involves the use of a memory address register (MAR) and a memory buffer register (MBR). For simplicity, these intermediate registers are ignored.

The first 4 bits (first hexadecimal digit) in the IR indicate that the AC is to be loaded. The remaining 12 bits (three hexadecimal digits) specify the address (940) from which data are to be loaded.

- The next instruction (5941) is fetched from location 301 and the PC is incremented.
- The old contents of the AC and the contents of location 941 are added and the result is stored in the AC.

- The next instruction (2941) is fetched from location 302 and the PC is incremented.

- The contents of the AC are stored in location 941

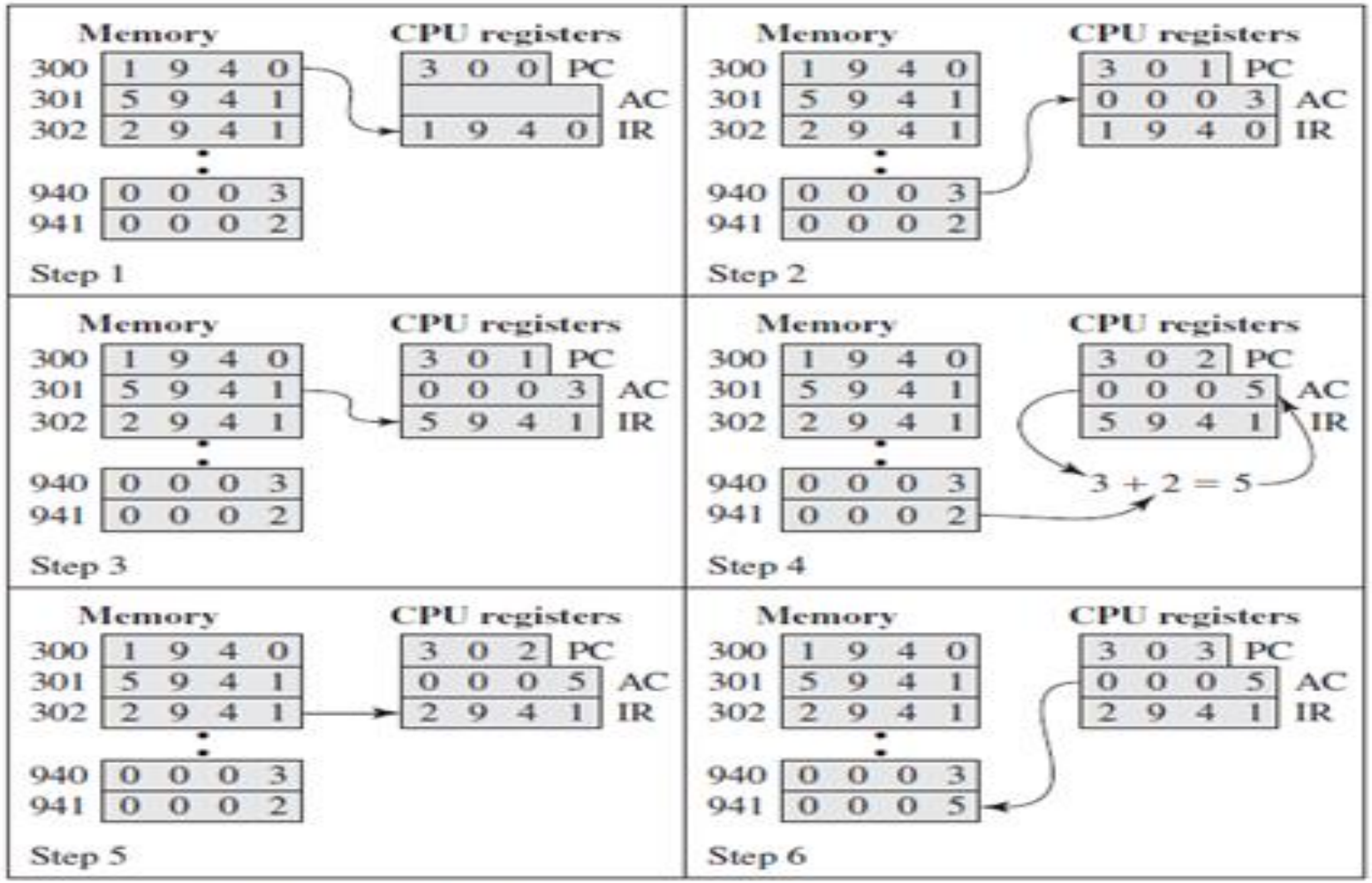

Figure 3.5 Example of Program Execution (contents of memory and registers in hexadecimal)

Computer Components

- Computers are made up of two parts: the hardware and the software
- ***Hardware:*** The physical equipment required to create, use, manipulate and store electronic data.
- ***Software***: The computerized instructions that operate a computer manipulate the data and execute particular functions or tasks

Hardware

- **1-1-1 Input/Output Devices**
- Computer uses to manipulate the data as it receives this data by special units called input units and as a result of the process show that can be sent to special units called output units
- **Input units** allocated to implement the following functions:

1. Receive data entered.
2. Convert the input data into a format understandable to the computer.
3. Data storage temporarily (some units of input).

- One of the main input devices used to the ***keyboard, mouse, Joystick, Scanner, Bar codes, Light Pen, Touch Screen, Digital camera, The Speech Input Device.***

Input Devices

- **Mouse Actions**
- Left Click : Used to select an item.
- Double Click : Used to start a program or open a file.
- Right Click : Usually used to display a set of commands.
- Drag and Drop : It allows you to select and move an item from one location to another.

- **(d)Scanner**
- Scanner is an input device used for direct data entry from the source document into the computer system. It converts the document image into digital form so that it can be fed into the computer

Output Devices

- **(a) Monitor**
- Monitor is an output device that resembles the television screen and uses a Cathode Ray Tube (CRT) to display information. Cathode ray tube (CRT) is an older monitor technology that uses a large vacuum tube and electron guns to create a display image on a phosphor-covered glass. See Figure 3.17. The electrons strike phosphors on the monitor glass and briefly light up. The display is refreshed many times per second to maintain the image. The phosphors are arranged in triads: red, green, and blue, as shown in Figure 3.18. Depending on what color a particular pixel should be, different phosphors illuminate within that triad

(c) Printer •

:When selecting a printer, there are a number of factors to consider •

- ▪ Initial cost: How much does the printer cost?
- ▪ Per-page cost: How much does it cost to print a page, taking into account the price of the **consumables**? How much do the ink, toner, or ribbon cost, and how many pages will it print before you have to replace it? Are there other parts in the printer that wear out and have to be replaced after a certain number of pages?
- ▪ Resolution: How many individual dots per inch (dpi) does the printed image consist of? A higher resolution results in a sharper image. A low-resolution printer might output at 300 dpi, while a high-resolution printer might output at 1200 dpi.