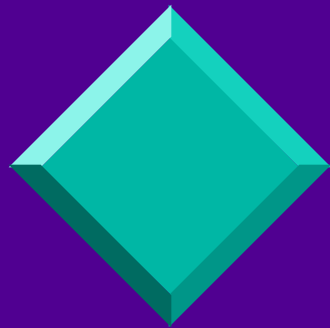


Teaching Social Impact and Career Preparation

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University of Toronto



Curriculum Changes

The new computer studies curriculum includes an emphasis on:

- ◆ the history of information technology
- ◆ the social impact of technology
- ◆ the importance of computer ethics
- ◆ employability skills
- ◆ career preparation



The New Strand

The Social Impact and Consequences strand:

- ◆ accounts for about 15% of course time
- ◆ gives the CS teacher more responsibility for informing the students about career opportunities and preparation
- ◆ provides opportunities for research, discussion, and presentations



Grade 10 CIS Expectations

Programming Language History

- ◆ describe the evolution of different levels of programming languages
- ◆ describe the need to translate higher-level languages to machine code



Grade 10 CIS Expectations

Social Impact:

- ◆ explain major developments in information technology and anticipate future changes
- ◆ describe how computers change how information is collected and how this effects people's privacy and access to information
- ◆ describe how computers change the ways in which people live, work, and communicate



Grade 10 CIS Expectations

Careers:

- ◆ describe software related careers

Safety:

- ◆ use appropriate strategies to prevent potential health and safety problems associated with computer use...



Grade 10 CIS Expectations

Ethics:

- ◆ comply with acceptable computer use policies



Grade 10 CE Expectations

Engineering History:

- ◆ identify important scientific advances in computer electronic components
- ◆ describe development of computer engineering technology and its impact



Grade 10 CE Expectations

Safety:

- ◆ use appropriate strategies to prevent potential health and safety problems associated with computer use...
- ◆ use safe practices in the handling of computer hardware and electronic components



Grade 10 CE Expectations

Careers:

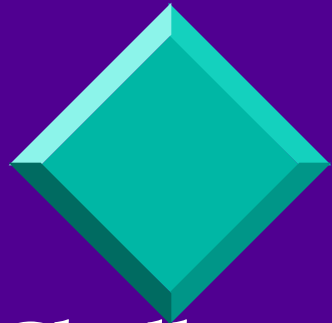
- ◆ describe careers related to computer engineering
- ◆ analyse the influences of computers on the engineering profession
- ◆ identify computer skills that are important to employers



Grade 10 CE Expectations

Ethics:

- ◆ demonstrate an understanding of the importance of ethical computer use
- ◆ demonstrate compliance with acceptable use policies



Computer History

Challenge

- ◆ you need to make it come to life!

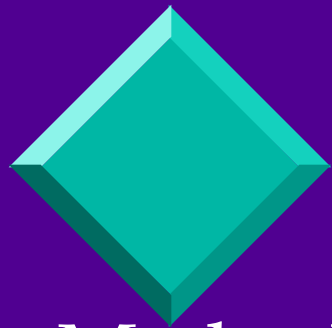
Computer history can be either cool and interesting or deadly dull. It is all in how you sell it.





Quick Lists

1. Make a list of at least five teaching strategies you would use to cover the history expectations. Be creative!
2. Make a list of at least five resources you could use to cover the history expectations.

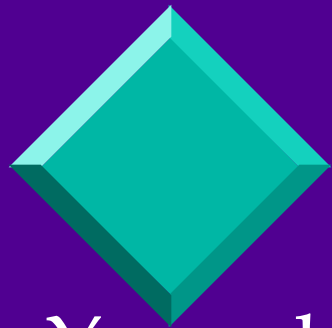


Computer History

Methodology

- ◆ debates
- ◆ presentations
- ◆ role playing
- ◆ papers
- ◆ virtual field trips





Teaching Safety

Your classroom must model the concepts.

- ◆ demonstrate correct procedures
- ◆ explain consequences of carelessness or mistakes
- ◆ discuss ergonomic issues
- ◆ models correct use and preventative measures
- ◆ have students conduct an inspection



Quick Lists

1. Make a list of at least five teaching strategies you would use to cover the career expectations. Be creative!
2. Make a list of at least five resources you could use to cover the career expectations.



Careers Preparation

Sources of Information

- ◆ guest speakers
- ◆ web searches
- ◆ newspapers
- ◆ magazines





Careers Preparation

Methodology

- ◆ brainstorming
- ◆ job searches
- ◆ skill webs
- ◆ interviews
- ◆ resume writing
- ◆ field trips





Why Computer Ethics?

“As we enter a generation marked by globalization and ubiquitous computing, the stakes are much higher, and consequently our deliberations must be broader, more profound, and above all effective in helping to realize a democratic and empowering technology rather than an enslaving and debilitating one.”

Simon Rogerson

Centre for Computing and Social Responsibility



What are Computer Ethics?

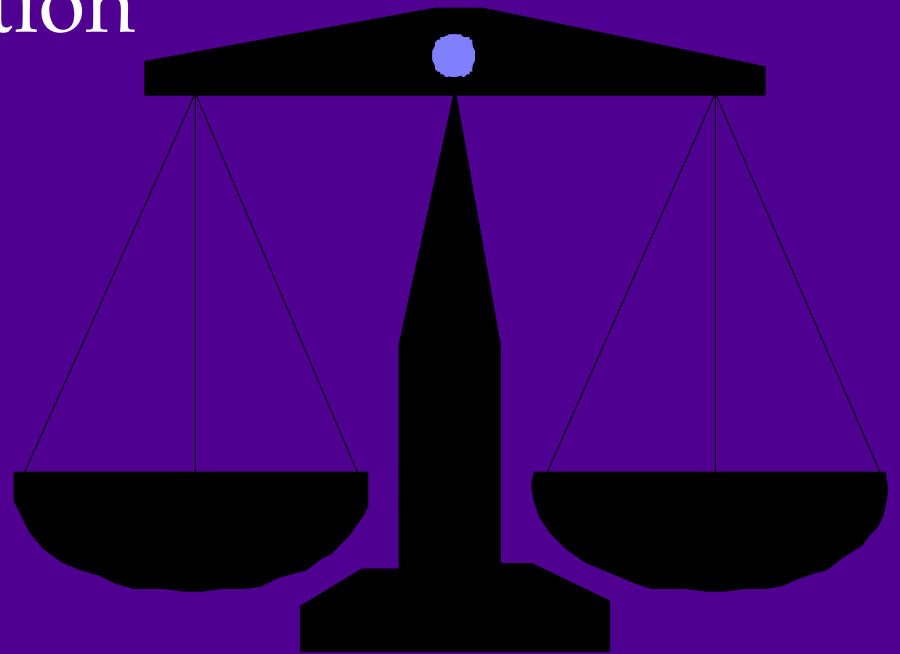
Areas of concern:

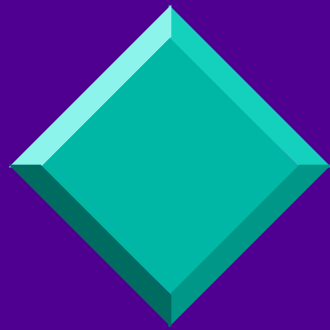
- ◆ ethical development: how information systems are developed
- ◆ ethical technology: the actual technologies we use to build systems
- ◆ ethical application: how this technology will be used

What are Computer Ethics?

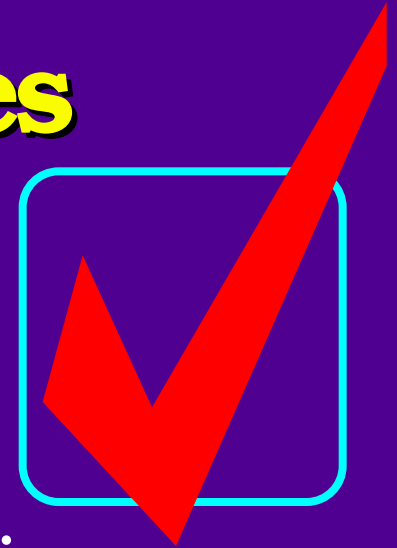
Means of application

- ◆ personal reflection and responsibility
- ◆ professional regulation
- ◆ legal enforcement





Learning Objectives



- ◆ personal responsibility regarding technology use
- ◆ professional responsibility regarding design of technology
- ◆ ability to do ethical reasoning
- ◆ ability to understand technology from a social and cultural perspective



Quick Lists

1. Make a list of at least ten ethical questions you could pose for students to answer.
2. Make a list of three strategies you would use to make it relevant to the kids own lives.



Questions to be Answered

- ◆ How should society cope with resulting unemployment and underemployment?
- ◆ How should we deal with exploitation of poor countries?
- ◆ What will happen to human relationships?
- ◆ Whose laws apply in cyberspace?
- ◆ How do we deal with the disenfranchised?



Looking at the Issues

Privacy:

- ◆ the ability to control personal information
- ◆ the right to know and not to know

Data Matching:

- ◆ collection of personal information by companies and governments
- ◆ pattern matching systems without human intervention



Looking at the Issues

Identity:

- ◆ increased dependence on digital icons (pin numbers, sin numbers, health card numbers)
- ◆ right to anonymity is threatened
- ◆ people are disenfranchised
- ◆ increased opportunity for computer fraud



Quick Lists

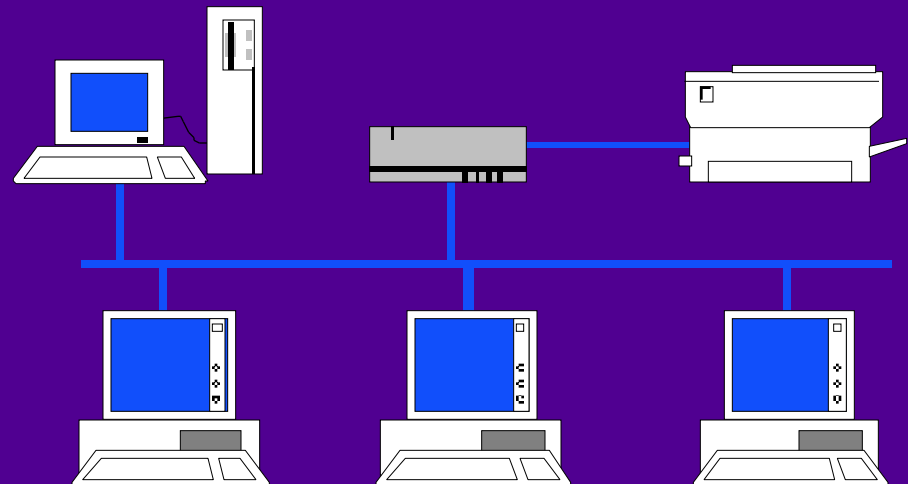
1. Make a list of at least five evil things your computer students do and how you could create a teachable moment around them.

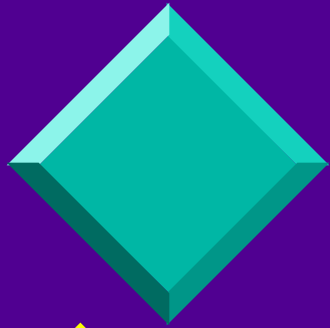


Hackers

Profile:

- ◆ male
- ◆ between the ages of 18 and 35
- ◆ often former employees or students
- ◆ intelligent
- ◆ highly motivated
- ◆ creative





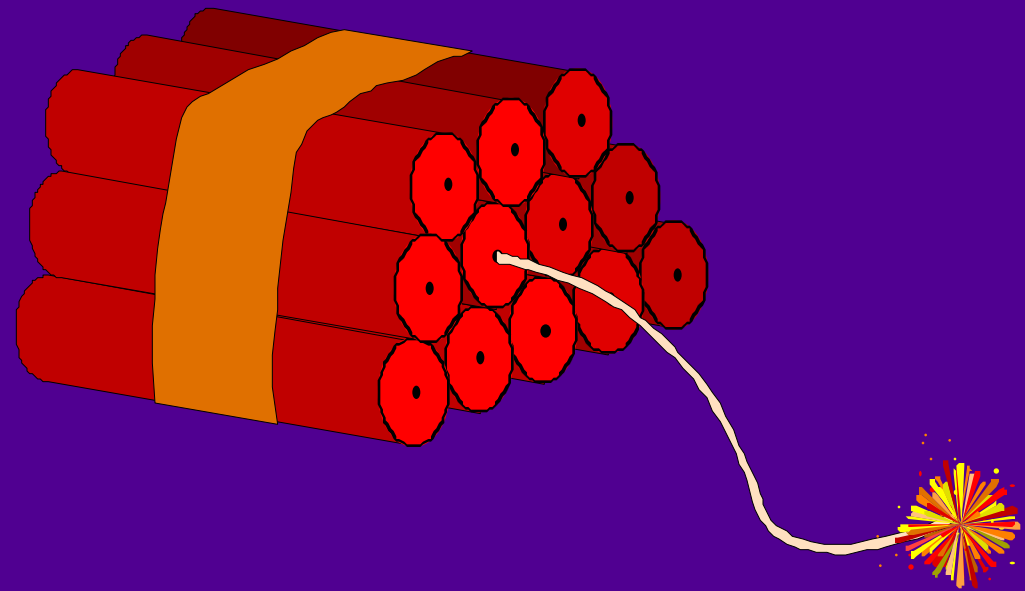
Types of Hacks

- ◆ unauthorized access to satisfy a personal motive such as curiosity or pride
- ◆ unauthorized access to tamper with or destroy information, for example infectious programs
- ◆ unauthorized access to steal data or computer services to perform acts for criminal purposes such as credit card fraud

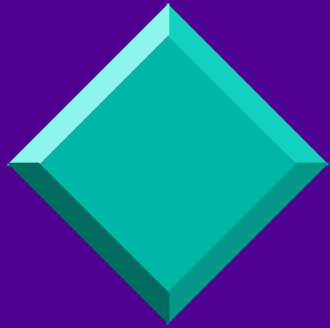


Infectious Programs

- ◆ worm
- ◆ virus
- ◆ trojan horse
- ◆ logic bomb
- ◆ time bomb



Many companies hire ex-hackers to work as security tiger teams.



Sample Topics

- ◆ Privacy
- ◆ Surveillance
- ◆ Automation
- ◆ Risk and reliability
- ◆ Artificial Intelligence
- ◆ Computer crime





Why Use Science Fiction?

Opportunity for :

- ◆ analysis of ethical, cultural and social issues
- ◆ expressing ideas and opinions
- ◆ raising awareness of issues
- ◆ decision-making and considering alternatives

Interesting! Entertaining! Motivating!



Science Fiction Examples

- ◆ The Net (privacy)
- ◆ The Handmaid's Tale (surveillance)
- ◆ War Games (risk)
- ◆ The Matrix (control)
- ◆ Bladerunner (artificial intelligence)
- ◆ The Case of the Killer Robot (automation)
- ◆ Star Trek (everything!)



Student Activities

- ◆ Practice solving morally ambiguous scenarios
- ◆ Presentations where students defend a pro/con stand on an issue
- ◆ Students develop case studies from newspaper or magazine articles
- ◆ Role-playing scenarios
- ◆ Analysis and report writing



Teacher as Role Model

- ◆ Ethical student/teacher relationships
- ◆ Deal consistently and fairly with students
- ◆ Maintain confidentiality of student information
- ◆ Discuss ethical standards and expectations with students
- ◆ Follow the laws regarding hardware and software use and abuse





Your Task

- ◆ In groups of five, develop an activity that would address one or more ethics or career expectations. Identify the following:
 - ◆ Prerequisite Learning
 - ◆ Required Resources
 - ◆ Teaching Strategies
 - ◆ Activity Description (including duration)
 - ◆ Learning Outcomes
 - ◆ Assessment Strategies