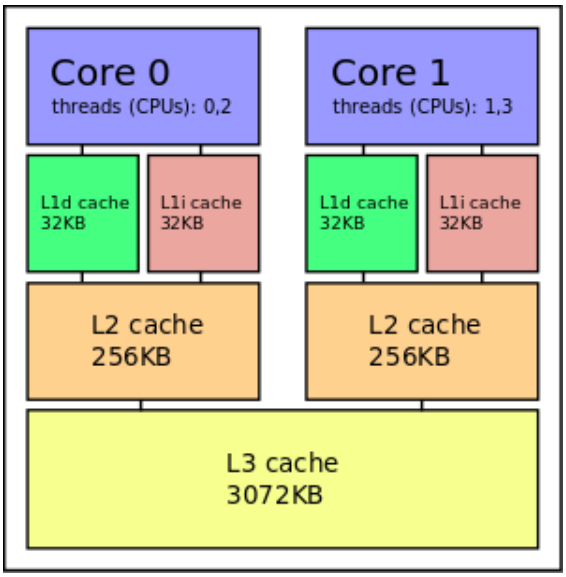

Figure 4 .2: Processor Cache: A Conceptual Diagram

1.2.2 Generations of Processors

The first Pentium V processor from Intel (product code:80501, Code Name:P5) was officially released in 1993. Its clock speed was *60 MHz!*. And today, your smart phone's processor speed is more than 1 GHz. The modern processor is the result of decades of research and innovation. This section summarizes the history of processors in brief.

- **1st Generation:** The first generation spans from 1971 to 1973. In 1971, Intel created the first microprocessor 4004 running at a clock speed of 108 KHz. Other contemporary microprocessors in the market included Rockwell international PPS-4, INTEL-8008 and National semiconductors IMP-16 were in use.
- **2nd Generation:** During the period from 1973 to 1978, very efficient 8-bit microprocessors like Motorola 6800 and 6801, INTEL-8085 and Zilogs-Z80 were implemented and were among the most popular ones. They were costly yet very fast as they were based on NMOS technology fabrication.
- **3rd Generation:** From 1979 to 1980, 16-bit processors were created and designed using HMOS technology. Examples of this period are: INTEL 8086/80186/80286 and Motorola 68000 and 68010. These processors were four times faster in speed than their counterparts from 2nd generation.
- **4th Generation:** From 1981 to 1995 this generation developed 32-bit

processors using HCMOS fabrication. Among those processors INTEL-80386 and Motorolas 68020/68030 were the popular ones.

- **5th Generation:** From 1995 to until now this generation has been bringing out high-performance and high-speed processors that make use of 64-bit processors. Such processors include Pentium, Celeron, Dual and Quad core processors.
- **6th Generation:** Very recently (September 2015), Intel Corporation introduced the 6th Generation Intel Core processor family. 6th Gen Intel Core processors have:
  - Thinner design.
  - 2.5 times better performance.
  - 3 times longer battery life.

Figure 4 .3: Intel Core i7: a 6th generation processor

1.2.3 Installing a Processor

Followings are the steps for installing a processor in your computer:

Step 1: Check motherboard compatibility.

Though every motherboard created in today's world has a computer processor socket, not all processors fit in all motherboards. Thus, before purchasing either the motherboard or the processor or both, one should be sure that her computer processor is compatible with the processor socket on the motherboard.

Step 2: Prepare the motherboard.

In the scenario where you're simply upgrading an old computer processor on an old motherboard, the best procedure is to disassemble the computer and remove the motherboard from the computer case. The computer should be worked on in a non-carpeted area. A carpetted area increases the chance of static electricity surge and it can damage your computer processor, your motherboard and other components. Additionally, you should also get rid of static electric charge from your body by touching an unpainted metal surface like a water pipe.

Step 3: Locate the CPU Chip.

The chip will be mounted onto the motherboard in a socket and depending on the type of computer you have, the socket may be shaped in various forms.

Some CPU chips are soldered onto the motherboard and can only be upgraded by removing and installing a new motherboard. This type of chip is referred to as the Proprietary CPU Chip.

Notes

Figure 4 .4: Install a processor: Step 3

Step 4: Check the Computer Manual before Upgrade.

Before you consider upgrading to a more powerful processor, check your computer's manual for instructions. Your processor is most likely a propriety Central Processing Unit, If the manual tells you to consult with the manufacturer. What this means is that the processor can only be as specified by the manufacturer manual.

Step 5: Remove Additional Components.

Components like the hard drive or an expansion slot should be removed beforehand to gain full access to the chip if necessary. Additionally, by only removing a couple of screws and sliding the panel with the motherboard down, newer and fancier tower units allow easy access to the chip.

Figure 4 .5: Install a processor: Step 5

Step 6: Pull the Socket Up.

Once you bring the CPU into plain view, grasp the lever on the Zero Insertion Force sockets and carefully but firmly pull the lever straight up. You can find this lever on the side of the chip. Be on look for a clamp because some other chips may contain one and that must be removed as well before you want to remove the CPU. Consult your owner's manual to see the components of your CPU.

Figure 4 .6: Install a processor: Step 6

Some chips are covered by a Heat Sink and/or a Cooling Fan. Make sure to remove these components set aside.

Step 7: Insert the Chip.

Place the beveled end of the chip to match the beveled end of the socket when inserting the new chip. This design was incorporated to enable the chip to be installed in only one direction.

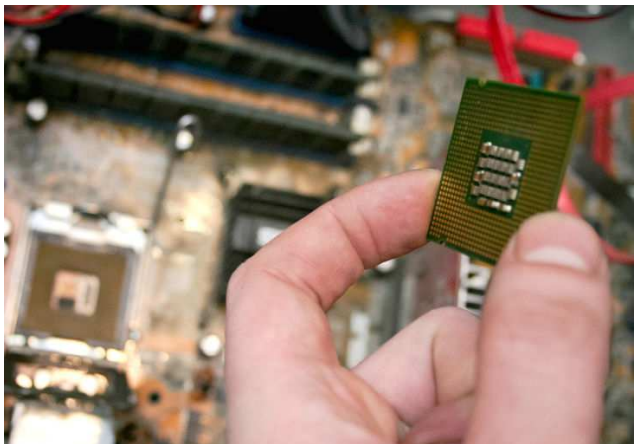

Figure 4 .7: Install a processor: Step 7

1.3 Exercise

1.3.1 Multiple Choice Question

1. Which are the two major processor manufacturers?

    a) Intel and AMD
    b) Intel and HP
    c) AMD and NVIDEA
    d) AMD and Microsoft

2. Which statement is not true about L1 cache?

    a) It is faster than secondary storage.
    b) It is relatively expensive.
    c) It is not as bigger as RAM of a typical computer.
    d) It can easily be modified.

3. Which cache memory lets processor cores to share information among themselves?