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Ans to the Qu: No: 1

1 (a)

A senson stones the measured quantity to the memory. A-D converten: An analog-to-digital converten converts the analog signal sent by the senson into a digital signal. processon & ASICS: processons assess the data to measure the output and stone it to the memory.

As well as general purpose computen's, there are othen types of computen system. The most common of these are known as embedded systems. An embedded system is a small computen that forms part of a langen system, device on machine. Its purpose is to control the device and to allow a usen to interact with it. They tend to have one, on a limited number of tasks thad they can perform.

Examples of embedded systems include :-

- central heating systems
- Engine management systems in vehicles.
- Domestic appliances, such as dishwashers, TVs and digital phones.
- Digital watches
- Electronic calculations
- GPS systems
- Fitness trackers

(1) (b)

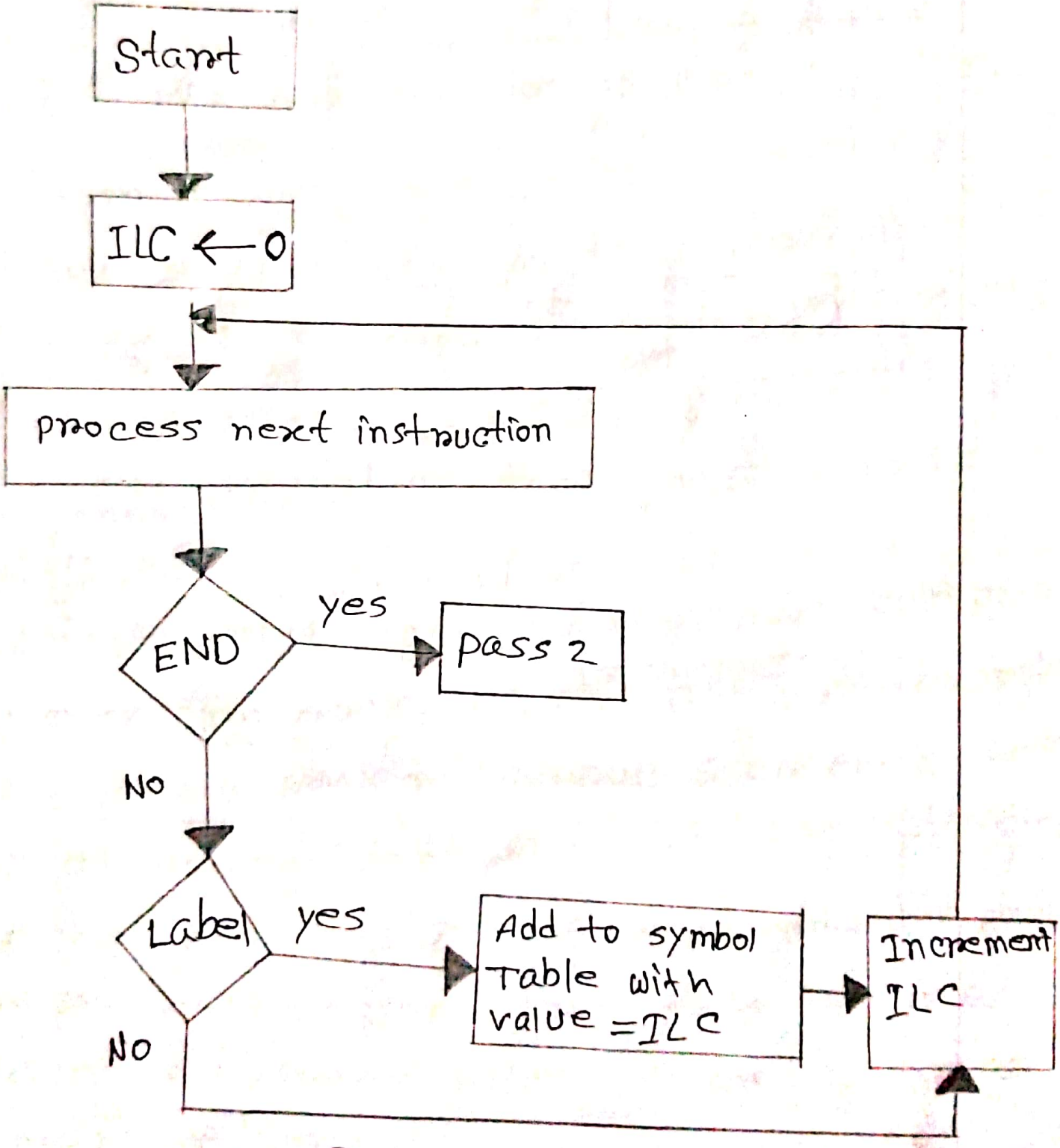


Figure : simplified pass one in a two-pass assembler

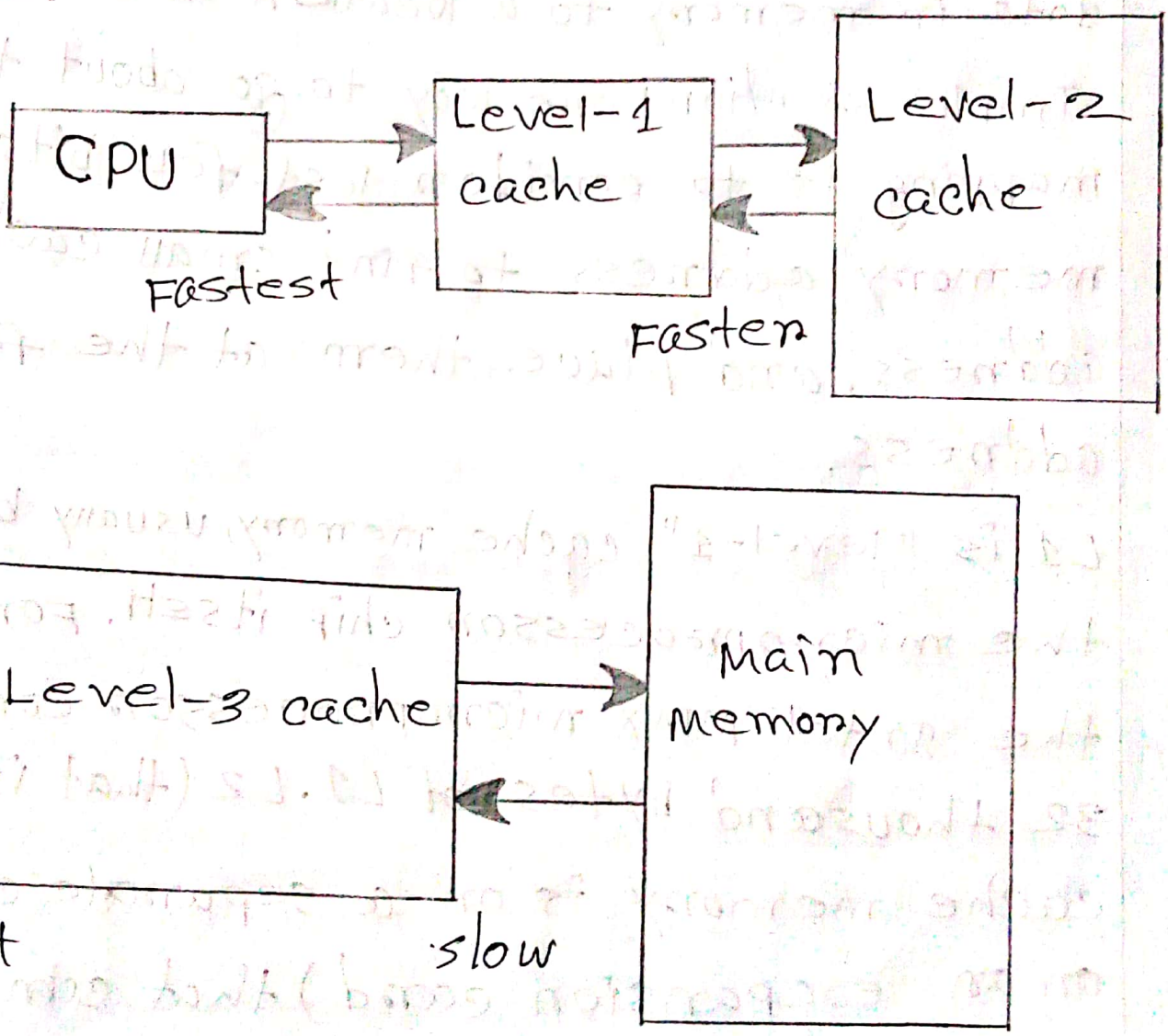
(1) (c)

Three-level cache organization :-

The cache organization is about mapping data in memory to a location in cache. A simple solution: one way to go about this mapping is to consider last few bits of long memory address to find small cache address, and place them at the found address.

L1 is "level-1" cache memory, usually built onto the microprocessor chip itself. For example the Intel MMX microprocessor comes with 32 thousand bytes of L1. L2 (that is, level-2 cache memory is on a separate chip (possibly on an expansion card) that can be accessed more quickly than the larger "main" memory.

The latency of L3 cache is even worse than L2, but having a large L3 cache is really important to prevent the CPU from needing to ask the RAM for needed data.



Three Level cache organization

Ans to the QU:NO:2

(2) (a)

Memory Access Registers :-

Two registers are essential in memory write and read operations. The memory data register (MDR) and memory address register (MAR). The MDR and MAR are used exclusively by the CPU are not directly accessible to programmers. In order to perform a write operation into a specified memory location, the MDR and MAR are used as follows:

1. The word to be stored into the memory location is first loaded by the CPU into MDR.

② The address of the location into which the word is to be stored is loaded by the CPU into a MAR.

③ A write signal is issued by the CPU.

Similarly, to perform a memory read operation, the MDR and MAR are used as follows:

① The address of the location from which the word is to be read is loaded into the MAR.

② A read signal is issued by the CPU.

③ The required word will be loaded by the memory into the MDR ready for use by the CPU.

(2) (b)

A read cache is a computer storage component that temporarily keeps a copy of data from a slower permanent storage location in order to accelerate the fulfillment of future requests for the data. A read cache typically retains copies of the data in fast I/O memory storage such as dynamic random access memory (DRAM) or flash. The main distinguising characteristic of a read cache is the mechanism by which the data populates the cache. Data enters the cache after it has been retrieved, or read, at least once from its permanent storage hard disk drive (HDD) or solid-state drive (SSD). An algorithm tracks the data reads and determines which data will be deposited in the read cache.

Below Draw cache operation :-