COSC 122
Computer Fluency

Social Implications of IT

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Key Points

1) Information technology improves our lifestyle and our society, but also introduces challenges related to its ethical use and management.

2) We must be aware of potential violations of our privacy and our computer by malicious programs and companies.

3) Copyright protects intellectual property from unauthorized distribution and modification.

Implications of Technology

Information technology, like any technological advance, can be used both for the benefit and the destruction of society.

As we become increasingly reliant on information technology, it is important that it be used appropriately and ethics guide its development and use.

As individuals, information technology is pervasive in our lives. Although this leads to new opportunities and experiences, we also must deal with the associated problems as well.

IT and Communications

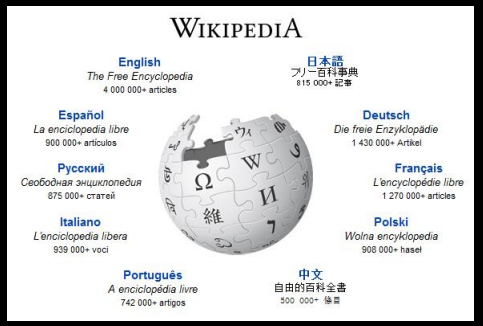
IT has allowed for real-time, inexpensive, readily-accessible communications across the globe.

The benefits of reliable communication are enormous - both personally and economically to our society.

However, communication tools can also be a time-consuming distraction that invades other aspects of our life. Further, we also must deal with limitations and challenges with the tools themselves.

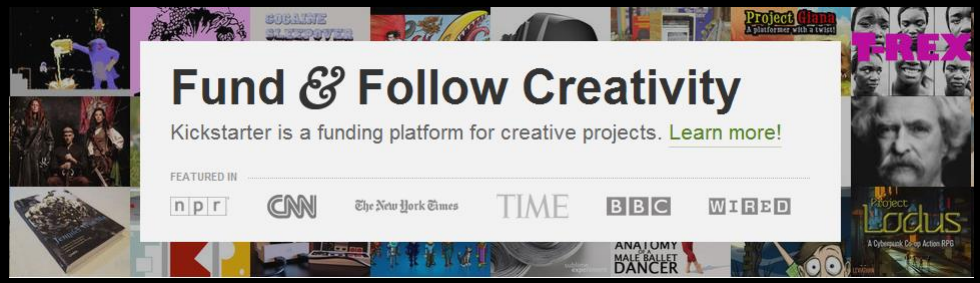
Crowdsourcing

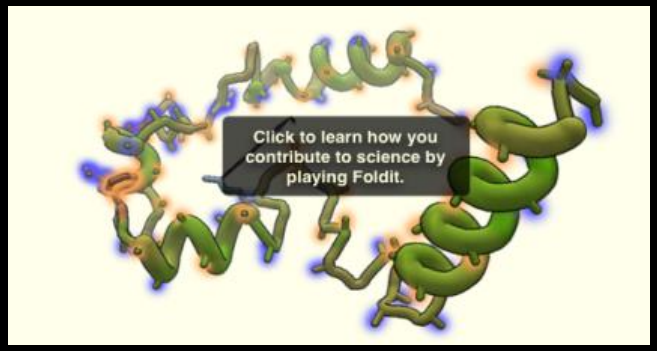
Crowdsourcing involves solving a problem or goal by using a large volunteer population.



Examples:

- Wikipedia http://www.wikipedia.org/
- Be a Martian (NASA) http://beamartian.jpl.nasa.gov/
- Foldit http://fold.it
- Freerice http://freerice.com
- Kickstarter http://www.kickstarter.com





Email Benefits and Challenges

Email and instant/text messaging are the most commonly used electronic communication methods.

Text conversation introduces some issues:

- Conveying emotion - happy faces (*emoticons*) sometimes used
- Emphasis - hard to highlight what is important without other cues
- Conversational pace - asynchronous nature makes dialog hard
- Ambiguity - poor formatting causes misinterpretations
- Flame-a-thons - due to impersonal nature, harsh and inflammatory messages are easier to write.
- Spam - junk messages sent by automatic programs
- Size limits – condense dialog and introduce ambiguities
- History – can be kept forever and may be public

Internet Etiquette

Internet etiquette are rules that civilized people use when communicating and interacting on the Internet that makes the interactions more personable, enjoyable, and acceptable.

- **Act as if you are there in person and that you were being recorded for everyone to see.**

Some email etiquette rules:

- Keep messages short and on a single topic.
- Always include context (question with your answer).
- Use an automated reply if unable to answer for a period of time.
- Answer a backlog of emails in reverse order.
- Get the sender's permission before forwarding email.
- Use targeted distribution lists (don't send that joke to everyone).
- Do not write in all capital letters.
- **Emails should still look "professional".**

Dealing with the Uncivilized

As in any society, people do not follow the rules all the time.

The best policy is to show the respect and grace in a virtual world that you would in the real-world.

- No harassment, slander, rudeness, etc.
- Remember: **The virtual world is not anonymous.**

Dealing with spam email and companies is mostly out of your control. To avoid spam, limit how you give out your e-mail address and do not post it on a web site.

- Use real-world and technical savvy to detect scams and marketing. Watch for non-professional e-mails, strange e-mail addresses, etc. Be very careful with personal data.
- Aside: Why do spam e-mails have many spelling mistakes?
  - ⇨ To avoid spam filters, recognizing common spam keywords.

Phishing

Phishing is the use of spam messages to trick users into supplying passwords and financial and personal data.

- Messages often report of security problems at your bank and direct to a bogus web site for data entry.

Notes:

- Never respond to requests for personal information over email. Legitimate businesses do not request information this way.
- Do not click on links or pre-typed addresses because they can be spoofed. Type the URL yourself.
- Check to make sure the web site is using encryption.
- Routinely review credit card and bank statements for unusual activity. Report suspected abuses to proper authorities.

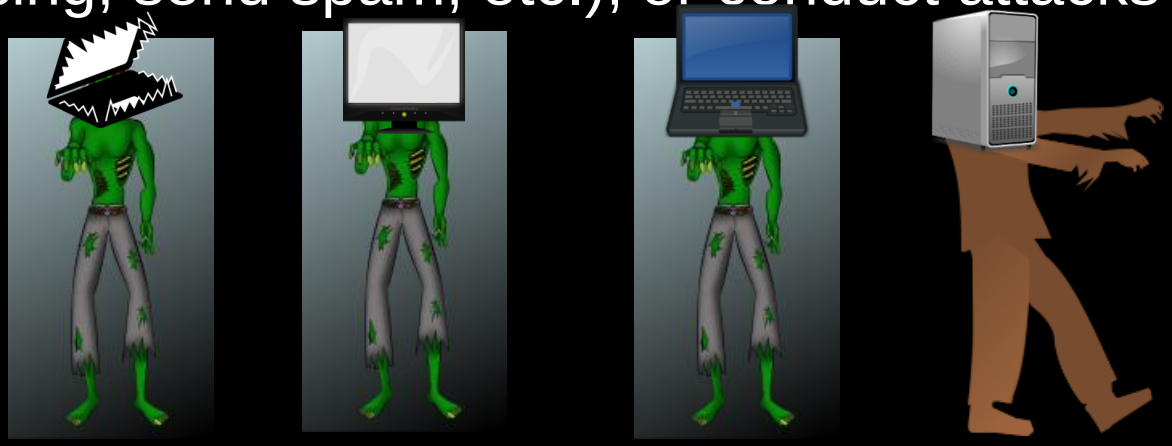
Malicious Threats
Viruses and Worms

Viruses and worms are programs that are designed to negatively effect your computer. Often they are used to destroy software or steal personal data.

- A ***virus*** is a program that "infects" another program by embedding a copy of itself. When the infected program runs, the virus copies itself and infects other programs.
- A ***worm*** is an independent program that copies itself across network connections.
- A ***trojan*** is a program that hides inside another useful program, and performs secret operations.
  - ⇨ May record keystrokes or other sensitive data or load malicious software.
- An ***exploit*** is a program that takes advantage of a security hole.
  - ⇨ Backdoor access enters computer and reconfigures it for remote control.

Zombies!!

Writing viruses and breaking into computer systems is a big business. Money can be made by stealing passwords and data, using computers to conduct activities (click on advertising, send spam, etc.), or conduct attacks on others.



Zombies – Infected, controlled computers

Botnet – Group of zombies working together

You are most likely to get bitten and infected by **social engineering** tricks rather than technical reasons!

Preventing Viruses and Worms

Viruses must enter your computer through an entry point:

- infected email - with an attachment containing the program
- infected web site - that downloads malicious software
- infected program - loaded onto computer (from P2P, other users)

Although up-to-date anti-virus software offers protection, ***you*** are the ultimate line of defense.

Always evaluate what email you open, web sites you visit, and programs you install on your computer. Once you make the initial decision to allow access, it is impossible to know exactly what a program does on your computer.

Intellectual Property

Intellectual property is any human creation like a photograph, music, textbooks, cartoons, etc.

Software is licensed in a form of leasing instead of buying. The license gives you the right to use the software personally, but not sell or give it away.

Shareware software allows you to download and try software for free, then pay the designer if you use it (honor system).

Ethics: It is very tempting to steal intellectual property (software, music, videos) on the Internet due to the availability of copying and distribution sites and tools.

- It is still ***STEALING***, even in a digital, virtual world.

Copyright

A person automatically owns ***copyright*** of what he creates in the U.S., Canada, and most nations. Copyright applies to almost all artistic works (books, music, video, art, etc).

The copyright protects the owner's right to:

- Make a copy of the work
- Use a work as the basis for a new work (derivative work)
- Distribute or publish the work, including electronically
- Publicly perform and display the work

You are free to view or read anything on the Internet, but you need the copyright holder's permission to re-publish, modify, or re-distribute.

Copyright and Free Use

The concept of ***Fair Use*** allows use of copyrighted material for educational or scholarly purposes, to allow limited quotation for review or criticism, and to permit parody.

Fair Use normally applies to distribution that is non-commercial.

There are large fines for violating copyright laws, especially for commercial purposes.

- Software is protected under the Software Copyright Act of 1980 in the United States.

Software Development Ethics

Software developers should follow ethical standards in the development of their systems.

- Professional societies such as the Association of Computing Machinery (ACM) and the Institute of Electrical and Electronic Engineers (IEEE) have defined a code of ethics and professional practice.

Ethics are especially important for developers as many systems are ***safety-critical*** whose failure impacts society.

- Examples: control system in a nuclear reactor, communication networks (including the Internet), bank and financial systems

Such safety-critical systems use hardware redundancy, risk management techniques, and highly structured software engineering development methodologies.

Survey
Virus Writing

Question: Would you write a destructive virus if you were absolutely sure you would not be caught?

A) yes

B) no

C) depends on the destructive effect

Survey
Intellectual Property - Software

Question: It is acceptable to copy or use software obtained on the Internet without purchasing it …

A) never

B) sometimes depending on circumstances

C) always

Survey
Intellectual Property - Music

Question: It is acceptable to copy or download music without paying …

A) never

B) sometimes depending on circumstances

C) always

Survey
Intellectual Property - Frequency

Question: I have copied/downloaded music, movies, or software without paying …

A) never

B) in my lifetime

C) in the last year

D) in the last week

E) right now … during class

Survey
Intellectual Property - Reasons

Question: My major reason for copying/downloading music/software/movies is:

A) I do not do it.

B) cost

C) rich media companies/entertainers

D) convenience

E) other

Open Discussion

In small groups, discuss two questions:

1) What impacts (positive and negative) has technology had on your life?

2) What impacts (positive and negative) has technology had on society and our planet?

Conclusion

IT benefits society in numerous ways, but requires ethical management and use similar to other technologies.

Malicious programs such as viruses and worms enter your computer through an email, web site, or infected program. Anti-virus software prevents some infection, but the computer user is the ultimate line of defense.

Ethics apply to the development of software to ensure that safety is considered when building software that may have negative effects if failures occur.

Copyright protects intellectual property, and applies on the Internet even with the existence of tools and sites that allows users convenient ways to steal digital data.

Objectives

- List some issues with email.
- Define and give one example of netiquette.
- Define: phishing
- Define: virus, worm, trojan, exploit
- Explain the role of copyright for protecting intellectual property.
- Be able to discuss some benefits and issues with IT in your own personal life and society.