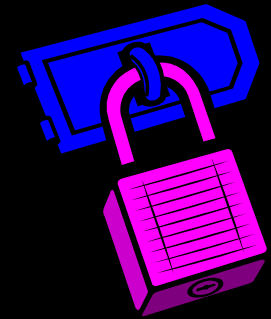


THREATS TO INFORMATION SYSTEMS



Threats to information systems

- **Hardware failure**
- **Fire**
- **Software failure**
- **Electrical problems**
- **Personnel actions**
- **User errors**
- **Access penetration, program changes**
- **Theft of data, services, equipment**
- **Telecommunications problems**



What is a Computer Virus?

- A software program
- Difficult to detect
- Spreads rapidly
- Destroys data
- Disrupts processing & memory
- Can **ONLY** catch a virus by running a program
- All computer viruses are man-made





Virus Found!

Scanning Information

Started: Manually 6/10/2005 4:18:17 PM
Ended: 6/10/2005 4:18:17 PM
Objects scanned: 5
Errors: 0

Display Test configuration

Virus statistics

Infected:	3
Healed:	0
Moved to Virus Vault:	0
Deleted:	0



Virus Alert



Norton AntiVirus has detected and removed a virus from your computer.

Object Name: C:\DOCUME~1\Ranjeet\LOCALS~1\Temp\2t99k.dll

Virus Name: Bloodhound.Packed.Jmp

Action Taken: The file was automatically deleted.

OK

- There are viruses that can simply display annoying messages on your computer screen and go away. On the other hand, there are viruses that can cause real harm to your computer by wiping out all information on your hard drive or changing all your file extensions.
- Viruses are becoming more prevalent because they can spread rapidly around the world by the click of a mouse.

Basic virus terminology

- **Worm**
 - Special type of virus that can replicate itself and use memory, but cannot attach itself to other programs. Uses computer networks to replicate itself.
- **Trojan Horse**
 - A computer program that installs malicious software under the guise of doing something else. Trojan Horses do not reproduce automatically.

A Trojan Horse Was Found!



There is no reason to worry, though. avast! has stopped the malware before it could enter your computer. When you click on the "Abort connection" button, the download of the dangerous file will be canceled.

File name: http://www13.plala.or.jp/setfsb/download/beta/setfsbU15a3_P5w/
Malware name: Win32:Killwin-F [Trj]
Malware type: Trojan Horse
VPS version: 0634-0, 21/08/2006

Processing

[Abort connection](#)

<http://www.avast.com>

[Fill in our virus report to help us](#)

[improve avast!](#)

Virus Detected!



Mail scanner detected a virus.

Mail Scan

Subject: A special excite game
Virus name: WORM_KLEZ.H
From: user <user@company.com>
Action when virus found: Unable to clean. The file was deleted.

Close

Emergency Lock

• Spyware

- Spyware is a small program or piece of code that is secretly installed on your computer and designed to “spy” on your online activity and/or personal information.
- It also interferes with user control of the computer in other ways, such as installing additional software, redirecting Web browser activity etc.

Symptoms-

- Your computer is **running much slower than usual**.
- Your computer takes a lot longer to boot up than it used to.
- You see a lot of activity on your network connection.

- **Adware (Spyware's close cousin)**

- Adware tracks your browsing habits, the type of ads you click on, bookmarks you make and other similar online activities.
- Because adware's purpose is designed to get you to perform an action, it is much easier to recognize than spyware.

Symptoms-

- Pop-up ads that won't quit.
- A hijacked browser home page.
- Search results that make no sense - Clicking on the links here will install spyware on your PC.

Songs.PK - Latest Bollywood Songs, Songspk, Pakistani Indian Movie Songs, Hindi Albums, Download Fr... http://optimizedby.rmxads.com - Amazing Speeds - Tata Photon - Microsoft Inte...

File Edit View Favorites Tools Help

Address http://songs.pk/

Web Search Bookmarks Settings Messenger Mail

http://adserving.cpxinteractive.com - New offer! - Microsoft Internet Explorer

Turn Your Desktop Into a Fun Clock!

Always FREE!

POPULAR SCREENSAVERS

Choose from over 40 channels
digital picture quality

Replay

Know more

photon TV
TV you can't carry

Only on TATA photon+
whole broadband service

photon+ USB

HDFC BANK
We understand your world

5x REWARD POINTS

We understand your need to get more benefits from your Credit Card. Now earn 5 times the reward points on every transaction.

Know More

Done Internet

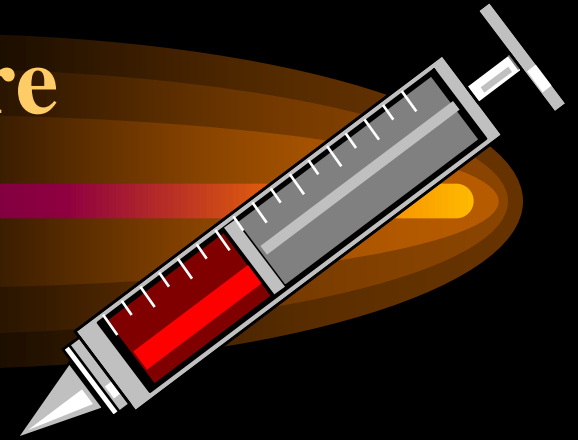
start My Computer Removable Disk (I:) Microsoft PowerPo... Songs.PK - Latest ... http://adserving.c... http://optimizedby... 1:41 AM

The image is a screenshot of a Windows XP desktop environment. At the top, there are two browser windows. The left window is titled 'Songs.PK - Latest Bollywood Songs, Songspk, Pakistani Indian Movie Songs, Hindi Albums, Download Fr...' and shows the address bar with 'http://songs.pk/'. The right window is titled 'http://optimizedby.rmxads.com - Amazing Speeds - Tata Photon - Microsoft Inte...' and displays a large advertisement for Tata Photon+ TV. The ad features a large clock with birds perched on it, and the text 'Turn Your Desktop Into a Fun Clock!' and 'Always FREE!'. Below the clock, it says 'POPULAR SCREENSAVERS'. To the right of the clock, there is a 'Replay' button and a 'Know more' button. The ad also features the 'photon TV' logo with the tagline 'TV you can't carry' and the 'TATA photon+' logo with the tagline 'whole broadband service'. A small image of a Photon+ USB device is also visible. Below the main advertisement, there is a banner for HDFC BANK. The banner features the HDFC logo and the text 'HDFC BANK We understand your world'. It also includes a '5x REWARD POINTS' badge and the text 'We understand your need to get more benefits from your Credit Card. Now earn 5 times the reward points on every transaction.' There are two 'Know More' buttons on the banner. At the bottom of the screen, the Windows taskbar is visible, showing the Start button, several icons, and the taskbar with the following open applications: 'My Computer', 'Removable Disk (I:)', 'Microsoft PowerPo...', 'Songs.PK - Latest ...', 'http://adserving.c...', and 'http://optimizedby...'. The system tray on the right shows the Internet icon, a network icon, and the time '1:41 AM'.

Other computer viruses

- **Concept, Melissa:**
 - Word documents, e-mail. Deletes files
- **Form:**
 - Makes clicking sound, corrupts data
- **Explore.exe:**
 - Attached to e-mail, tries to e-mail to others, destroys files
- **Monkey:**
 - Windows won't run
- **Chernobyl:**
 - Erases hard drive, ROM bios
- **JUNKIE:**
 - Infects files, boot sector, memory conflicts

Antivirus software



- Software to detect viruses
- Eliminate viruses
- Advanced versions run in memory to protect processing, guard against viruses on disks, and on incoming network files
- All major anti-virus software includes an “e-mail scan” feature that will check your e-mail attachments for viruses before you open the attachments.

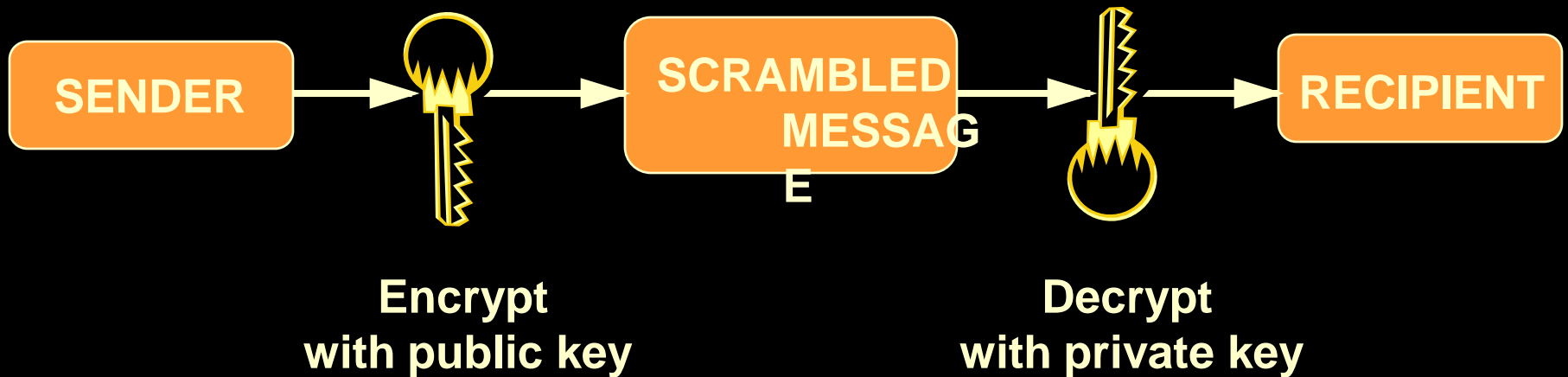
SECURITY AND THE INTERNET

- **ENCRYPTION:**
Coding & scrambling
messages to deny
unauthorized access
- **AUTHENTICATION:**
Ability to identify another party



SECURITY AND THE INTERNET

PUBLIC KEY ENCRYPTION



Principles of a Simple Cryptography

- Substitution

THIS IS A SECRET (key $n=3$)

WKLV LV D VHFUHW

- Transposition

THIS IS A SECRET (key 4213)

IHSTSI S EAERTC

Caesar Cipher



ABCDEFGHIJKLMNOPQRSTUVWXYZ



Rotate 13 points

NOPQRSTUVWXYZABCDEFGHIJKLM



THE GOTHS COMETH

(Plaintext)



$(n=13)$

GUR TAFUE PAYRFU

(*Ciphertext*)

Rotating Key Cipher

- ABCDEFGHIJKLMNOPQR**S**TUVWXYZ
- BCDEFGHIJKLMNOPQRS**T**UVWXYZA
- CDEFGHIJKLMNOPQRST**U**VWXYZAB
- **DE**FGHIJKLMNOPQRST**U**VWXYZ**ABC**
- EFGHIJKLMNOPQRST**U**VWXYZ**AB**CD
- FGHIJKLMNOPQRST**U**VWXYZ**ABC**DE
- GHIJKLMNOPQRST**U**VWXYZ**ABC**DEF
- HIJKLMNOPQRST**U**VWXYZ**ABC**D...

General Principles



- Longer keys make better ciphers
- Random keys make better ciphers
- Good ciphers produce “random” ciphertext
- Best keys are used once and thrown away