EXPERIMENT NO: 5

Title: Case study on multicore processors/buses.

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Case study on multicore processors/buses

AIM	To study various multicore processors of specific families./ study various expansion bus slots of computers. To
LEARNING OBJECTIVE	To analyze the various core processors and various expansion buses slots.
LEARNING OUTCOME	Students will be able to differentiate multicore processors/buses.
LAB OUTCOME	CSL 403.4: Ability to explain and compare various components and buses on system or compare multicore processors.
PROGRAM OUTCOME	PO11, PO21, PO41, PO83, PO9-3
BLOOM'S TAXONOMY LEVEL	Analyze

THEORY	AMD: **Actual generation:** 3. **Actual architecture:** Zen 2 **Target market:** Consumer **Technology:** 7 nm **Socket:** AM4, FP5, FP6, TR4 (SP3r2), TRX4 (sTRX4) Types: of amd processors AMD Sempron The AMD Sempron processor is designed to meet the needs of home and business PC users. AMD Sempron processors are 32-bit and offer capabilities that include HyperTransport technology, up to 512K total high-performance cache, advanced 333Mhz frontside bus and an integrated DDR memory controller. AMD Athlon 64 X2 Dual-Core The AMD Athlon 64 X2 Dual-Core processor contains two processing cores, residing on one chip, which increases efficiency and speed while running multiple programs and multi-threaded software. It enables a seamless transition from 32-bit to 64-bit applications. Both 32- and 64-bit applications can run virtually simultaneously and transparently on the same platform. AMD Athlon 64 AMD64 provides full support for x86 code base for 32-bit computing and is ready for 64-bit applications. AMD64 technology doubles the number of processor registers and increases the system memory addressability. AMD Opteron

	The AMD Opteron processor offers simultaneous 32- and 64-bit computing, using AMD's Direct Connect Architecture. It's designed to run existing 32-bit applications and offer simplified migration path to 64-bit computing. The AMD Opteron processor is available in 1 to 8-way servers and 1 to 4-way workstation solutions. Ryzen Lineup: **Processor Gen. Frequency Turbo** (1 Core) **Turbo**(All Cores) **Cores HT** AMD Ryzen 3 4300U 3. 2.70 GHz 3.70 GHz3.70 GHz 4 No AMD Ryzen 5 3500X 3. 3.60 GHz 4.10 GHz4.00 GHz 6 No AMD Ryzen 5 3600 3. 3.60 GHz 4.20 GHz4.00 GHz 6 Yes AMD Ryzen 5 3600X 3. 3.80 GHz 4.40 GHz4.20 GHz 6 Yes AMD Ryzen 5 4500U 3. 2.30 GHz 4.00 GHz3.80 GHz 6 No AMD Ryzen 5 4600H 3. 3.00 GHz 4.00 GHz4.00 GHz 6 Yes AMD Ryzen 5 4600U 3. 2.10 GHz 4.00 GHz3.60 GHz 6 Yes AMD Ryzen 7 3700X 3. 3.60 GHz 4.40 GHz4.00 GHz 8 Yes AMD Ryzen 7 3800X 3. 3.90 GHz 4.50 GHz4.20 GHz 8 Yes AMD Ryzen 7 4700U 3. 2.00 GHz 4.10 GHz3.40 GHz 8 No AMD Ryzen 7 4800H 3. 2.90 GHz 4.20 GHz3.80 GHz 8 Yes AMD Ryzen 7 4800HS 3. 2.90 GHz 4.20 GHz3.80 GHz 8 Yes AMD Ryzen 7 4800U 3. 1.80 GHz 4.20 GHz3.20 GHz 8 Yes AMD Ryzen 9 3900 3. 3.10 GHz 4.30 GHz 12 Yes AMD Ryzen 9 3900X 3. 3.80 GHz 4.60 GHz4.20 GHz 12 Yes AMD Ryzen 9 3950X 3. 3.50 GHz 4.70 GHz4.00 GHz 16 Yes AMD Ryzen 9 PRO 3900 3. 3.10 GHz 4.30 GHz 12 Yes AMD Ryzen Threadripper 3960X 3. 3.80 GHz 4.50 GHz4.00 GHz 24 Yes AMD Ryzen Threadripper 3970X 3. 3.70 GHz 4.50 GHz3.80 GHz 32 Yes AMD Ryzen Threadripper 3990X 3. 2.90 GHz 4.30 GHz3.20 GHz 64 Yes AMD Athlon 3000G 2. 3.50 GHz 3.50 GHz3.50 GHz 2 Yes AMD Ryzen 3 2200U 2. 2.50 GHz 3.40 GHz2.50 GHz 2 Yes AMD Ryzen 3 3200G 2. 3.60 GHz 4.00 GHz3.80 GHz 4 No AMD Ryzen 3 3200U 2. 2.60 GHz 3.50 GHz2.60 GHz 2 Yes AMD Ryzen 3 3300U 2. 2.10 GHz 3.50 GHz2.10 GHz 4 No AMD Ryzen 3 PRO 2200U 2. 2.50 GHz 3.40 GHz2.50 GHz 2 Yes AMD

	Ryzen 3 PRO 3300U 2. 2.10 GHz 3.50 GHz2.10 GHz 4 No AMD Ryzen 5 1600 AF 2. 3.20 GHz 3.60 GHz3.40 GHz 6 Yes AMD Ryzen 5 2600 2. 3.40 GHz 3.90 GHz3.70 GHz 6 Yes AMD Ryzen 5 2600H 2. 3.20 GHz 3.60 GHz 4 Yes AMD Ryzen 5 2600X 2. 3.60 GHz 4.20 GHz4.00 GHz 6 Yes AMD Ryzen 5 3400G 2. 3.60 GHz 3.90 GHz3.70 GHz 4 Yes AMD Ryzen 5 3500U 2. 2.10 GHz 3.70 GHz3.00 GHz 4 Yes AMD Ryzen 5 3550H 2. 2.10 GHz 3.70 GHz3.00 GHz 4 Yes AMD Ryzen 5 3580U 2. 2.10 GHz 3.70 GHz3.00 GHz 4 Yes AMD Ryzen 5 PRO 3500U 2. 2.10 GHz 3.70 GHz3.00 GHz 4 Yes AMD Ryzen 7 2700 2. 3.20 GHz 4.10 GHz3.60 GHz 8 Yes AMD Ryzen 7 2700E 2. 2.80 GHz 4.00 GHz3.20 GHz 8 Yes AMD Ryzen 7 2700X 2. 3.70 GHz 4.30 GHz3.85 GHz 8 Yes AMD Ryzen 7 3700U 2. 2.30 GHz 4.00 GHz3.50 GHz 4 Yes AMD Ryzen 7 3750H 2. 2.30 GHz 4.00 GHz3.50 GHz 4 Yes AMD Ryzen 7 3780U 2. 2.30 GHz 4.00 GHz3.50 GHz 4 Yes AMD Ryzen 7 PRO 3700U 2. 2.30 GHz 4.00 GHz3.50 GHz 4 Yes AMD Ryzen Threadripper 2920X 2. 3.50 GHz 4.30 GHz3.60 GHz 12 Yes AMD Ryzen Threadripper 2950X 2. 3.50 GHz 4.40 GHz3.50 GHz 16 Yes AMD Ryzen Threadripper 2970WX 2. 3.00 GHz 4.20 GHz3.00 GHz 24 Yes AMD Ryzen Threadripper 2990WX 2. 3.00 GHz 4.20 GHz3.00 GHz 32 Yes AMD Athlon 200GE 1. 3.20 GHz 3.20 GHz3.20 GHz 2 Yes AMD Athlon 220GE 1. 3.40 GHz 3.40 GHz3.40 GHz 2 Yes AMD Athlon 240GE 1. 3.50 GHz 3.50 GHz3.50 GHz 2 Yes AMD Athlon 300U 1. 2.40 GHz 3.30 GHz2.40 GHz 2 Yes AMD Athlon PRO 300GE 1. 3.40 GHz 3.40 GHz3.40 GHz 2 Yes AMD Ryzen 3 1200 1. 3.10 GHz 3.45 GHz3.10 GHz 4 No AMD Ryzen 3 1300X 1. 3.40 GHz 3.90 GHz3.60 GHz 4 No AMD Ryzen 3 2200G 1. 3.50 GHz 3.70 GHz3.65 GHz 4 No AMD Ryzen 3 2300U 1. 2.00 GHz 3.40 GHz2.00 GHz 4 No AMD Ryzen 3 Pro 1200 1. 3.10 GHz 3.40 GHz3.30 GHz 4 No AMD Ryzen 3 Pro 1300 1. 3.50 GHz 3.70 GHz3.60 GHz 4 No AMD Ryzen 3 PRO 2300U 1. 2.00 GHz 3.40 GHz2.00 GHz 4 No AMD Ryzen 5 1400 1. 3.20 GHz 3.40 GHz3.40 GHz 4 Yes AMD Ryzen 5 1500X 1. 3.50 GHz 3.70

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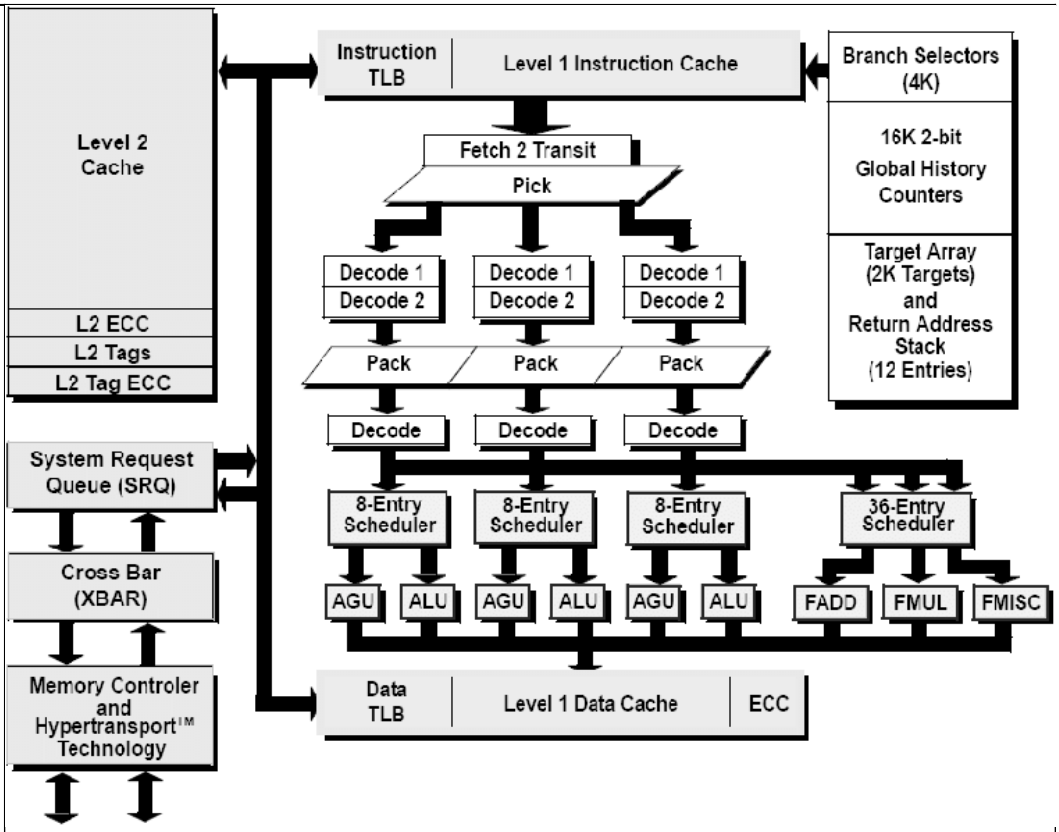
	These CPUs are still dual-core but add Hyperthreading, which presents two logical processor cores to the operating system for every physical core. This can definitely help performance in multithreaded workloads, though it's nowhere near the boost you'd get from moving to a quad-core CPU. Core i3-6100 CPUs include 3MB of cache while 6300-series chips include 4MB of cache; nearly all of them use the Intel HD 530 GPU. Exceptions: The Core i3-6098P uses an Intel HD 510 GPU. Core i5 These are all quad-core CPUs without Hyperthreading, and they probably represent the best balance of price and performance for high-end users. They also use Intel's Turbo Boost feature, which let the CPU run at higher clock speeds when there's enough thermal headroom or when fewer cores are being actively used. Not all workloads will benefit from two extra processor cores, but video editing, Photoshop work, and an increasingly large number of games are all happier with four cores. All of these CPUs include 6MB of cache and most of them have Intel HD 530 GPUs. Exceptions: The Core i5-6402P includes an Intel HD 510 GPU. Core i7 These are best described as Core i5 chips with Hyperthreading, higher clock speeds, and and 8MB of cache. Otherwise they're the same. As with Core i3 CPUs, Hyperthreading definitely does help performance in heavily threaded programs, but jumping from a Pentium or Core i3 to a Core i5 will get you a much larger performance bump than jumping from an i5 to an i7. Desktop Processor suffixes The Celeron, Pentium, and various Core labels tell you *most* of what you need to know about a given CPU, but the model number suffix is important too. Here's what these suffixes mean (and note that some CPUs have more than one letter attached). No suffix: These are "mainstream" CPUs with no particularly special properties.

	T-series: These are low-power desktop chips with lower TDP values, which generally (but not always) translates into lower power consumption. These power savings are usually realized by reducing the CPUs' maximum clock speed. For example, a Core i7-6700 has a TDP of 65W, a base frequency of 3.4GHz, and a Turbo frequency of 4.0GHz. A Core i7-6700T has a TDP of 35W, a base frequency of 2.8GHz, and a max clock speed of 3.6GHz. K-series: This relatively rare suffix denotes a multiplier-unlocked CPU that can be overclocked when paired with a high-end Intel Z170 chipset. The chips also have a higher 91W TDP, relative to the standard 65W for a quad-core CPU. E-series: E is for "embedded," which implies that these are mostly going to come with pre-built systems or soldered to motherboards. System builders can mostly ignore this one. P-series: Back in the Core 2 days, a P-series chipset didn't include an integrated GPU. Now, P-series chips just include *slower* integrated GPUs.

	Intel processors: • • Features of Intel Processors: • Intel’s Core i7 processors are based on the Penryn manufacturing process the company introduced last year, but otherwise there are few similarities with the Core 2 Duo, Core 2 Quad, and Core 2 Extreme lines. A Core i7 processor fit in familiar LGA775 motherboard chip sockets the Intel norm for years now. Core i7 processors employ a new technology the Intel Quick Path Interconnect (QPI), for increased bandwidth and reduced latency. Hyper- Threading has also been reintroduced the line, so each core process two threads simultaneously making eight-core processing a reality. And in case that not enough multiprocessing for the technology can support as eight physical cores meaning that 16- core processing. The road to the Core i7 actually started with the demise of Intel’s Netburst architecture. Intel's old strategy for producing microprocessors was to simply increase the core clock speeds, instruction sets and cache sizes a few ticks every year. Every time this happened the power draw and heat levels would increase as well, until eventually Intel hit a brick wall with the Pentium 4. They are 64 bit processors in computer architecture, 64-bit integers, memory addresses or other data units are those that are at most 64 bits wide. Also 64-bit CPU and ALU architectures are those that are based on registers, address buses or data buses of that size. The need for core i7 processors requires a comparison with their immediate predecessors. The comparison can be summarized as follows. The Core i7 is a completely new architecture which is much faster and more efficient than the Core 2 Duo. Currently only the Core i7 920, 945 and 965 XE versions are available. Of that the Core i7 920 is available at just offers better performance than almost all Core 2 Duo processors. Achitecture diagram: AMD: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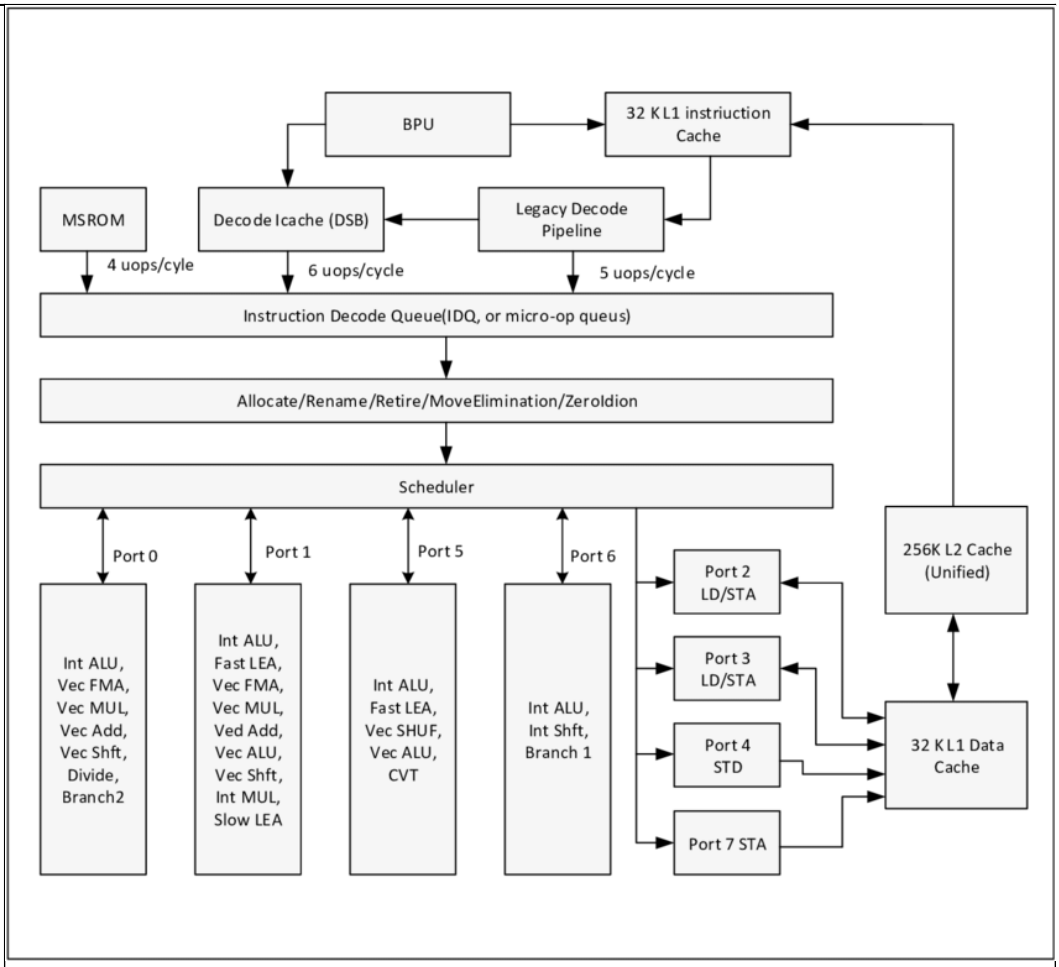

CONCLUSION	We have successfully understood the types of processors , their architecture their generations and how all of these are realted to their performance.
REFERENCES	https://www.cpu-monkey.com/en/cpu_family-amd_ryzen-32 https://pcpartpicker.com/products/motherboard/?compatible_with=jLF48d https://en.wikipedia.org/wiki/List_of_AMD_Ryzen_microprocessors