The Evaluation Of The Microprocessor. Essay, Research Paper

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The microprocessor has changed a lot over the years, says (Michael W.

Davidson,http://micro.magnet.fsu.edu/chipshot.html) Microprocessor technology

is progressing so rapidly that even experts in the field are having trouble

keeping up with current advances. As more competition develops in this $150

billion a year business, power and speed of the microprocessor is expanding at

an almost explosive rate. The changes have been most evident over the last

decade. The microprocessor has changed the way computers work by making them

faster. The microprocessor is often called the brain of the C.P.U.(or the

central processing unit)and without the microprocessor the computer is more or

less useless. Motorola and Intel have invented most of the microprocessors over

the last decade. Over the years their has been a constant battle over cutting

edge technology. In the 80’s Motorola won the battle, but now in the 90’s it

looks as Intel has won the war.

The microprocessor 68000 is the original microprocessor(Encarta 95). It was

invented by Motorola in the early 80’s. The 68000 also had two very distinct

qualities like 24-bit physical addressing and a 16-bit data bus. The original

Apple Macintosh ,released in 1984, had the 8-MHz found at the core of it. It

was also found in the Macintosh Plus, the original Macintosh SE, the Apple

Laser-Writer IISC, and the Hewlett-Packard’s LaserJet printer family. The

68000 was very efficient for its time for example it could address 16 megabytes

of memory, that is 16 more times the memory than the Intel 8088 which was found

in the IBM PC. Also the 68000 has a linear addressing architecture which was

better than the 8088’s segmented memory architecture because it made making

large applications more straightforward.

The 68020 was invented by Motorola in the mid-80’s(Encarta 95). The 68020 is

about two times as powerful as the 68000. The 68020 has 32-bit addressing and a

32-bit data bus and is available in various speeds like 16MHz, 20MHz, 25MHz, and

33MHz. The microprocessor 68020 is found in the original Macintosh II and in the

LaserWriter IINT both of which are from Apple.

The 68030 microprocessor was invented by Motorola about a year after the 68020

was released(Encarta 95). The 68030 has 32-bit addressing and a 32-bit data bus

just like it’s previous model, but it has paged memory management built into it,

delaying the need for additional chips to provide that function. A 16-MHz

version was used in the Macintosh IIx, IIcx, and SE/30. A 25-MHz model was used

in the Mac IIci and the NeXT computer. The 68030 is produced in various

versions like the 20-MHz, 33MHz, 40-MHz, and 50MHz.

The microprocessor 68040 was invented by Motorola(Encarta 95). The 68040 has a

32-bit addressing and a 32-bit data bus just like the previous two

microprocessors. But unlike the two previous microprocessors this one runs at

25MHz and includes a built-in floating point unit and memory management units

which includes 4-KB instruction and data coaches. Which just happens to

eliminate the need additional chips to provide these functions. Also the 68040

is capable of parallel instruction execution by means of multiple independent

instruction pipelines, multiple internal buses, and separate caches for both

data and instructions.

The microprocessor 68881 was invented by Motorola for the use with both

microprocessor 68000 and the 68020(Encarta 95). Math coprocessors, if supported

by the application software, would speed up any function that is math-based.

The microprocessor 68881 does this by additional set of instructions for high-

proformance floating point arithmetic, a set of floating-point data registers,

and 22 built-inconstants including p and powers of 10. The microprocessor 68881

conforms to the ANSI/IEEE 754-1985 standard for binary floating-point

arithmetic. When making the Macintosh II, Apple noticed that when they added a

68881, the improvement in performance of the interface, and thus the apparent

performance was changed dramatically. Apple then decided to add it as standard

equipment.

The microprocessor 80286, also called the 286was invented by Motorola in

1982(Encarta 95). The 286 was included in the IBM PC/AT and compatible

computers in 1984. The 286 has a 16-bit resister, transfers information over

the data bus 16 bits at a time, and use 24 bits to address memory location. The

286 was able to operate in two modes real (which is compatible with MS-DOS and

limits the 8086 and 8088 chips) and protected ( which increases the

microprocessor’s functionality). Real mode limits the amount of memory the

microprocessor can address to one megabyte; in protected mode, however the

addressing access is increased and is capable of accessing up to 16 megabytes of

memory directly. Also, an 286 microprocessor in protected mode protects the

operating system from mis-behaved applications that could normally halt (or

“crash”) a system with a non-protected microprocessor such as the 80286 in real

mode or just the plain old 8088.

The microprocessor 80386dx also called the 386 or the 386dx was invented in

1985(Encarta 95). The 386 was used in IBM and compatible microcomputers such as

the PS/2 Model 80. The 386 is a full 32-bit microprocessor, meaning that it has

a 32-bit resister, it can easily transfer information over its data bus 32 bits

at a time, and it can use 32 bits in addressing memory. Like the earlier 80286,

the 386 operates in two modes, again real (which is compatible with MS-DOS and

limits the 8086 and 8088 chips) and protected ( which increases the

microprocessor’s functionality and protects the operating system from halting

because of an inadvertent application error.) Real mode limits the amount of

memory the microprocessor can address to one megabyte; in protected mode,

however the total amount of memory that the 386 can address directly is 4

gigabytes, that is roughly 4 billion bytes. The 80386dx also has a virtual mode,

which allows the operating systems to effectively divide the 80386dx into

several 8086 microprocessors each having its own 1-megabyte space, allowing each

“8086″ to run its own program.

The microprocessor 80386sx also called the 386sx was invented by Intel in 1988

as a low-cost alternative to the 80386DX(Encarta 95). The 80386SX is in essence

an 80386DX processor limited by a 16-bit data bus. The 16-bit design allows

80386SX systems to be configured from less expensive AT-class parts, ensuring a

much lower complete system price. The 80386SX offers enhanced performance over

the 80286 and access to software designed for the 80386DX. The 80386SX also

offers 80386DX comforts such as multitasking and virtual 8086 mode.

The microprocessor 80387SX also called the 387SX was invented by Intel(Encarta

95). A math, or floating-point, coprocessor from Intel for use with the 80386SX

family of microprocessors. The 387sx is available in a 16-MHz version only, the

80387SX, if supported by the application software, can dramatically improve

system performance by offering arithmetic, trigonometric, exponential, and

logarithmic instructions for the application to use-instructions not offered in

the 80386SX instruction set. The 80387SX also offers perfect operations for sine,

cosine, tangent, arctangent, and logarithm calculations. If used, these

additional instructions are carried out by the 80387SX, freeing the 80386SX to

perform other tasks. The 80387SX is capable of working with 32- and 64-bit

integers, 32-, 64-, and 80-bit floating-point numbers, and 18-digit BCD (binary

coded decimal) operands; it coincides to the ANSI/IEEE 754-1985 standard for

binary floating-point arithmetic. The 80387SX operates individually on the

80386SX’s mode, and it performs as expected regardless of whether the 80386SX is

running in real, protected, or virtual 8086 mode.

The microprocessor mi486 also called the 80486 or the 486 was invented in 1989

by Intel(Encarta 95). Like its 80386 predecessor, the 486 is a full-bit

processor with 32-bit registers, 32-bit data bus, and 32-bit addressing. It

includes several enhancements, however, including a built-in cache controller,

the built-in equivalent of an 80387 floating-point coprocessor, and provisions

for multiprocessing. In addition, the 486 uses a “pipeline” execution scheme

that breaks instructions into multiple stages, resulting in much higher

performance for many common data and integer math operations.

In conclusion it is evident by the following that microprocessors are developing

at leaps and bounds and it is not surprising that if by the time it hits the

teacher’s desk or by the time you read this the next superchip will be

developed(Encarta 95).

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