

HAPPY NEW YEAR
2007



Tech Veda

Age At Work

They move too slowly forget things and are inflexible. They don't do teamwork and can't adapt to new technologies. Many people describe older workers in these terms, and the characterizations are often the reasons personnel managers give for hiring younger employees instead. But are these views substantiated? Do older employees in fact perform poorly? If so, at what tasks? Neuroscientists and psychologists active in the field of cognitive gerontology are investigating these questions. What they have found so far is surprising: although older people may be slower at some tasks, they are actually faster at others, and in most cases they are less prone to mistakes. The research also reveals that only certain brain functions are affected by possible age-related deficits and those simple changes in the workplace can compensate for them.

Faster May Not Be Better

There is great emphasis in today's work environment on speed and flexibility. Even delivery drivers, who for years followed the same routes, now find that their courses may change daily. Handling a changing environment requires fluid intelligence the ability to switch readily between different tasks, redirect attention, and block out irrelevant or distracting information. Older people do tend to find it difficult to coordinate competing tasks. Age-related performance deficits can be overcome if work situations are constructed in the appropriate way. As research improves, many examples of supposed age-related deficits will dissolve.

In one test, volunteers of various ages were presented with four letters: A, E, I, O. They saw the letters appear randomly on a screen, one after another, or

... continued overleaf ...

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An
 **IEEE**
Student Branch
Presentation

Extra Bits

- The first couple to be shown in bed together on prime time television were Fred and Wilma Flintstone, of the popular cartoon series Flinstones.
- If a statue in the park of a person on a horse has both front legs in the air, the person died in battle. If the horse has one front leg in the air, the person died as a result of wounds received in battle. If the horse has all four legs on the ground, the person died of natural causes.
- It was once considered a letter in the English language. The Chinese call it a little mouse, Danes and Swedes call it 'elephant' s trunk', Germans a spider monkey, and Italians a snail. Israelis pronounce it 'strudels' and the Czechs say 'rollmops' s. What is it? "The @ sign"

... continued from first page ...

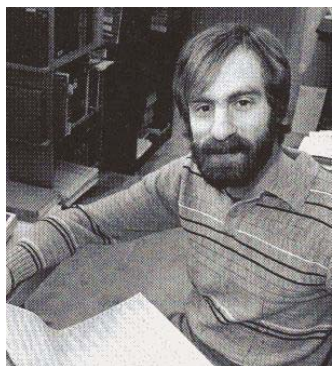
heard them being pronounced through headphones. The subjects were asked to respond to each letter as quickly as possible by pressing a button, but they had to use a different finger for each letter. This so-called choice reaction task thus forced them to decide anew each time how to react. Other subjects, acting as controls, were told to respond using the same single finger in every case.

Electroencephalograms measured the event-related potentials the brain waves that arose during sensory perception and cognitive processing. By examining the components of these waves, we can follow individual neuronal processes. For reaction task, the first part of the signal represented the processing of the visual or auditory stimuli, the second related to the thinking and decision making involved, and the third corresponded to the brain signal that prepares a finger to move. As expected, the older subjects took somewhat longer, and yet they made fewer mistakes (using the wrong finger). The reason was interesting. Detailed analysis showed that older people processed visual and auditory stimuli just as quickly as younger people did. Their brains also thought and made decisions just as well. The only lag occurred during the final phase the brain signal that prepares the finger to move. In older subjects the threshold to initiate a motor response was higher. Older brains seemed to operate according to the motto: Better to be slow but right.

Distraction!

Other experiments conducted revealed that older people make fewer mistakes largely because they are less easily distracted. This finding was surprising, because common wisdom says older people are more susceptible to distraction. Visual distraction tests, done on a computer screen also showed the value of delayed response. Essentially, when distracting lights appeared on a screen, younger participants initiated the action to (wrongly) push a button before they fully comprehended that their reaction would be incorrect. Older people began their push the button activation signal later, which prevented them from

Achievers 0101011010101110110110101010110100101010101010110110111010100101101110110101010101101010111010



Tim Paterson
Author of MS-DOS

Tim Paterson (born 1956) is an American computer programmer, best known as the original author of the popular MS-DOS operating system. Educated at the University of Washington, Paterson worked as a repair technician for a computer store in Seattle, Washington. After he graduated magna cum laude in June 1978, he went to work for Seattle Computer Products (SCP) as a designer and engineer.

He designed a schematic of Microsoft's Z-80 SoftCard which has a Z80 CPU and runs the CP/M operating system on an Apple II. A month later, Intel released the 8086 CPU, and Paterson went to work designing an S-100 8086 board, which went to market in November 1979. The only commercial software that existed for the board was a standalone version of Microsoft BASIC, and without a true operating system, sales were slow. Paterson began work on QDOS (Quick and Dirty Operating System) in April 1980 to fill that void. QDOS was approximately 4,000 lines of 8086 assembly code and highly compatible with the APIs of the popular CP/M operating system, and version 0.10 was complete by July 1980. While acknowledging that he made QDOS compatible with CP/M, Paterson has maintained that the QDOS program was his original work and has denied allegations that he referred to CP/M's code while writing it. When a book appeared in 2004 claiming that QDOS was an unoriginal "rip-off" of CP/M, Paterson

making mistakes.

The subjects who were slower had an immense performance advantage. This ability can be very useful in numerous jobs, not to mention in daily life situations such as guiding a car through a busy, distraction-filled intersection. Our studies do show that seniors do not perform as well under severe time pressure, especially if they must visually search for a target. In this circumstance, older subjects had both longer reaction times and higher error rates. They also found the test more stressful. But here, too, such problems could be mitigated in the workplace.

Restructuring Offices and Brains

Because older people perform even better than the young on many tasks, it is wrong to categorize them as generally less capable. And modest deficits can be overcome by adjusting the work environment. With neuro physiological testing, researchers can pinpoint the causes of lackluster performance and redesign workplaces appropriately. We should also note that in the real business world, speed and accuracy are not the only success factors. Older employees typically have gained knowledge with experience that younger employees do not have. In addition, older people often are more socially competent, making them attractive for customer contact and advising tasks.

Furthermore, even when an older employee might prove initially slower at a particular mental function, neural networks can restructure themselves over time. Experiments have shown that seniors who performed poorly on a memory test activated the same brain regions as young subjects, yet seniors who did well had a different activation pattern. These results make it clear that neuronal restructuring can help compensate for deficits although not every older brain is capable of carrying that out. Restructuring workplaces and brain networks will both be necessary in tomorrow's labor market.

sued the authors and publishers for defamation.

Later Microsoft bought a QDOS license. Paterson left SCP in April 1981 and worked for Microsoft from May 1981 to April 1982. After a brief second stint with SCP, Paterson started his own company, Falcon Technology, which was bought by Microsoft in 1986. Paterson did a second stint with Microsoft from 1986-1988 and a third stint from 1990-1998. During his third stint at Microsoft, he worked on Visual Basic.

After leaving Microsoft a third time, Paterson founded another software development company, Paterson Technology. Aside from his core career, Paterson also races rally cars in the SCCA Pro Rally series.

Story of MSDOS

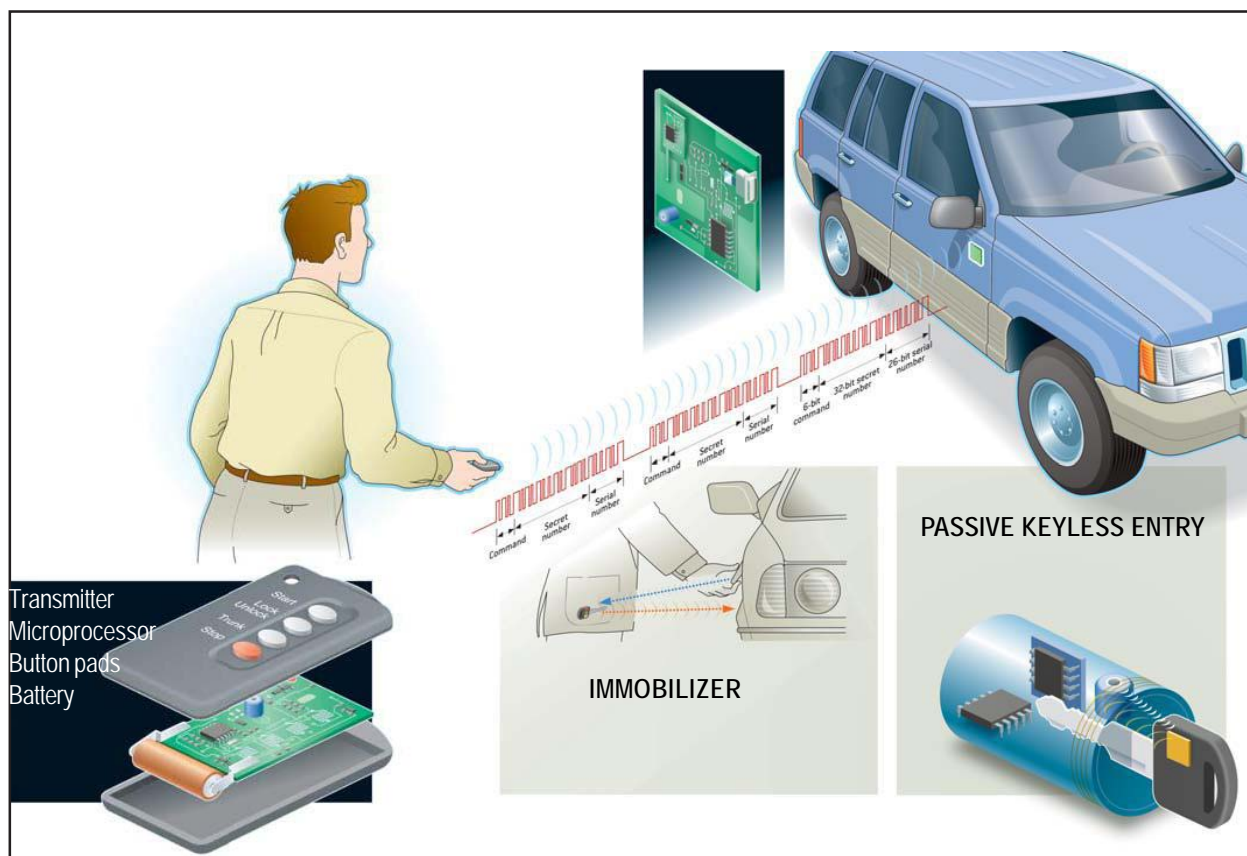
In 1980, IBM first approached Bill Gates and Microsoft, to discuss the state of home computers and Microsoft products. Gates gave IBM a few ideas on what would make a great home computer, among them to have Basic written into the ROM chip. Gates had suggested that IBM investigate an OS called CP/M (Control Program for Microcomputers), written by Gary Kildall of Digital Research. Kindall had written the most successful operating system of the time, his OS set the standard at that time. IBM tried to contact Kildall for a meeting, who refused to sign a non-disclosure agreement. IBM soon returned to Bill Gates and gave Microsoft the contract to write the new operating system, one that would eventually wipe Kildall's CP/M out of common use.

The "Microsoft Disk Operating System" or MS-DOS was based on QDOS, the "Quick and Dirty Operating System" written by Tim Paterson of Seattle Computer Products, for their prototype Intel 8086 based computer. Microsoft bought the rights to QDOS for \$50,000, keeping the IBM deal a secret from Seattle Computer Products. Gates then talked IBM into letting Microsoft retain the rights, to market MS DOS separate from the IBM PC project, Gates proceeded to make a fortune from the licensing of MS-DOS. In 1981, Tim Paterson quit Seattle Computer Products and found employment at Microsoft.

"Life begins with a disk drive." - Tim Paterson

Open Sesame !!

You exit a busy store, point your key fob across the crowded parking lot, press a button and “Pop!” — your car door unlocks. How does the car know it’s you? And why don’t other cars open, too? Most new vehicles offer what the industry calls remote keyless entry. Manufacturers program a microprocessor in each car and in its dedicated key fob with an algorithmic formula that generates a secret, encrypted code that changes each time a button is pressed. Each formula is unique, so one person’s fob cannot open any other vehicle. Current - day garage door openers work similarly. “The scheme has been around for 10 years and has proven very secure,” says Fanie Duvenhage, product marketing manager at Microchip Technology, a Chandler, Ariz., firm whose code-generating processors run the majority of U.S. automotive fobs. “We have not seen any successful attack on the algorithm.” Success has spawned even greater convenience and protection. In “passive keyless entry,” a driver standing beside a door begins to lift its handle, and a transceiver inside the car compares code with a key fob or smart card in the driver’s pocket or handbag— handy for someone carrying an armful of groceries or packages. “Immobilization” systems will not allow a car to start after a key is inserted into the ignition unless a chip built into the key head provides the right code to a chip inside the ignition housing. In European countries that have mandated immobilizers in new cars, theft of current models has decreased by more than 50 percent. Immobilizer and passive entry communications take place at the relatively low frequency of 125 kilohertz. Remote keyless systems tap much higher frequencies, typically 315 megahertz in the U.S. and Japan, in part to span a parking lot or front lawn. European manufacturers have been using 433 megahertz, notes Alec Makedessian, business manager at integrated-circuits maker Maxim Integrated Products in Sunnyvale, Calif., “but they are moving up to 868 megahertz because the lower bands are becoming congested.” About two million new keyless gadgets worldwide add to the saturation every year.



1. Auto manufacturer programs a car’s receiver and a key fob with a software algorithm that will generate a unique 32-bit number each time they are activated. The number is created along a preset pattern determined by a formula that only that vehicle and fob share, so one person’s fob can’t open another’s car.

2. Driver presses a fob button, and it transmits a stream of 64-bit data packets. The receiver captures one full packet comprising a serial number, a new secret number and a command (unlock door). If the serial number matches, the receiver also generates a new secret number. If the numbers agree, the receiver instructs the car’s controller to open the door. The number is created with encryption technology so a thief cannot decipher it if he manages to capture the transmission with a radio scanner.

3. If a fob is pressed while too far from the car, when it is pressed again the new secret number will be further along the pattern than the number the receiver will generate. The receiver waits for the driver to press the fob again. If the increment matches what the

receiver’s formula predicts would be generated, the receiver accepts the fob as the correct one, updates its memory and executes the command.

Did You Know ?

TIRES: Low tire pressure can lead to dangerous steering or a blowout. Recent federal law mandates that new vehicles must eventually be equipped with tire-pressure monitoring systems. The leading option, already offered on some models, is a sensor housed in a fob inside a tire, behind the valve stem. If pressure drops 25 percent below recommended inflation, the fob’s battery-powered radio transmitter (much like a key fob’s) alerts the car’s computer, which lights a warning icon on the dashboard.

GARAGES: The first garage door openers appeared in the 1950s. They sent a simple “open” or “close” command over a single frequency. As they slowly proliferated, one person could drive down the street and open neighbors’ doors. By the 1970s the “clicker” and the door controller each had an integrated circuit switch with eight little pins that were manually set to agree, providing one of 256 possible codes—better, but still not very secure. Today’s openers use the same electronic algorithms as auto key fobs do; a 32-bit code offers more than four billion possible combinations.

HOUSES, TOO: Some homes now have keyless dead bolts that communicate with a key fob. They typically display a red light that indicates when a door is locked. No more fumbling for keys when hands are full or scraping for the keyhole in the dark. Just be sure the button isn’t depressed on that spare fob hidden under the flowerpot.

HCL

Hindustan Computer Ltd.

Profile

Fall 1975 proved to be a turning point for six engineers who dreamt of creating India's own computer systems and Services Company. Despite the lack of venture capital, Shiv Nadar and five of his associates started with their dream from a garage and gradually acquired the contours of a vision, and in 1976, Hindustan Computers Limited was born. It started with a dream and is always driven by dreams.

HCL Technologies is one of India's leading global IT services and product engineering companies, providing value-added, software-led IT solutions and services to large- and medium-scale organizations. HCL Technologies offers world class technology solutions for the emerging network centric world. It provides a range of technology and software engineering services including Technology Development Services, Software Engineering Services, Application Engineering Services, Networking Services.

These services are predicated on a rich technology heritage. Experience with the development and application of technologies like Internet and E-Commerce, Embedded software, Networking and telecom protocols, VLSI design etc. Skills on a wide variety of computing platforms from Open Systems to Enterprise Servers based on mainframes expertise, object oriented and legacy system architecture, methodologies in addition to distinguished R&D background uniquely positions us as a preferred provider of technology and software engineering services in the emerging network centric world.

HCL Technologies has established dedicated offshore software factories with clients such as Bankers Trust (Australia), Lexis Nexis (US), Southern California Edison (US), A Networking Major (US). HCL Technologies operates through 29 offices in 15 countries in United States, Europe, Japan, Asia Pacific. The company employs 14300 IT professionals worldwide. HCL Technologies holds 100% stake in Intelicent (former HCL James Martin Inc.), a US based methodology consulting led Services Company. The company also has a 100% subsidiary in India, HCL Comnet Systems and Services Ltd, which provides networking services. HCL Technologies recruits some of the brightest minds from India. We hold campus recruitments in various campuses across the country.

Selection Procedure

The Recruitment consists of 3 Rounds.

1. Written Test (90 minutes)
2. Technical Interview.
3. HR Interview

Written Test has 4 sections. Questions will be objective type and there will be negative marking for each incorrect answer.

- Technical (15Questions - 15 Marks)
- Basic Computer Fundamentals. (20 Questions – 20 Marks)
- Analyzing C Program Segment. (10 Questions – 20 Marks)
- General Aptitude.(20 Questions – 20 Marks)

Sample Question Paper

Written Test:

Sample Questions:

1. Dravid scored 1/3 total score for India in a match. Sachin scored 80% of the runs excluding dravid and others. While other batsmen managed to take 32 in total. Whats is the score of dravid ?
2. Ramu and Raja can finish a project 'X' in 3 and 4 days. Ramu and Somu can finish the project 'Y' in 4 and 5 Day. They can all do the project 'Z' in 12 days ?
3. What is the output of following fragement ?

```
int *a; int (*b)();
printf("%d %d",sizeof(a),sizeof(b);
```
4.

```
#define dprint(expr) printf(#expr "=%d\n",expr)
main()
{
int x=7; int y=3;
dprintf(x/y); }
```
5.

```
#define INC(X) X++
main()
{
int X=4;
printf("%d",INC(X++)); }
```

Technical Interview Round:

The Technical round mostly consists of questions in C, C++, JAVA, DBMS, Data Structures, OS, Networking,etc. alongwith other topics not specified here.

Sample:

1. What are Universal Gates and Their Functions?
2. Write a C Program to reverse a String using Pointers.
3. Write a Program to insert a node in a Doubly Linked List.
4. Write a C Program to find whether a number is Prime or not.
5. Networking OSI - Seven Layers. Function Of Each and Also Examples for each layer.
6. What is IP address?
7. Binary Tree and Binary Search.
8. Explain TCP
9. What is bit slice processor?
10. What is a deadlock? explain it?
11. What is virtual memory?
12. What is circuit switching and packet switching
13. What is the significance of friend keyword in C++?
14. Different types of inheritance?

HR Round:

Few predicted questions can be:

1. Tell me about Yourself.
2. Why HCL?
3. Tell me about HCL.
4. Strengths and Weakness,etc.

The History Of Plastics (contd.)

Nylon

Nylon represents a family of synthetic polymers, a thermoplastic material, first produced on February 28, 1935 by Gerard J. Berchet of Wallace Carothers' research group at DuPont. The first product was a nylon-bristled toothbrush (1938), followed more famously by women's 'nylons' stockings (1940). It is made of repeating units linked by peptide bonds (another name for amide bonds) and is frequently referred to as polyamide (PA).

Nylon was the first commercially successful polymer and the first synthetic fiber to be made entirely from coal, water and air. These are formed into monomers of intermediate molecular weight, which are then reacted to form long polymer chains. It was intended to be a synthetic replacement for silk and substituted for it in parachutes after the United States entered World War II in 1941, making stockings hard to find until the war's end. Nylon fibers are now used in fabrics and ropes, and solid nylon is used for mechanical parts and as an engineering material.

Engineering grade Nylon is processed by extrusion, casting & injection molding. Type 6/6 Nylon 101 is the most common commercial grade of Nylon, and Nylon 6 is the most common commercial grade of cast Nylon.

DuPont began commercial production of nylon in 1939. The first testing used nylon fiber as sewing thread, in the creation of parachute fabric, and also in women's hosiery. In February 1939, Nylon stockings were first shown at the San Francisco Exposition. During the World War II, nylon replaced Asian silk in parachutes. It also found use in tires, tents, ropes, ponchos, and other military supplies, and even was used in the production of a high-grade paper for U.S. currency.

Rayon

Rayon is produced from naturally occurring polymers and therefore it is not a synthetic fiber, but a manufactured regenerated cellulosic fiber. It was the first manufactured fibre.

Georges Audemars developed the first "artificial silk" about 1855, but his method was impractical for commercial use. Hilaire de Charbonnet, Comte de Chardonnay, patented "Chardonnay silk" in 1884, but it was so inflammable it had no safe use. Finally, in 1894, Charles Frederick Cross, Edward John Bevan, and Clayton Beadle patented the first safe and practical artificial silk, which they named "viscose." Avtex Fibers Incorporated began selling their formulation in 1910 in the United States. The name "rayon" was adopted in 1924, with "viscose" being used for the viscous organic liquid used to make both rayon and cellophane. In Europe, though, the fabric itself became known as "viscose," which has been ruled an acceptable alternative term for rayon by the Federal Trade Commission.

Rayon was only produced as a filament fiber until the 1930s when it was discovered that broken waste rayon could be used in staple fiber. The physical properties of rayon were unchanged until the development of high-tenacity rayon in the 1940s. Further research and development led to the creation of high-wet-modulus rayon (HWM rayon) in the 1950s.

- Kiran KJ
S₇P

Technology is going out of Hands..

The increase in the average temperature of the Earth's atmosphere and oceans in recent decades due to the increase of Greenhouse gases is known as Global warming. Similarly the consumption of all living matter on Earth while building more and more of self-replicating Nanorobots is known as Grey goo.

Grey goo refers to a hypothetical end-of-the-world scenario involving molecular nanotechnology in which out-of-control self-replicating robots consume all living matter on Earth while building more of themselves.

The term is usually used in a science fiction context. In a worst-case scenario, all of the matter in the universe could be turned into goo, killing the universe's inhabitants. The disaster is posited to result from an accidental mutation in a self-replicating nanomachine used for other purposes, or possibly from a deliberate doomsday device.

Thus the first replicator assembles a copy in one thousand seconds, the two replicators then build two more in the next thousand seconds, the four build another four, and the eight build another eight. At the end of ten hours, there are not thirty-six new replicators, but over 68 billion. In less than a day, they would weigh a ton; in less than two days, they would outweigh the Earth; in another four hours, they would exceed the mass of the Sun and all the planets combined.

Yabshad Koya K.
S3E

Siemens Breaks Network Speed Record

Siemens AG set a new Network Speed Record when they transferred data at the speed of 107 gigabits per second (107Gbps) through a single fiber optic cable. At this speed, one could download roughly two DVDs worth of data in just a second (107 Gigabits = 13.37500 Gigabytes)

The new record is nearly 2.5 times faster than its previous record. The test was conducted on a 100 mile long stretch of Fibre optic cable in the US. This is the first time such a test was performed out of the Laboratory.

Siemens said the advantage of its method of using electrical processing only was that it removed the need to split signals into multiple, lower data-rate signals to avoid bottlenecks — which makes transmission slower and more expensive.

This technology is comparatively cheaper and faster than the current technology what we use in our homes today. This new technology is still under its development cycle, so it might take few more years to get into the final shape. Lets patiently wait until then.

Give it a Thought 101101101010100101010101011011101010

The most incomprehensible thing about our universe is that it can be comprehended.

-Albert Einstein

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Beep Codes

When a computer is first turned on, or rebooted, its BIOS performs a power-on self test (POST) to test the system's hardware, checking to make sure that all of the system's hardware components are working properly. Under normal circumstances, the POST will display an error message; however, if the BIOS detects an error before it can access the video card, or if there is a problem with the video card, it will produce a series of beeps, and the pattern of the beeps indicates what kind of problem the BIOS has detected.

Because there are many brands of BIOS, there are no standard beep codes for every BIOS. The two most-used brands are AMI (American Megatrends International) and Phoenix.

Below are listed the beep codes for AMI systems:

No. of beeps

1	DRAM refresh failure. There is a problem in the system memory or the motherboard
2	Memory parity error. The parity circuit is not working properly.
3	Base 64K RAM failure. There is a problem with the first 64K of system memory.
4	System timer not operational. There is problem with the timer(s) that control functions on the motherboard.
5	Processor failure. The system CPU has failed.
6	Gate A20/keyboard controller failure. The keyboard IC controller has failed, preventing gate A20 from switching the processor to protect mode.
7	Virtual mode exception error.
8	Video memory error. The BIOS cannot write to the frame buffer memory on the video card.
9	ROM checksum error. The BIOS ROM chip on the motherboard is likely faulty.
10	CMOS checksum error. Something on the motherboard is causing an error when trying to interact with the CMOS.
11	Bad cache memory. An error in the level 2 cache memory.
1 long, 2 short	Failure in the video system.
1 long, 3 short	A failure has been detected in memory above 64K.
1 long, 8 short	Display test failure.
Continuous long	A problem with the memory or video.

Ever thought of what it meant?

Some of the words which come in our talks frequently and we do use them too, but not actually knowing what they stand for. Lets know more about them.

AGP	Accelerated Graphics Port
AMD	- Advanced Micro Devices
ATX	Advanced Technology Extended
BIOS	Basic Input Output System
CMOS	Complementary Metal Oxide Semiconductor
DDR	Double Data Rate
DVD	- Digital Versatile Disc
HDD	Hard Disk Drive
IDE	- Integrated Drive Electronics
PnP	Plug 'n Play
SCSI	- Small Computer System Interface
TWAIN	Technology Without An Important Name

Are you really safe from viruses, inside a MAC OS or LINUX machine?

We've all heard it many times when a new Microsoft virus comes out. In fact, I've heard it a couple of times this week already. Someone on a mailing list or discussion forum complains about the latest in a long line of Microsoft email viruses or worms and recommends others consider Mac OS X or Linux as a somewhat safer computing platform. In response, another person named, oh, let's call him "Bill," says, basically, "How ridiculous! The only reason Microsoft software is the target of so many viruses is because it is so widely used! Why, if Linux or Mac OS X was as popular as Windows, there would be just as many viruses written for those platforms!"

Of course, it's not just "regular folks" on mailing lists who share this opinion. Businesspeople have expressed similar attitudes including ones who work for anti-virus companies. Jack Clarke, European product manager at McAfee, said, "So we will be seeing more Linux viruses as the OS becomes more common and popular."

Sure, there are Linux viruses. But let's compare the numbers. There are about 60,000 viruses known for Windows, 40 or so for the Macintosh, about 5 for commercial Unix versions, and perhaps 40 for Linux. Most of the Windows viruses are not important, but many hundreds have caused widespread damage. Two or three of the Macintosh viruses were widespread enough to be of importance. None of the Unix or Linux viruses became widespread - most were confined to the laboratory.

So there are far fewer viruses for Mac OS X and Linux. It's true that those two operating systems do not have monopoly numbers, though in some industries they have substantial numbers of users. But even if Linux becomes the dominant desktop computing platform, and Mac OS X continues its growth in businesses and homes, these Unix-based OS's will never experience all of the problems we're seeing now with email-borne viruses and worms in the Microsoft world.

VMWare - Workstation

VMware Workstation is powerful desktop virtualization software for running multiple operating systems simultaneously on a single PC all running side by side. Users can run Windows, Linux, NetWare, or Solaris x86 in fully networked, portable virtual machines - no rebooting or hard drive partitioning required. VMware Workstation delivers excellent performance and advanced features such as memory optimization and the ability to manage multi-tier configurations and multiple snapshots.

Run various OS just as you handle different windows in Windows XP environment. Each windows running a different OS.

VMware Workstation enables users to:

- Configure and test multi-tier applications, application updates, and operating system patches on a single PC with different OS..
- Easily restore or share archived test environments, reducing repetitive configuration and set-up time
- Streamline computer-based training by allowing students to always start from a "clean" state and experiment with multiple operating systems, applications, and tools in secure, isolated virtual machines
- Run software demos of complex or multi-tier configurations on a single laptop.
- Accelerate help desk resolution of end-user problems with a library of pre-configured virtual machines

If nothing sticks to Teflon, how does it stick to pans?

Teflon is a trademark of Du Pont for a plastic material known as polytetrafluoroethylene. The secret to Teflon's slick surface lies in the fluorine enveloping its molecules. These fluorine atoms repel almost all other materials, preventing them from adhering to Teflon.

We can use two techniques to make Teflon stick to the surfaces of items such as pots and pans. The first is sintering, a process similar to melting, in which Teflon is heated at a very high temperature and pressed firmly onto a surface. When the material cools down to room temperature, however, chances are it will eventually peel away. Chemically modifying the side of Teflon that you want to have "stick" yields better results. By bombarding it with ions in a high vacuum under an electric field, or plasma, we can break away many of the fluorine atoms on the surface that we want to make sticky. We can then substitute other atoms, such as oxygen, that adhere strongly to surfaces.

Though perhaps best known as a cookware coating, Teflon has a wide range of applications, from insulating data communications cables to repelling water and stains from clothing and upholstery.

How is caffeine removed to produce decaffeinated coffee?



In the first method, called water processing, the moistened coffee beans are soaked in a mixture of water and green-coffee extract that has previously been caffeine-reduced. Osmosis draws the caffeine from the highly caffeine-concentrated beans into the less caffeine-concentrated solution. Afterward, the decaffeinated beans are rinsed and dried. The

extracted caffeine rich solution is passed through a bed of charcoal that has been pretreated with a carbohydrate. The carbohydrate blocks sites in the charcoal that would otherwise absorb sugars and additional compounds that contribute to the coffee's flavor but permits the absorption of caffeine. The caffeine-reduced solution, which still contains compounds that augment the taste and aroma, can then be infused into the beans. The water process is natural, in that it does not employ any harmful chemicals, but it is not very specific for caffeine, extracting some noncaffeine solids and reducing flavor. It eliminates 94 to 96 percent of the caffeine.

An alternative method extracts caffeine with a chemical solvent. The liquid solvent is circulated through a bed of moist, green coffee beans, removing the caffeine. The solvent is recaptured in an evaporator, and the beans are washed with water. Finally, the beans are steamed to remove chemical residues. Solvents, such as methylene chloride, are more specific for caffeine than charcoal is, extracting 96 to 97 percent of the caffeine and leaving behind nearly all the noncaffeine solids.

In the third approach, carbon dioxide is circulated through the beans in drums operating at roughly 250 to 300 times atmospheric pressure. At these pressures, carbon dioxide takes on unique supercritical properties, having a density similar to that of a liquid but with the diffusivity of a gas, allowing it to penetrate the beans and dissolve the caffeine. The caffeine-rich carbon dioxide exiting the extraction vessel is channeled through charcoal or water to absorb the caffeine and is then returned to the extraction vessel. Carbon dioxide is popular because it has a relatively low pressure critical point, it is nontoxic, and it is naturally abundant. Supercritical carbon dioxide decaffeination is more expensive, but it extracts 96 to 98 percent of the caffeine.

How do rewritable CDs work?

All CDs—and DVDs—work by virtue of marks on the disc that appear darker than the background. These are detected by shining a laser on them and measuring the reflected light. In the case of molded CDs or DVDs, such as those bought in music or video stores, these marks are physical "pits" imprinted into the surface of the disc. In CD-Recordable (CD-R) discs, a computer's writing laser creates permanent marks in a layer of dye polymer in the disc. CD-Rewritable (CD-RW) discs are produced in a similar fashion, except that the change to the recording surface is reversible.

The key is a layer of phase-change material, an alloy composed of silver, indium, antimony and tellurium. Unlike most solids, this alloy can exist in either of two solid states: crystalline (with atoms closely packed in a rigid and organized array) or amorphous (with atoms in random positions). The amorphous state reflects less light than the crystalline one does. When heated with a laser to about 700 degrees Celsius, the alloy switches from the original crystalline phase to the amorphous state, which then appears as a dark spot when the disc is played back. These spots can be erased using the same laser (at a lower power) to heat the material to a temperature of 200 degrees C or so; this process returns the alloy to its crystalline state. Most CD-RW makers suggest that one disc can be overwritten up to 1,000 times and will last about 30 years.

How long can humans stay awake?

The quick answer is 264 hours, or 11 days. In 1965 Randy Gardner, a 17-year-old high school student, set this apparent world record as a science-fair project. Several other research subjects have remained awake for eight to 10 days in carefully monitored experiments. None experienced serious medical or psychiatric problems, but all showed progressive and significant deficits in concentration, motivation, perception and other higher mental processes. Nevertheless, all returned to relative normalcy after one or two nights of sleep. Other, anecdotal reports describe soldiers staying awake for four days in battle and unmedicated patients with mania going without sleep for three to four days. The more complete answer revolves around the definition of the word "awake." Prolonged sleep deprivation in normal subjects induces numerous brief episodes of light sleep (lasting a few seconds), often described as "microsleep," alternating with drowsy wakefulness, as well as loss of cognitive and motor functions. Many people know about the dangerous drowsy driver on the highway and sleep-deprived British pilots during World War II who crashed their planes, having fallen asleep while flying home from the war zone.

Michel Jouvet and his colleagues in Lyons, France, studied a 27-year-old man with this condition and found that he had virtually no sleep over a period of several months. During that time, the man did not feel sleepy or tired and did not show any disorders of mood, memory or anxiety. Nevertheless, nearly every night between approximately 9 and 11 he experienced 20 to 60 minutes of auditory, visual, olfactory and somesthetic (sense of touch) hallucinations, as well as pain and vasoconstriction in his fingers and toes. The ultimate answer to this question remains unclear. Indeed, the U.S. Department of Defense has offered research funding for the goal of sustaining a fully awake, fully functional "24/7" soldier, sailor or airman. Will bio-engineering eventually produce soldiers and citizens with a variant of Morvan's syndrome, who need no sleep but stay effective and happy? I hope not. A good night's sleep is one of life's blessings.

As Coleridge wrote in *The Rime of the Ancient Mariner*, "Oh sleep! it is a gentle thing, Beloved from pole to pole!"

Puzzles to Puzzle You

Lets see if you can make your mind tackle these bits of bytes:

- ```
main()
{
 printf("\n%%");
}
```
- ```
main()
{int n=5; printf("\nn=%*d",n,n);
}
```
- ```
main()
{
 struct a
 {
 category:5; scheme:4; };
 printf("%d",sizeof(struct a));
}
```
- ```
main()
{unsigned char i=0x80; printf("%d",i<<1);}
```
- ```
main()
{
 char *a="abcdef"; char *b="apqrs";
 char *c='de'; char *d='dc';
 if(*a==*b) printf("a = b");
 else printf("a != b");
 if(*c==*d) printf("c = d");
 else printf("c != d");
}
```
- What is the difference between

```
const char *s;
char const *s;
```

Answers: 1) %% 2) n= 5 3) 2 4) 256 5) a = b c != d 6) No difference

## Quiz Time

- Costa Rica was the first nation to offer all of its citizens this free method of electronic communication, in 1999. What was it?
- What was the first widely-used high-level programming language for business applications?
- What technique did an Edge Wireless technician combine with computer modeling to find the approximate location of a cellphone used by the wife and children of missing CNET editor James Kim in the Oregon wilderness few week back?
- The WWW Wanderer was the first Web-based version of this most basic Internet exploration tool, created by Matthew Gray at MIT in 1993. What was it?
- Who was the first company to establish a .com, in 1985?
- Which "vision" systems sense a wider range of electromagnetic wavelengths, a video camera or the human eye?
- What wireless transmission technology is named for a Danish king who ruled in the mid-tenth century?
- What sophisticated data communications system does NASA use to stay in touch with space missions?

## Mind Bogglers

Solve the Su do ku:

|   |   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|---|
| 1 |   | 7 |   |   | 2 |   |   | 8 |
|   | 2 | 8 |   |   | 7 |   |   |   |
| 6 |   |   | 3 | 8 |   |   |   |   |
|   |   | 6 | 9 |   |   |   | 2 |   |
| 5 |   | 9 |   |   |   | 6 |   | 3 |
|   | 8 |   |   |   | 6 | 4 |   |   |
|   |   |   |   | 9 | 3 |   |   | 6 |
|   |   |   | 2 |   |   | 7 | 8 |   |
| 4 |   |   | 8 |   |   | 3 |   | 2 |

A mind game and a puzzle that you solve with reasoning and logic. Fill in the grid with digits in such a manner that every row, every column and every 3x3 box accomodates the digits 1 to 9, without repeating any.

Hard

\*Answer will be published in the next issue

Answer to last issue's SuDoKu

|   |   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|---|
| 1 | 5 | 8 | 6 | 2 | 9 | 3 | 4 | 7 |
| 4 | 9 | 7 | 3 | 8 | 1 | 2 | 5 | 6 |
| 2 | 6 | 3 | 4 | 7 | 5 | 8 | 9 | 1 |
| 5 | 7 | 9 | 8 | 1 | 6 | 4 | 3 | 2 |
| 8 | 4 | 6 | 2 | 9 | 3 | 1 | 7 | 5 |
| 3 | 1 | 2 | 5 | 4 | 7 | 9 | 6 | 8 |
| 9 | 8 | 4 | 7 | 5 | 2 | 6 | 1 | 3 |
| 7 | 3 | 1 | 9 | 6 | 8 | 5 | 2 | 4 |
| 6 | 2 | 5 | 1 | 3 | 4 | 7 | 8 | 9 |

1. E-mail
2. Cobol
3. Triangulation
4. Search engine
5. Now part of Compaq- DEC (Digital- Equipment Corporation)
6. Machine vision
7. Bluetooth (Harald Bluetooth)
8. Deep Space Network (DSN)

Answers  
Quiz time

## Guess Who



Hints:-

- Youngest entrepreneurs in World Economic Forum (WEF) Foundation Board, 2006
- Co-founder of NASSCOM, INFOSYS
- Recipient Padma Bhushan
- One of the 100 most influential people in the world by Time Magazine, 2006

Answer :- Nandan Nilekani  
President, Infosys

## Cartoon Corner



" You want me to clean my room!  
What's my budget for the project."