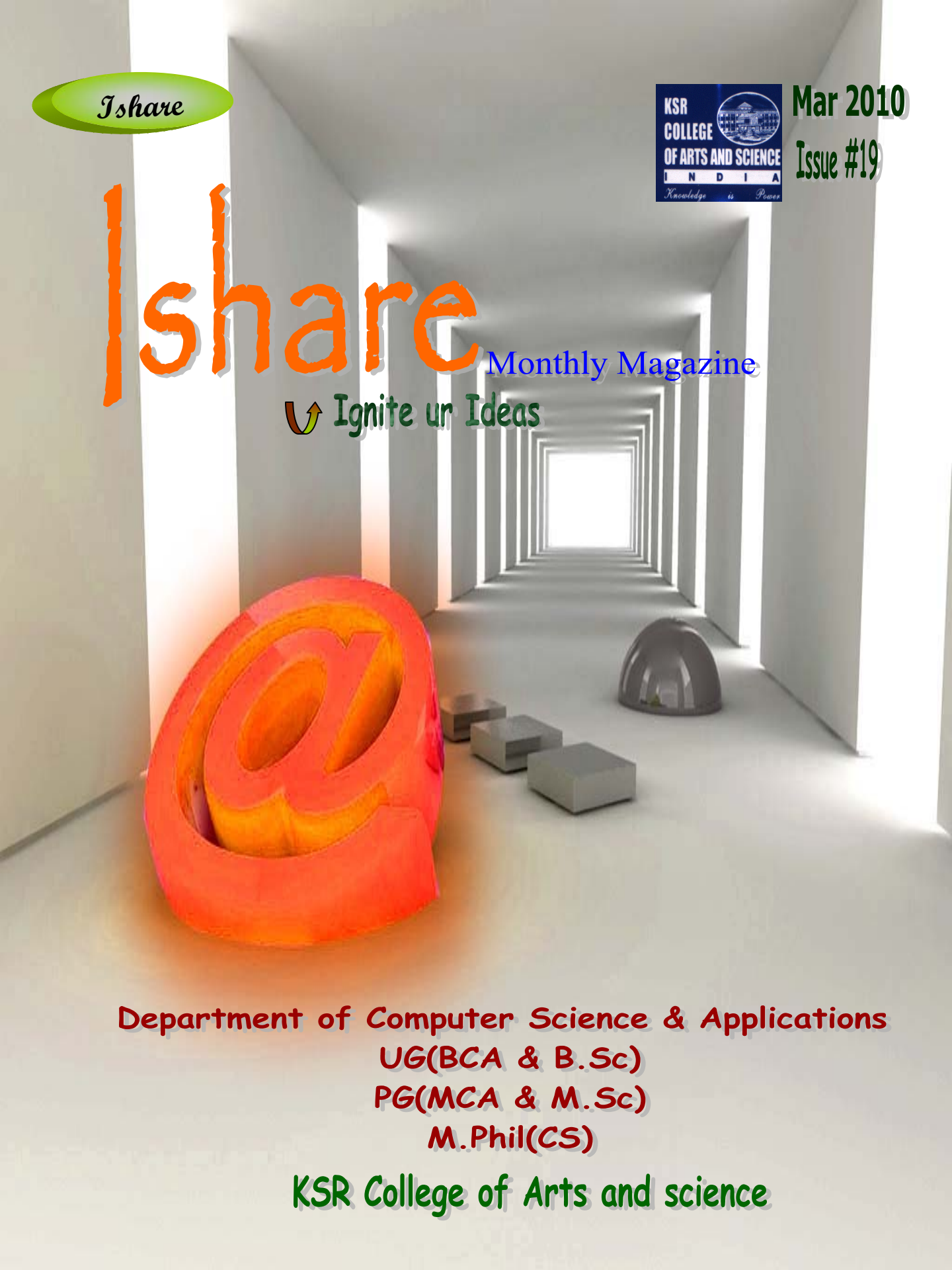

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Ignite ur Ideas

Department of Computer Science & Applications

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EDITORIAL …

PARAM Padma is C-DAC's next generation high performance scalable computing cluster, currently with a peak computing power of One Teraflop. The hardware environment is powered by the Compute Nodes based on the state-of-the-art Power4 RISC processors, using Copper and SOI technology, in Symmetric Multiprocessor(SMP) configurations. These nodes are connected through a primary high performance System Area Network, PARAMNet-II, designed and developed by C-DAC and a Gigabit Ethernet as a backup network. C-DAC's PARAM series of supercomputers have been deployed to address diverse applications in science and engineering, and business computing at various institutions in India.More useful and interesting informations in this edition of I SHARE....

Editorial Board

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History of Viruses and Worms

Author

M. Mohammad arif ,
II B.Sc(CS) B

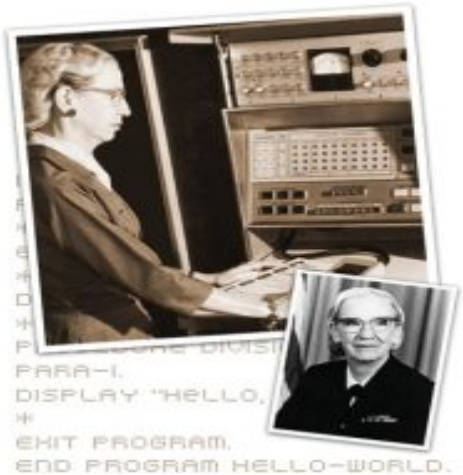
Article Title

Tongue Drive System

Article Description

This article gives information about tongue drive system to operate computers.

The history of **computer virus** goes back to the middle of 20th century.



- In 1945 **Rear Admiral Grace Murray Hopper** found a moth that was stuck between relays in Navy computer. She called the trapped moth a **"bug"** which is a term that has been used since 19th century, referring to problems related to electrical devices. The procedure of fixing the problem with the computer was called **"debugging"**, a term coined by the same admiral.

- Four years later, a researcher from Hungary, named **John von Newman** developed a theory of **self-replicating programs**. He was the one to come up with a theoretical base for computers that store information in their "memory".

- In 1960 the largest provider of telephone services, **AT&T**, presented the **first commercial modem**, which the company dubbed Dataphone. Three years later American Standard Code for

Information Interchange (ASCII) is created. This language allowed computers developed by different companies to exchange information.

- In 1969 experts at AT&T's Bell Laboratories created the **UNIX operating system**, which was world's first multi-tasking OS. In the same year Advanced Research Projects Agency introduced **ARPANET**, one of the first networks. The precursor of Internet was used by different government research teams and universities. The commercial version of ARPANET, called Telenet, was introduced in 1974.

- In 1979 specialists at Xerox Palo Alto Research Center managed to develop a computer **"worm"** - a small software program that searched the network for idle processors. The worm was created to improve computer use but back then no one knew that it would be the forerunner of modern worms, which are, in fact, computer viruses that users download without knowing it and destroy or alter information on computers.

- **Fred Cohen**, who in 1983 was a doctoral candidate at University of Southern California, for the first time defined the term "computer virus". He stated that a computer virus is a program that has a destructive nature and is able to "affect other computer programs by modifying them in such a way as to include a (possibly evolved) copy of itself." Somewhat later the developers of anti-virus programs capitalized on his study on computer virus defense methods.

- **"The Brain"** was one of the fist computer viruses. It was developed by programmers from Pakistan in 1986.

- Two years later **Robert Morris**, a 23-year-old programmer,

developed and launched a worm that penetrated ARPANET computers. His program was able to immobilize about 6,000 computers by flooding the memory banks of computers in the network with duplicates of itself.

- In 1991 Symantec presents the Norton **Anti-Virus software**.

- In 1995 the software giant Microsoft released its operating system **Windows 95**. Companies developing anti-virus programs worried that Windows OS will be resistant to computer viruses. The same year saw the appearance of advanced "macro" viruses that had the possibility to corrupt the system.

- In 1998 two teenagers from California managed to take control of over 500 computers systems from the military, government and private sector. The cyber attack was dubbed **"Solar Sunrise"**.

- A year later the notorious computer virus, known as **"Melissa"**, shows a record speed in infecting thousands of computers. The damage caused by this computer virus was estimated at $80 million. It also led to an increase in demand for anti-virus software. When downloaded, the computer virus started a program that launches copies of itself to the first 50 names from the list in the Outlook e-mail address book of the recipient of the virus.

- In 2000 such giants as Yahoo, eBay, Amazon and Datek along with a number of other Web sites

were knocked offline for several hours following a chain of **"distributed denial-of-service attacks."** It was later found that the DDOS attacks, which put out of action a target system simply by flooding traffic from hundreds of PC at the same time, were carried out when hackers infiltrated powerful computers at the University of California.

- A year later, President Bush appointed **Richard Clarke** as the first cybersecurity chief in the United States. In 2002 the 33-year-old developer of Melissa computer virus, **David L. Smith**, was sentenced to 20 months in federal prison. In the same year a denial-of-service attack strikes all 13 of the "root" servers that supply the primary roadmap for nearly all Internet communications. The attack raised serious concerns regarding the security of the Internet infrastructure.

- At the beginning of 2003, in about 3 hours, the **"Slammer"** worm was able to infect hundreds of thousands of computers. It proved to be the fastest spreading worn, causing chaos on businesses around the globe, knocking cash machines offline as well as delaying airline flights.

- In 2009 9 million computers running on Windows operating system were hit with the new "downadup" worm, dubbed **"Conficker"** and **"Kido"**. The worm had the ability to infect USB sticks and corporate laptops. The malware spread via the Internet and the main tools that helped the worm spread were unpatched corporate networks and USB

memory sticks that were attacked to infected computers. First discovered last October, downadup loads itself on to a computer by exploiting a weakness in Windows servers. Once it has infected a machine, the software also tries to connect to up to 250 different domains with random names every day.

Best Antivirus Software

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Article Title

Best Antivirus Software

Article Description

This article gives information about the top 6 best anti virus software.

These **anti-viruses** are listed randomly, which means that they all have their advantages and drawbacks and they cannot be arranged in any particular order. Various online sources have their own lists of the best anti-virus software programs, but all of them have tangency points, which we decide to outline in this article. You can consider this list a subjective opinion and are welcome to express your opinion in the comment section.

Whenever you decide to install anti-virus software, there are some things you need to take into consideration. Some of the most important things you need to know were presented in one of our previous articles, so check it out. Here is out list of top 6 best anti-virus software programs.

BitDefender Antivirus

The BitDefender antivirus has always been considered as a good one, being able to effectively **capture and delete malware**. It shows great protection especially against spyware. The results of independent tests showed that the latest BitDefender Antivirus 2010 can block effectively serious

threats. It features an improved antiphishing and ID theft protection. It blocks websites that try to steal personal information such as details of your credit card. It runs without slowing down the system and has an improved IM encryption, being able to protect your chats over instant messaging.

Kaspersky Anti-Virus

Everybody knows Kaspersky, which for many years has been considered one of the best anti-viruses on the market. The latest Kaspersky Anti-Virus 2010 once again proves that it can effectively deal against computer viruses, spyware, adware, and more. The latest version of the anti-virus there's one interesting feature - a "virtual keyboard" - meant to protect the user from keyloggers and phishing websites. The virtual keyboard makes it possible for the user to introduce sensitive passwords without using the physical keyboard. In addition, the virtual keyboard is able to block programs that attempt to make a screenshot of the virtual keyboard.

Panda Antivirus

This anti-virus software can boast an ultra fast scan engine. Panda Antivirus Pro has voted as one of the best protection tools for Windows OS. It automatically and quickly gets rid of malware and automatically updates. The anti-rootkit technology (featured in the latest Panda Antivirus Pro 2010 program) is able to identify and delete silently-installed rootkits

that are usually used to dodge common antivirus products. In addition, the anti-virus protects user's identity using its anti-phishing filter and anti-banking Trojans engine. The program's Web filter allows you to surf the Internet without worrying about your system being infected.

Norton AntiVirus

Besides boasting a nice design, this anti-virus software shows some high speeds in scanning for malware. This anti-virus software is rather expensive and it would probably be better for the company to make something about this drawback. The 2010 version features an improved anti-spyware function and fast pulse updates that last between 5 and 15 minutes. The program also offers a great protection against malware that attempts to steal personal information. It allows the users to safely connect to Wi-Fi and protects against websites that try to install malware on your system. The latest version features Internet Worm Protection function that is able to block sophisticated worms like Blaster and Sasser (you can read about these viruses here at www.InfoNIAC.com - check the links at the bottom of the article) before these worms infect your computer.

Trend Micro Antivirus

This anti-virus is considered to be one of the best for the same reasons as all viruses described here: great protection against computer viruses, worms, Trojan horse programs, phishing, spam,

bots, spyware, adware and more. The program is easy to use and is rather inexpensive. Based on specific categories the anti-virus can block websites that feature inappropriate content. It automatically updates and boasts real-time protection. In addition, the latest version of Trend Micro Antivirus features Remote File Lock that keeps the information on your laptop locked for intruders if the computer is lost or stolen.

ESET NOD32

ESET NOD32 Antivirus instantly detects and deletes computer viruses, Trojan horse programs, worms, adware, spyware, phishing, rootkits and more. This anti-virus software uses a mix of filtration methods and can detect both known and unknown malware. One of its drawbacks is that the program can take some resources when scanning the computer for viruses. ESET NOD32 Antivirus effectively blocks programs that try to steal personal data. In addition, it can perform real-time scan of emails. For laptop users the anti-virus has one more feature - it includes an automatic energy-conserving battery mode.

Tongue Drive System

Author

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Article Title

History of Computer Viruses and Worms.

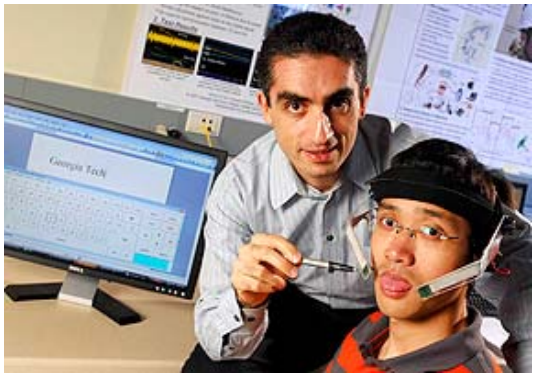
Article Description

This article gives information about the computer viruses and Worms throughout history.

Scientists developed a new revolutionary system to help individuals with disabilities to control wheelchairs, **computers**

and other devices simply by using their tongue.

Engineers at the Georgia Institute of Technology say that a new **technology** called **Tongue Drive system** will be helpful to individuals with serious disabilities, such as those with severe spinal cord injuries and will allow them to lead more active and independent lives.



Individuals using a tongue-based system should only be able to move their tongue, which is especially important if a person has paralyzed limbs. A tiny magnet, only a size of a grain of rice, is attached to an individual's tongue using implantation, piercing or adhesive. This technology allows a disabled person to **use tongue when moving a computer mouse or a powered wheelchair**.

Scientists chose the tongue to control the system because unlike the feet and the hands, which are connected by brain through spinal cord, the tongue and the brain has a direct connection through cranial nerve. In case when a person has a severe spinal cord injure or other damage, the tongue will remain mobile to activate the system. *"Tongue movements are also fast, accurate and do not require much thinking, concentration or effort."* said Maysam Ghovanloo, an assistant professor in the Georgia Tech School of Electrical and Computer Engineering.

The motions of the magnet attached to the tongue are spotted by a number of magnetic field sensors installed on a headset worn

outside or an orthodontic brace inside the mouth. **The signals coming from the sensors are wirelessly sent to a portable computer** that placed on a wheelchair or attached to an individual's clothing.

The Tongue system is developed to recognize a wide array of tongue movements and to apply specific movements to certain commands, taking into account user's oral anatomy, abilities and lifestyle.*"The ability to train our system with as many commands as an individual can comfortably remember is a significant advantage over the common sip-n-puff device that acts as a simple switch controlled by sucking or blowing through a straw,"* said Ghovanloo.

The Tongue Drive system is **touch-free, wireless and non-invasive technology** that needs no surgery for its operation.

During the trials of the system, six able-bodied participants were trained to use tongue commands to control the computer mouse. The individuals repeated several motions left, right, up and down, single- and double-click to perform computer mouse tasks.

The results of the trials showed **100 percent of commands were accurate** with the response time less than one second, which equals to an information transfer rate of approximately 150 bits per minute.

Scientists also plan to test the ability of the system to operate by people with severe disabilities. The next step of the research is to **develop software to connect the Tongue Drive system to great number of devices** such as text generators, speech synthesizers and readers. Also the researchers plan to upgrade the system by introducing the standby mode to allow the individual to eat, sleep or

talk, while prolonging the battery life.

Quantum Computer

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Article Title

Quantum Computer

Article Description

This article gives information about the world's First Programmable Quantum Computer.

With only a few intense lasers, electrodes and some ultracold ions, researchers at the University of Sussex in Brighton, England, have been able to build the first programmable quantum computer.

What makes this experiment different is that this new system is able to perform more than 150 random processing routines. For Quantum computers to become more useful, these machines should be able to be progammed just like a normal computer can be programmed. This will of course mean that the system will be able to run many different programs. Up until now, earlier versions of quantum computers have been very restricted with regards to the amount of specific tasks they could perform.

The new study is "a powerful demonstration of the technological advances towards producing a real-world quantum computer," says quantum physicist Winfried Hensinger of the University of Sussex in Brighton, England. The researchers, led by David Hanneke of the National Institute of Standards and Technology in Boulder, Colo. built the computer based on two cooled beryllium ions with a temperature of just above zero.

The ions formed the quantum bits, or qubits, analogous to the bits in

normal computers represented by 0s and 1s, and were trapped by a magnetic field on a gold-plated aluminum chip. To perform the processing operations, short laser bursts were used to manipulate the beryllium ions. Magnesium ions kept the beryllium ions stationary, and from getting hot. It is believed that this system may be applied to larger-scale systems.

The system built was mostly experimental, but what is important is the fact that the principal may be applied on a larger scale, and therefor become practical.

Tips to prevent cyber attacks

* Organizations need to protect their infrastructure by securing their endpoints, messaging and Web environments. In addition, defending critical internal servers and implementing the ability to back up and recover data should be priorities. Organizations also need the visibility and security intelligence to respond to threats rapidly.

* IT administrators need to protect information proactively by taking an information-centric approach to protect both information and interactions. Taking a content-aware approach to protecting information is key in knowing where sensitive information resides, who has access, and how it is coming in or leaving your organization.

* Organizations need to develop and enforce IT policies and automate their compliance processes. By prioritizing risks and defining policies that span across all locations, customers can enforce policies through built-in automation and workflow and not only identify threats but remediate

incidents as they occur or anticipate them before they happen.

* Organizations need to manage systems by implementing secure operating environments, distributing and enforcing patch levels, automating processes to streamline efficiency, and monitoring and reporting on system status.

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Article Title

Tips to prevent cyber attacks.

Article Description

This article helps to prevent the cyber attacks which are given by Symantec.

New licensing scheme for Office 2010

Author

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Article Title

New licensing scheme for Office 2010

Article Description

This article gives information about the Microsoft's new licensing scheme for Office 2010.

Microsoft is implementing a new sales strategy with the coming release of its Office 2010 it says should make it easier to sell and deploy for channel partners, but one that could take away their opportunities to sell upgrades.

With the launch of Microsoft Office 2010, expected on June 15, the vendor wants to pre-load a new Office image that includes all three versions of the application on between 80 percent and 100 percent of all new systems sold, said Vic Barakat, OEM distribution partner account manager at Microsoft.

That image will include the Home and Student edition, which will include licenses for use on up to three PCs, as well as the Home and Business and the Professionals editions, which will include licenses that allow it to be installed on one desktop PC and one portable PC used by the same user, Barakat said.

Microsoft, through its channel and retail partners, will also sell a new "product key card" or PKC that will allow customers to unlock their preferred version of the application. The PKC will include a code that causes the selected version to automatically turn on in minutes without the need for further installation, and customers can purchase keys at a later date to automatically upgrade to other versions.

Barakat unveiled the new licensing scheme during a presentation to solution providers and system builders at the D&H 2010 West Coast Technology Show, held in California.

The single image containing all three versions is aimed at simplifying the number of SKUs of the software that partners take to customers, and make it easier for them to sell the product.

The PKCs will be available in blister packs for sale to customers in a variety of outlets, which means it is important for solution providers to make the Office 2010 sale with the PC.

In response to an audience member who asked about whether customers can purchase the PKCs from places like Office Depot or eBay.

Microsoft is also introducing an "Upgrade Anywhere" program whereby customers can upgrade the Home and Student edition or

the Home and Business Edition to other editions. Such an upgrade is done by customers contacting Microsoft directly, and does not offer solution providers an opportunity to participate.

Microsoft also launched its Microsoft Technology Guarantee program under which customers who purchase Microsoft Office 2007 and activate it by September 30 get a free upgrade to Office 2010, as long as they activate the upgrade by October 31.

That customers can download the Office 2010 upgrade starting in mid-June when it is scheduled to be released, or they can order a DVD with the software from Microsoft for $15.

That Office 2010 will be available for downloading by channel partners on about June 1, and that Microsoft plans a media blitz over the new software in July.

Microsoft is simplifying the availability of Office 2010 with the PKC, thereby eliminating the need for disks and electronic distribution. It doesn't have separate disks for different editions of the software.

John Vickers, president and CEO of Vickers Technology, a Calif.-based solution provider, said he also appreciates how Microsoft is moving all three versions of Office 2010 into a single image.

However the fact that Microsoft is eliminating disks from the Office sales process except for those who order the DVD when upgrading from Office 2007 to Office 2010 could lead to problems later.

Michael Schwab, co-president of D&H, said that the new PKC is a much more natural way to sell and deploy Microsoft Office than in the past by offering a code that unlocks the application without

having to go through the entire installation process.

However, whether upgrading Office via PKC or volume licensing is the better solution is one that solution providers can hash out with their distributors.

A NEW ROUTER

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Article Title

A New Router

Article Description

This article gives information about the new router CRS-3 which was developed by CISCO.

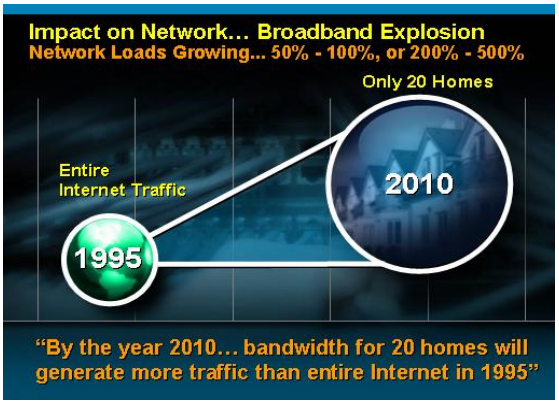
CRS-3, its next-generation Internet router for the world's largest Internet service providers. Cisco may have overhyped the announcement just a tad. After a two-week countdown to an announcement that it said would "forever change the Internet," the company unveiled what looks like an upgrade to its existing "core" router called the CRS-1.

While the hype machine may have failed to deliver something truly revolutionary, Cisco's announcement is still significant. The new router offers 12 times the traffic capacity than its older-generation routers offer. It's three times faster than the older CRS-1, which was introduced in 2004. And it can handle 322 terabits of traffic per second, or simultaneous video calls for every person in China.

The new router, which starts at $90,000, will be sold to the world's largest Internet service providers. These aren't your run-of-the-mill ISPs selling 10 Mbps broadband service to consumers. These companies, such as AT&T,

Verizon Communications, Level3, and Sprint, are the Internet service providers that aggregate and shuttle the bulk of the nation's Internet traffic across what is known as "the Internet backbone."

When the new Cisco routers are installed, the average broadband consumer likely won't notice anything new. But over time, they will see the benefits of the upgraded infrastructure. The Cisco CRS-3 will allow these Internet backbone service providers to increase capacity so that new applications, especially video-based applications, like high-definition TV, video conferencing, and 3D TV, can be offered to the mass market.



This new router will serve as the foundation of the next-generation Internet that will see tremendous growth due to video.

"Video is the killer app," "Video brings the Internet to life and most of the devices that will be coming on the network will evolve quickly into video".

Chambers said just looking at the devices and applications that were at the Consumer Electronics Show in Las Vegas in January and Mobile World Congress in Barcelona in February are a good indication of what is to come in the future. And he said all these products feed into the Internet, which will load the network with more traffic.

"Whether it was gaming or video or tablets or ESPN bringing 3D sports to TV, it's about video," he

said. Chambers added that this video traffic, along with other data intensive applications for things such as health care, will require more bandwidth than anyone could have imagined a short time ago.

Indeed, the new router will play a significant role in enabling all kinds of new applications and services to be rolled out. And as the access broadband networks get faster, more capacity will be needed in the backbone of the Internet to accommodate the traffic. Several broadband providers are already offering 50Mbps and 100Mbps broadband service to consumers. Google also recently announced that it plans to build ultra-high speed broadband networks to test new services and applications that use 1Gigabit-per-second speeds. And if history has taught the industry anything, it's that when more bandwidth is made available, applications quickly come online to use it. Once consumers start using high-capacity applications that necessitate these speeds, infrastructure equipment deep in the Internet backbone will have to be in place to support the flood of traffic.

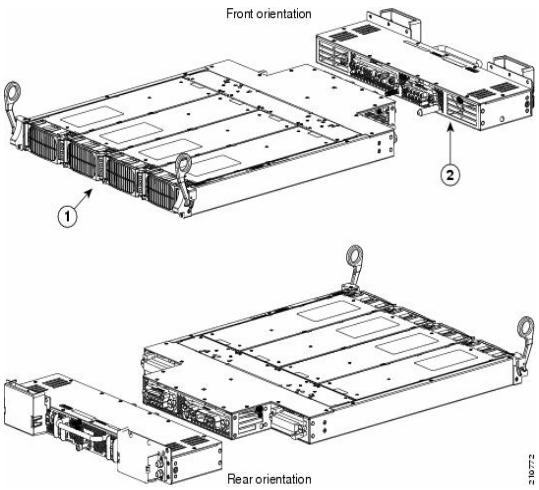
While the scale and speed of the new CRS-3 is impressive and definitely takes the Internet to a new level of capacity, will it really "forever change the Internet?" as Cisco billed the announcement.

The Cisco's announcement is more of an incremental upgrade to the company's existing product, the CRS-1. IP routing is Cisco's bread and butter. It's not surprising that the company has developed yet another big router to keep up with growing Internet traffic demand.

Zeus Kerravala, a senior vice president at the market research firm Yankee Group, agreed. But he

said the announcement is still very important to the growth of the Internet and future innovation of new applications.

"There is no way that a routing announcement could live up to the hype that Cisco created," he said. "But if you look down the road, when consumers want to watch multiple channels of high-definition video and 3D programming, and as more mobile apps come onto 4G wireless networks, companies like Cisco and its rival Juniper Networks need to push the envelope in terms of routing engineering."



REAL-TIME OPERATING SYSTEM

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Article Title

Real-Time Operating System.

Article Description

This article gives information about a real-time operating system used for real-time applications.

A **real-time operating system** (**RTOS**) is an operating system (OS) intended for real-time applications. Such operating systems serve application requests nearly real-time. A real-time operating system offers programmers more control over process priorities. An application's process priority level may exceed that of a system process. Real-time operating systems minimize critical sections of system code, so

that the application's interruption is nearly critical.

A key characteristic of a real-time OS is the level of its consistency concerning the amount of time it takes to accept and complete an application's task; the variability is jitter. A hard real-time operating system has less jitter than a soft real-time operating system. The chief design goal is not high throughput, but rather a guarantee of a soft or hard performance category. A real-time OS that can usually or generally meet a deadline is a soft real-time OS, but if it can meet a deadline deterministically it is a hard real-time OS.

A real-time OS has an advanced algorithm for scheduling. Scheduler flexibility enables a wider, computer-system orchestration of process priorities, but a real-time OS is more frequently dedicated to a narrow set of applications. Key factors in a real-time OS are minimal interrupt latency and minimal thread switching latency, but a real-time OS is valued more for how quickly or how predictably it can respond than for the amount of work it can perform in a given period of time.

Design philosophies

Two basic designs exist:

- Event-driven which switches tasks only when an event of higher priority needs service, called preemptive priority, or priority scheduling.
- Time-sharing designs switch tasks on a regular clock interrupt, and on events, called round robin.

Time-sharing designs switch tasks more often than strictly needed, but give smoother, more deterministic multitasking, giving

the illusion that a process or user has sole use of a machine.

Early CPU designs needed many cycles to switch tasks, during which the CPU could do nothing else useful, so early OSes tried to minimize wasting CPU time by maximally avoiding unnecessary task switching. For example, in a 20 MHz 68000 processor (typical of late 1980s), task switch times are roughly 20 microseconds. In contrast, a 100 MHz ARM CPU (from 2008) switches in less than 3 microseconds.

Scheduling

In typical designs, a task has three states: 1) running, 2) ready, 3) blocked. Most tasks are blocked, most of the time. Only one task per CPU is running. In simpler systems, the ready list is usually short, two or three tasks at most.

Usually the data structure of the ready list in the scheduler is designed to minimize the worst-case length of time spent in the scheduler's critical section, during which preemption is inhibited, and, in some cases, all interrupts are disabled. But, the choice of data structure depends also on the maximum number of tasks that can be on the ready list.

If there are never more than a few tasks on the ready list, then a doubly linked list of ready tasks is likely optimal. If the ready list usually contains only a few tasks but occasionally contains more, then the list should be sorted by priority, so that finding the highest priority task to run does not require iterating through the entire list. Inserting a task then requires walking the ready list until reaching either the end of the list, or a task of lower priority than that of the task being inserted. Care

must be taken not to inhibit preemption during this entire search; the otherwise-long critical section should probably be divided into small pieces, so that if, during the insertion of a low priority task, an interrupt occurs that makes a high priority task ready, that high priority task can be inserted and run immediately before the low priority task is inserted.

The critical response time—sometimes called the flyback time—is the time it takes to queue a new ready task and restore the state of the highest priority task to running. In a well-designed RTOS, readying a new task will take 3 to 20 instructions per ready-queue entry, and restoration of the highest-priority ready task will take 5 to 30 instructions.

In more advanced real-time systems, real-time tasks share computing resources with many non-real-time tasks, and the ready list can be arbitrarily long. In such systems, a scheduler ready list implemented as a linked list would be inadequate

Temporarily masking/disabling interrupts

General-purpose operating systems usually do not allow user programs to mask (disable) interrupts, because the user program could control the CPU for as long as it wishes. Modern CPUs don't allow user mode code to disable interrupts as such control is considered a key operating system resource. Many embedded systems and RTOSs, however, allow the application itself to run in kernel mode for greater system call efficiency and also to permit the application to have greater control of the operating environment without requiring OS intervention.

On single-processor systems, if the application runs in kernel mode

and can mask interrupts, often interrupt disablement is the best (lowest overhead) solution to prevent simultaneous access to a shared resource. While interrupts are masked, the current task has exclusive use of the CPU since no other task or interrupt can take control, so the critical section is protected. When the task exits its critical section, it must unmask interrupts; pending interrupts, if any, will then execute. Temporarily masking interrupts should only be done when the longest path through the critical section is shorter than the desired maximum interrupt latency, or else this method increases the system's maximum interrupt latency. Typically this method of protection is used only when the critical section is just a few instructions and contains no loops. This method is ideal for protecting hardware bit-mapped registers when the bits are controlled by different tasks.

Binary semaphores

When the critical section is longer than a few source code lines or involves lengthy looping, an embedded/real-time algorithm must resort to using mechanisms identical or similar to those available on general-purpose operating systems, such as semaphores and OS-supervised interprocess messaging. Such mechanisms involve system calls, and usually invoke the OS's dispatcher code on exit, so they typically take hundreds of CPU instructions to execute, while masking interrupts may take as few as one instruction on some processors. But for longer critical sections, there may be no choice; interrupts cannot be masked for long periods without increasing the system's interrupt latency.

A binary semaphore is either locked or unlocked. When it is locked, tasks must wait for the semaphore. A binary semaphore is therefore equivalent to a mutex. Typically a task can set a timeout on its wait for a semaphore. There are several well-known problems with semaphore based designs such as priority inversion and deadlocks.

In priority inversion, a high priority task waits because a low priority task has a semaphore. A typical solution is to have the task that owns a semaphore run at (inherit) the priority of the highest waiting task. But this simplistic approach fails when there are multiple levels of waiting: A waits for a binary semaphore locked by B, which waits for a binary semaphore locked by C. Handling multiple levels of inheritance without introducing instability in cycles is complex.

In a deadlock, two or more tasks lock semaphores and then wait forever (that is, no timeout) for other the other task's semaphore, creating a cyclic dependency graph. The simplest deadlock scenario occurs when two tasks lock two semaphores in lockstep, but in the opposite order. Deadlock is usually prevented by careful design, or by having floored semaphores (which pass control of a semaphore to the higher priority task on defined conditions).

Binary semaphores in existing real-time operating systems

Operating system	Protocol	Details
uC/OS-II	Priority Calling	Addresses priority inversion, but suffers from chained blocking and deadlock.

Message passing

The other approach to resource sharing is for tasks to send messages in an organized message passing scheme. In this paradigm, the resource is managed directly by only one task. When another task wants to interrogate or manipulate the resource, it sends a message to the managing task. Although their real-time behavior is less crisp than semaphore systems, simple message-based systems avoid most protocol deadlock hazards, and are generally better-behaved than semaphore systems. In particular, a queue entry is the entire resource consumed by a waiting service request. However, problems like those of semaphores are possible: Priority inversion can occur when a task is working on a low-priority message, and ignores a higher-priority message (or a message originating indirectly from a high priority task) in its incoming message queue. Protocol deadlocks can occur when two or more tasks wait for each other to send response messages.

Interrupt handlers and the scheduler

Since an interrupt handler blocks the highest priority task from running, and since real time operating systems are designed to keep thread latency to a minimum, interrupt handlers are typically kept as short as possible. The interrupt handler defers all interaction with the hardware as long as possible; typically all that is necessary is to acknowledge or disable the interrupt (so that it won't occur again when the interrupt handler returns). The interrupt handler then queues work to be done at a lower priority level, often by unblocking a driver task (through releasing a semaphore or sending a message). The scheduler

often provides the ability to unblock a task from interrupt handler context.

An OS maintains catalogs of objects it manages, such as threads, mutexes, memory, and so on. Updates to this catalog must be strictly controlled. For this reason it can be problematic when an interrupt handler call an OS function while the application is in the act of also doing so. The OS function called from an interrupt handler can find the object database to be in an inconsistent state because of the application's update. In general there are two major approaches to deal with this problem: the unified architecture and the segmented architecture. RTOSs implementing the unified architecture solve the problem by simply disabling interrupts while the internal catalog is updated. The downside of this is that interrupt latency increases, potentially losing interrupts. The segmented architecture does not make direct OS calls but delegates the OS related work to a separate handler. This handler runs at a higher priority than any thread but lower than the interrupt handlers. The advantage of this architecture is that the RTOS adds very few cycles to interrupt latency. As a result, OSes which implement the segmented architecture are more predictable and can deal with higher interrupt rates compared to RTOSs implementing the unified architecture.

Memory allocation

Memory allocation is even more critical in an RTOS than in other operating systems.

First, speed of allocation is important. A standard memory allocation scheme scans a linked list of indeterminate length to find a suitable free memory block;

however, this is unacceptable as memory allocation has to occur in a fixed time in an RTOS.

The simple fixed-size-blocks algorithm works astonishingly well for simple embedded systems.

Examples

An early example of a large-scale real-time operating system was the Transaction Processing Facility developed by American Airlines and IBM for the Sabre Airline Reservations System.

Currently the best known, most widely deployed, real-time operating systems are

- QNX
- RTLinux
- VxWorks
- Windows CE

Author

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Article Title

A Professional Biography.

Article Description

This article gives some tips to make a professional biography.

A PROFESSIONAL BIOGRAPHY

A professional biography or overview, showcasing your background, experience and expertise, is a necessity for every business owner. While any information about you and your business is helpful, information that is presented in a professional, well-polished manner can make all the difference in how others perceive you. Consider these important points as you craft your own professional biography.

1. One page wonder.

Your professional biography should be a few paragraphs and

kept to one page or less. One page is perfect for copying on the reverse side of a handout or flyer. Several paragraphs, left justified make it easier to read and skim.

2. First, second, or third person?

Always write your biography in the third person. That is, refer to yourself by your name or she/he as appropriate. It sounds more professional as it appears that a third party wrote the text.

3. Business in brief.

Not only do readers want to know what you do, but also they want to know who you work with - because they might want to work with you! A professional biography should include a sentence or two about your business niche (or niches) as well as the types of clients you serve.

4. And the winner is....

Make sure that you include a list of awards that you have received. Readers are interested in knowing about your talents and the organizations that recognize you for them.

5. Organizations.

Include names of the organizations, clubs, or associations to which you belong. A reader's interest might be highlighted at seeing that you belong to the same alumni association or professional business group. Again, these connections might possibly lead to some interesting and exciting business opportunities.

6. Certifications and designations.

Include any professional certifications or designations you hold. Make sure you write out their names in full, rather than use abbreviations. Not everyone might

know that CMA stands for Certified Management Accountant. And, perhaps, in a different discipline, it might represent something else - like a Certified Materials Analyst. If you no longer hold a particular designation, but it has played a major role in who you are and what you do, don't hesitate to make a reference to it. Don't include abbreviations of college degrees, like MBAs as it looks unprofessional. The only exception to this would be for a Ph.D. designation.

7. Published?

Have you written any articles, books, e-courses or e-books? Self-published or not, your works add to your level of professionalism and credibility. Showcase them in your biography and you might earn additional royalties in terms of new clients or other opportunities.

8. Did I mention the media?

Have you been a guest on talk radio or television? Were you or your business featured or even mentioned in a newspaper article? If so, readers want to know. Again, these types of "mentions" add to your credibility and presence.

9. Call me any time.

People who want to know about you will read your biography for just that reason. And, if it’s compelling, rich, and includes the information they're interested, in, they'll want to contact you. Include complete contact information like your title (if any), name, address, telephone, fax, email, and website address. Make it easy to find this information by including it in the last paragraph of your professional overview.

10. Write, rewrite, and do it again.

After you have written your biography, edit, edit, and edit

again. You may need to do a dozen or so revisions before you get it just right. Eliminate extra words, use descriptive words, keep the sentences short but varied in length, and write in the third person. Ask some friends to provide input as well. Make sure to revise your biography regularly to keep it up-to-date and refreshed.

Author

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Article Title

eyeOS

Article Description

This article gives information about the eyeOS and its history.

eyeOS is an open source web desktop following the cloud computing concept that leverages collaboration and communication among users. It is mainly written in PHP, XML, and JavaScript. It acts as a platform for web applications written using the eyeOS Toolkit. It includes a Desktop environment with 67 applications and system utilities. It is accessible by portable devices via its mobile front end.

HISTORY of eyeOS

The first publicly available eyeOS version was released on August 1, 2005 as eyeOS 0.6.0 in Barcelona (Spain). At the time, it greatly participated in creating the definition of a web operating system and acted as a concept. Quickly, a worldwide community of developers took part in the project and helped improve it by translating, testing and developing it.

After two years of development, the eyeOS Team published eyeOS

1.0(on June 4, 2007). Compared with previous versions, eyeOS 1.0 introduced a complete reorganization of the code and some new web technologies, like eyeSoft, a portage-based web software installation system. Moreover, eyeOS also included the eyeOS Toolkit, a set of libraries allowing easy and fast development of new web Applications.

With the release of eyeOS 1.1 on July 2, 2007, eyeOS changed its license and migrated from GNU GPL Version 2 to Version 3.

Version 1.2 was released just a few months after the 1.1 version and integrated full compatibility with Microsoft Word files.

eyeOS 1.5 Gala was released on January 15, 2008. This version is the first to support both Microsoft Office and OpenOffice.org file formats for documents, presentations and spreadsheets. It also has the ability to import and export documents in both formats using server side scripting.

eyeOS 1.6 was released on April 25, 2008 and included many improvements such as synchronization with local computers, drag and drop, a mobile version and more.

eyeOS 1.8 Lars was released on January 7, 2009 and featured a completely rewritten file manager and a new sound API to develop media rich applications. Later, on April 1, 2009 1.8.5 was released with a new default theme and some rewritten apps such as the Word Processor or the Address Book. On July 13, 2009 1.8.6 was released with an interface for the iPhone and a new version of eyeMail with support for POP3 and IMAP.

Structure and API

Each core part of the desktop is its own application, using javascript to send server commands as the user interacts. As actions are performed using ajax (such as launching an application), it sends event information to the server. The server then sends back tasks for the client to do in XML format, such as drawing a widget.

On the server, eyeOS uses XML files to store information. This makes it simple for a user to set up on the server, as it requires zero configuration other than the account information for the first user, making it simple to deploy. To avoid bottlenecks that flat files present, each user's information and settings are stored in different files, preventing resource starvation from occurring.

Video Display Devices

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Article Title

Video Display Devices

Article Description

This article gives information about different display devices and its uses.

The display devices used commonly can be classified as below:

- Cathode Ray Tube (CRT) display
- Liquid Crystal Display (LCD) display
- Plasma Displays

Cathode Ray Tube (CRT):

CRT display is the most commonly used form of visual displays, through it is getting gradually replaced with LCD and Plasma displays.

A computer monitor using CRT display.

In a CRT, an electron beam sweeps the display screen horizontally, one line at a time, gradually down the screen. A synchronization (sync) signal brings the beam back to the top row of the display. This type of scanning (line-by-line) is known as raster scan.

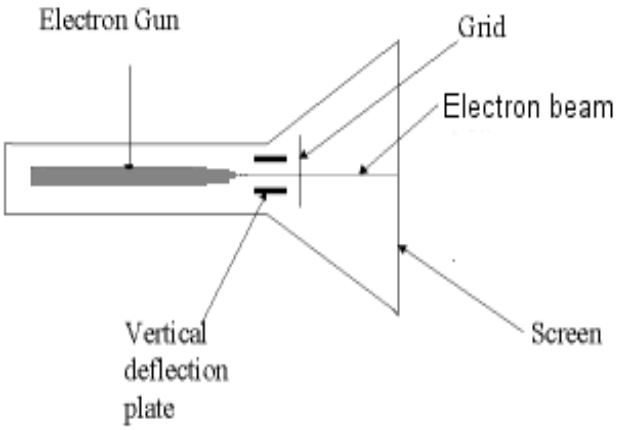
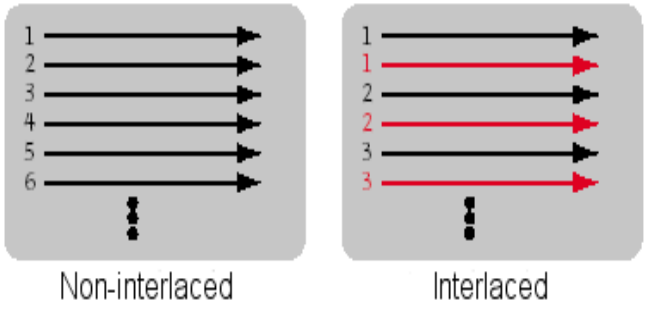


Figure: CRT cross sectional diagram showing important components of a CRT.

There are two types of cathode ray displays. One is non-interlaced, and the other is interlaced. Normally, all the displays are interlaced to reduce flicker.



As shown in the figure, for non-interlaced display, the scanning is done continuously from top to bottom. For non-interlaced display, alternate rows are scanned.

A black and white monitor contains only one electron gun, whereas a color display monitor will have three electron guns, each of which represent red, green, and blue.

The horizontal and vertical deflection takes place by applying appropriate voltages to the horizontal, and vertical deflection plates. Usually, the screen is refreshed between 60-100 times per second.

The grid shown in the figure controls the speed with the electrons hit the screen. If a positive voltage is applied to the screen grid, because of which the electrons are accelerated and hit the screen, making the screen brighter. If a negative voltage is applied to the grip, the electrons are decelerated and the screen will not glow. The microscopic control of electron beam flow, produces images on the screen.

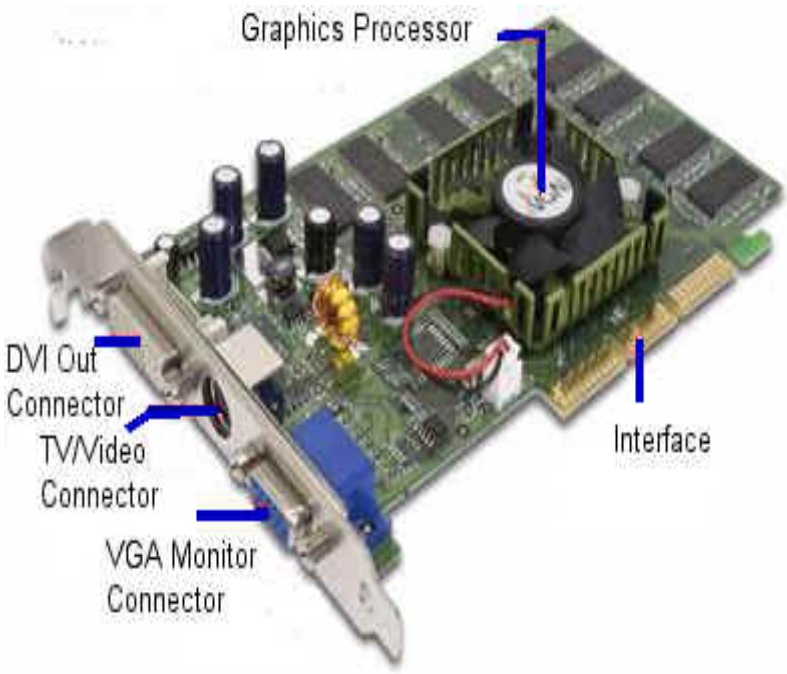
One basic unit of measurement is "pixel". A pixel is the smallest area in a graphics display that can be manipulated.

Given below are the commonly used screen resolutions:

Screen resolution is always stated as the horizontal number of pixels by the vertical number of pixels. A screen displaying 800 x 600 pixels has 600 rows, each 800 pixels wide.

Display Type	Number of pixels
Video Graphics Array (VGA)	640 * 480 pixels
Super Video Graphics Array(SVGA)	800 * 600 pixels
eXtended Graphics Array (XGA)	1024 * 768 pixels
Super eXtended graphics Array (SXGA)	1280 * 1024 pixels

Graphics Cards: The graphics card resides in the CPU box, and drives the video display. A typical graphics card is shown below:



The graphics card shown includes DVI connector, TV/Video connector, and a VGA connector. The card has an on-board graphics processor with cooling fan. Usually, for graphic intensive applications, you need a higher end graphic adapter card. For normal desktop usage, a video adapter will be sufficient.

Mailing List

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Happenings

SEMINAR

"Knowledge Is Power"

K.S.RANGASAMY COLLEGE OF ARTS AND SCIENCE

DEPARTMENT OF COMPUTER SCIENCE & APPLICATIONS

Innovative Seminar on

"PROGRAMMING IN JAVA"

By

Mr.Mayur Vasan, Group Leader,

Ken Education,

Erode.

Venue: A.C Gallery Hall

Time: 9:00 am – 5:00 pm

Date: 17th February 2010

Organized By

Department of Computer Science and Applications

Audience: III B.Sc(CS) & III BCA Students

The Lecture was on basics of JAVA, Inheritance, Interface, Multithreading, Packages and Applets. These concepts were briefed with programs related to real time applications which were relevant to industries. It also helps the students to contribute themselves in project work and equip their skills.

We welcome your valuable comments, suggestions & articles to
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Amazing technology from Japan .....

Are they pens with cameras?

In the revolution of miniature computers, scientists have made great developments with bluetooth technology. This is the forthcoming computers you can carry within your pockets ...

This "pen sort of instrument" produces both the monitor as well as the keyboard on any flat surfaces from where you can carry out functions you would normally do on your desktop computer.

Can anyone say, "Good-bye laptops!!!"