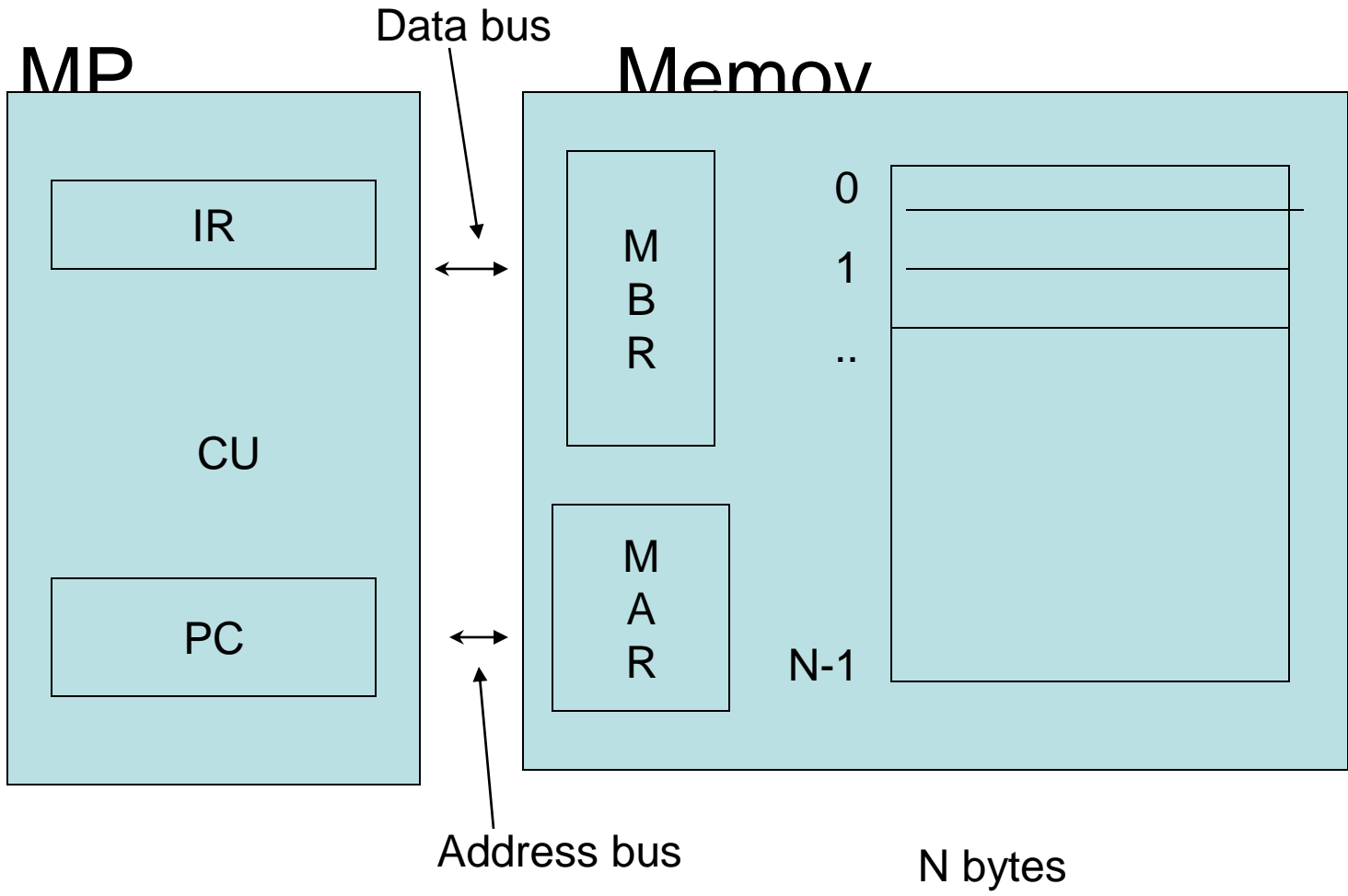


A typical microprocessor architecture

- A typical microprocessor is the processor of 8-bit that is used for many general propose application.
- The internal structure of processor is as follows

- **MP**



- Although the understanding of internal operations of a typical microprocessor not required for programming operations, but help us to explain how instructions work.
- A typical microprocessor contains:
 - - register array
 - - timing and control section
 - - ALU
 - -instruction register
 - - decoder
 - - bus connections to outside world.

- Note that:
- 16 address bus connection $A0 \rightarrow A15$
- Shard address data bus containing the least significant 8 bits of the memory address $A0 \rightarrow A7$
- Data bus $D0 \rightarrow D7$

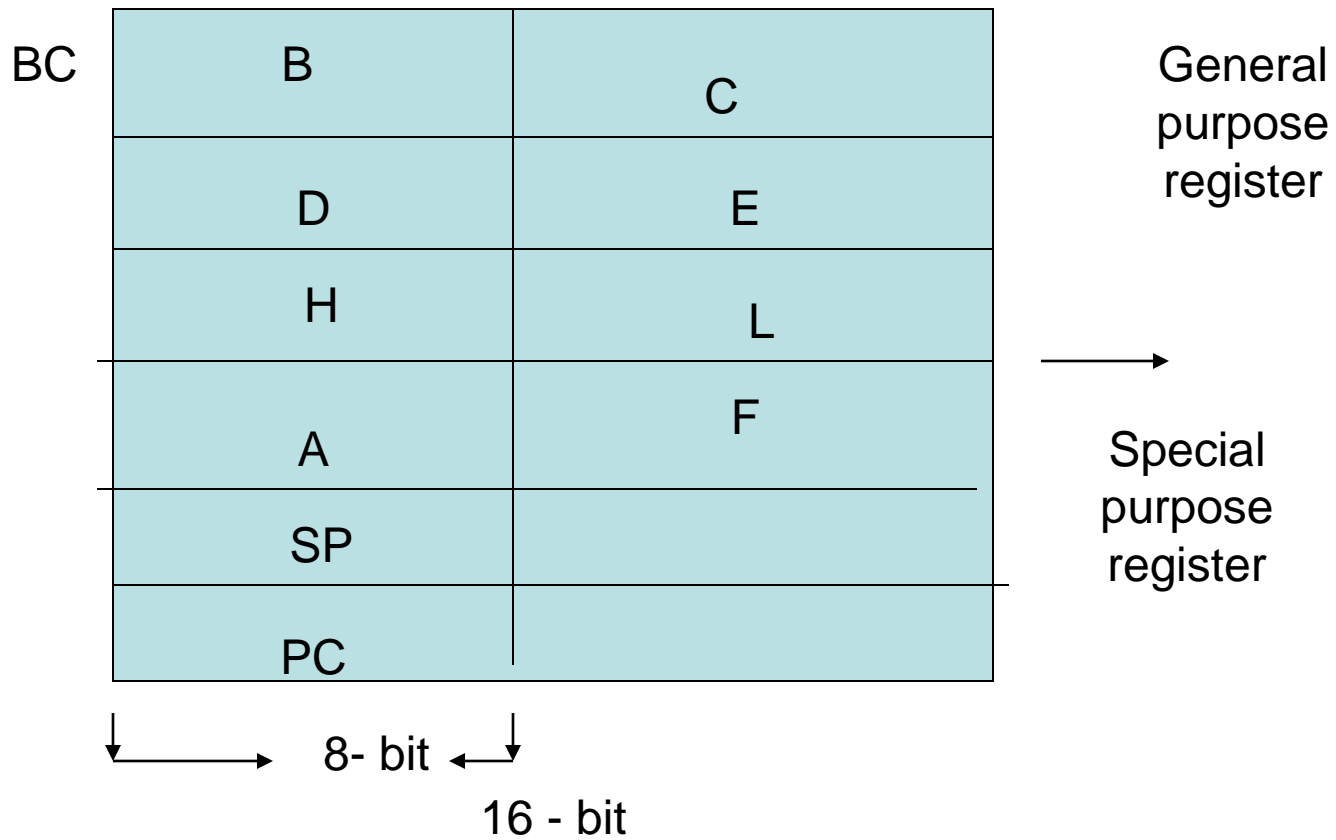
- Registers
- A typical microprocessor contains many number of internal registers which used to temporary storing for data, memory address, instructions, and information about the status of processor.
- IR: used to store currentlyt executed instruction
- Temporary register:
- Used to store information from memory , register array of ALU, and the other inputs for ALU comesa from Accumulator.

- Incrementer / decrementer address:
- Latch: used to store the address of data which we deal with it in memory or input/output devices.
- Miscellaneous section
- Interrupt control unit: used to determine the priority of control inputs in interrupt and provide the interrupt instruction to IR.

- The serial I/O control section: used to control 2 data bus for I/O.
- SID: (serial input data) read external data
- SOD: (serial output data) write external data.
- The timing and control section: provide us with signals of control bus RD, WR, IO/M.

The programming model

- Before ,we explain the instruction, and writing a program, we understand the internal structure for register.
- The set of registers divided into two parts : general purpose registers and special purpose registers.



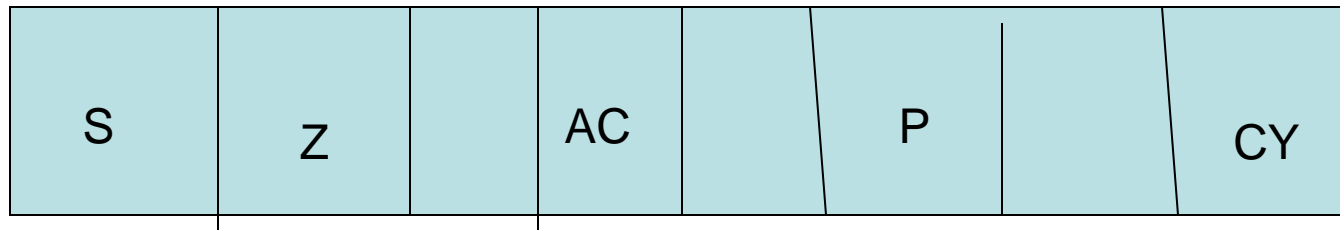
General purpose registers

- A typical microprocessor has 6 general purpose register B, C, D, E, H, L used to store numeric data, BCD data, and ASCII data. We can use BC, DE, and HL as single register with 16-bit.

Special purpose registers

- A, F, SP, PC used for accumulating results from ALU and house keeping.
- The Accumulator register (A): used to accumulate the answer after almost every arithmetic and all logic operations. Called the answer register because the answer is normally found here.
- The flage register (F): 5 bits register that are used as flags or indicators for the ALU.

- F7 F6 F5 F4 F3 F2 F1 F0



- S: Sign flag bit
 - 1 negative result
 - 0 positive result

Z: Zero flag

- 1 zero result
- 0 non zero result

Ac: Auxiliary carry flag

used to store the carry value of ALU that occur when using the instruction DAA.

P: parity flag bit

- 1 even parity
- 0 odd parity (parity is a count of the number of 1's)

CY: The carry flag

used to store the carry value that occur during addition, and borrow value during subtraction or logic zero after all logic operation.

PC: the program counter

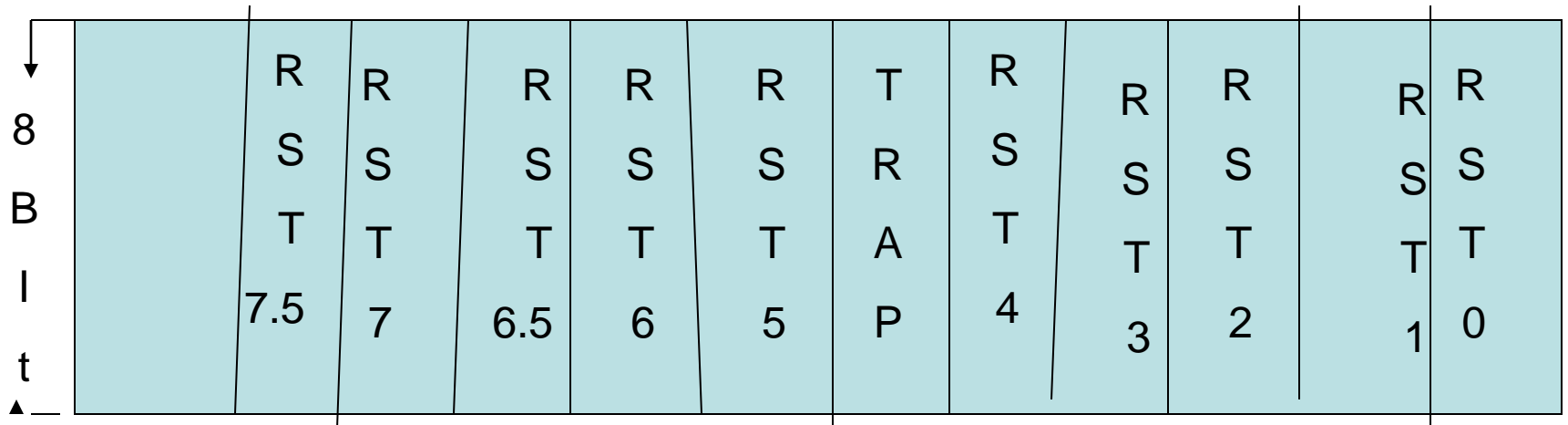
used to determine the next instruction to be executed.

SP: the stack pointer

allows the microprocessor to track its LIFO stack.

A typical microprocessor memory map

- A typical microprocessor memory map addressed using hexadecimal system form 0000 to FFFF, this means that the capacity of memory is 64 K byte. Each location in memory can store one byte of information which can be instruction / data or any information. In addition to the memory location their exist another location called RST in a certain memory location.
- RST is instruction Restart
- Trap is special type of restart



User
RAM

0	0	0	0
0	0	0	0
18	10	0	0
		8	0

- The memory divided into two parts first part assigned for system programs, and second part used for storing data and programs.
- The reset locatin 0000 at this address the processor begin the eecution of the program.

The typical microprocessor I/O map

- The typical microprocessor can connect with 256 I/O devices . (256 for input , 256 for output) I/O devices called I/O ports

