CSC 304

Ethical Issues in Computing & Research Methods
(3-0-1)

Lecturer: Professor Abdel Monim Artoli
Office 2120 ☎ 467 9174  aartoli@ksu.edu.sa

Course Information

- Credit hours: 3
- Prerequisite : CSC 113
- Two parts:
  - Ethics
  - Research
- Texts in Ethics
  1. *Main: Joseph M. Kizza: "Ethical and social issues in Information Age" 5th Edition Springer 2013.*
  2. *Giannis Stamatellos : Computer Ethics a global perspective" 2nd Edition Jones and Bartlett 2007.*
- *Research resources:*
  - *Lectures and slides*
  - *Google Scholar*
  - *Web of Science*
  - *Plagscan*
  - *Endnote*
  - *Grammarly*
- *Evaluation*
  - *Rubrics for assignments and term paper (30%)*
  - *Midterm 30%*
  - *Final 40%*

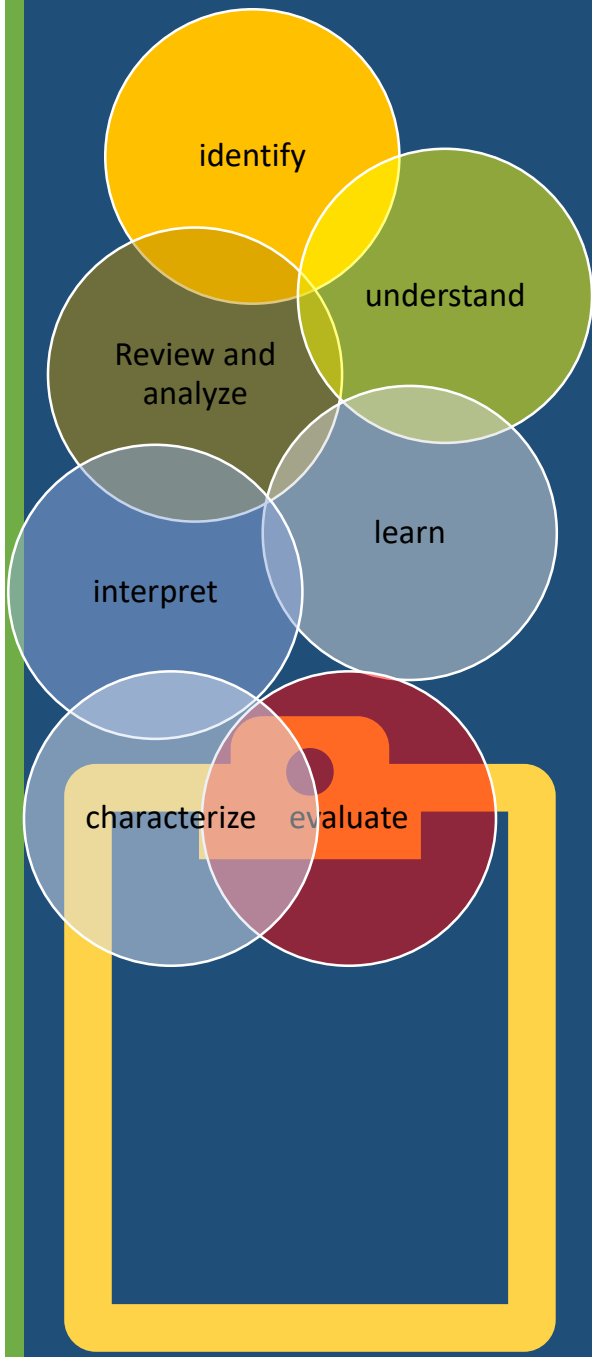
Goals

1. *Gain sufficient knowledge of Computer Ethics to enable you to*
   - *recognize the ethical nature of certain issues that arise in the Information and Communications Technology (ICT) workplace.*

- *Current Issues:*
  - *Consumer privacy*
  - *AI bias*
  - *Unequal access to healthcare –technology barrier*
  - *IoT data collection and use*
  - *Computational demand and energy requirements : Impact on Environment*
  - Collection and selling Personal identifiable information ➔Real-world daily bias
  - Cybersecurity
  - Always-on culture
  - Job market
  - And many others --Forbes, 21
- 2. Understand and practice on research methods

Objectives-P1

- Identify ethical issues in different computing settings
- Review and analyze real-life ethical cases and be able to develop ethical resolutions and policies.
- Understand local and international laws and regulations related to ethics.
- Learning ACM and SWE code of practice.
- identify and Resolve ethical conflicts and crisis.
- Interpret the social context of a given design and its implementation.
- Evaluate stakeholder positions in a given situation.
- Characterize and contrast the concepts of copyright, patenting and trademarks.



Syllabus-P1

- *The course studies:*
  - *the effect of the proliferation of computers in our world,*
  - *the impact of computers in the*
    - *social,*
    - *economic,*
    - *political, and other aspects of our life.*
  - *It covers the **moral and legal obligations** of computer professionals and issues concerning*
    - *security,*
    - *privacy versus freedom of information,*
    - *ethics and professionalism,*
    - ***Intellectual** property rights,*
    - ***research** methods:*
      - *collecting and analyzing data,*
      - *critical evaluation of research,*
      - *report writing,*
      - *choosing and evaluating references, and*
      - *presentation skills.*

Intelligenthq.com

Instructor

- Professor Abdel Monim Artoli https://faculty.ksu.edu.sa/ar/aartoli
- King Saud University
- Department of Computer Science
- Contact: aartoli@ksu.edu.sa
- Office hours: Immediately after lecture time
-

Calendar

- Virtual classes on Mondays and Wednesdays
- Mondays and Wednesdays
  - 8:00 to 10:20 G1 32658
  - 10:30 to 12:50 G2 37645
- Assignment submission deadlines:
  - One week later after each assignment
  - Penalty applies afterwards (50% deduction in W2 and 100% deduction in W3)

- Midterm exam is 25% of the total assessment marks
  - Initially on Monday Dec 26, 2022 in the evening at the college.
- Final exam is 40% of the total assessment marks
- Other coursework (25%), with the following details:
  - Research paper Writing and presentation assignment on one topic from a given list : ➔ 25%
    - Selecting the topic, literature review, analysis, findings, report, similarity report, presentation, oral discussion
  - Two ethical case presentations (teamwork) 5%
  - Participation and asssignments ➔ 5 %

Study material and references

- *Joseph M. Kizza: "Ethical and social issues in Information Age"*
  5th Edition Springer 2017.

- *Giannis Stamatellos :Computer Ethics a global perspective" 2nd Edition Jones and Bartlett 2007.*
- *National and international digital ethics material, legislations, and cases*
- *ACM*
- *IEEE*
- *Web of science*
- *SDL*
- *Saudi legislations and codes*

Course topics

Care, discipline, responsibility, and mentoring, conduct, update, reliability, certification, etc.

Professional ethics

Ethical argumentation, theories, decision making, moral assumptions and values

Analytical tools

patents, copyrights, trade secrets and trademarks, IDIP, plagiarism, lwgal foundations, etc

Intellectual property

Legal foundations of privacy protection, Ramifications of differential privacy

Privacy and civil liberties

Hardware, software, networking, internet and ethics

history

Digital forensics, viruses, cyperterrorism, hacking, etc

Security policies, computer crimes

Main issues

- Morality and code of ethics
- Computer crime
- Intellectual property
- Security and privacy
- Legal issues
- Research methods and ethics

الشركة السعودية
لحقوق الملكية الفكرية
Saudi Intellectual Property
Rights Company

Breakdown-P1

1. History of Computing and ethics
2. Morality and the Law
3. **Ethics and Ethical Analysis**
4. **Ethics and the Professions**
5. **Anonymity, Security, Privacy, and Civil Liberties**
6. **Intellectual Property Rights and Computer Technology**
7. **Social Context of Computing**
8. **Software Issues: Risks and Liabilities**
9. **Computer Crimes**
10. **Ethical AI, virtual reality**
11. **Ethics in cyberspace and internet**
12. **Ethical, Privacy, and Security Issues in the Online Social Network Ecosystem**
13. **Mobile Systems and Their Intractable Social, Ethical and Security Issues**
14. **Computer Crime Investigations and Ethic**
15. **Biometrics Technologies and Ethics**

Timetable

	Sunday	Monday	Tuesday	Wednesday
8:00 -9:00				
9:00 -10:00				
10:00 -11:00				
11:45-12:50				
12:50-13:30		Office		Office
13:30-14:35		Hours		Hours
14:35-14:45				
14:45-15:50				
15:50 - 16:00				
16:00 - 17:05				

CLOs

1. Understand ethical, legal, security, and social issues and responsibilities.
2. Describe major ethical theories.
3. Apply matured viewpoints to ethical dilemmas in CS and recommend appropriate ethical actions.
4. Demonstrate leadership and teamwork.
5. Analyze ethical cases based on the ACM ethical code of conduct and ethical theories.
6. Explain contemporary legal and social issues.
7. Recognize, identify and implement basic research concepts and methods.
8. Be Committed to ACM and professional codes of ethics.

Expected performance

- Two ethical cases completely analyzed: (5%)
- One midterm exam on ethical theories and a case study (25%).
- A final exam on Codes of ethics and research methods (40%)
- One term paper on a selected topic (15%)
- A presentation on the term paper. (10%)
- Participation and assignments 5% -(on-time)

Deadlines

- Midterm exam : Monday Dec. 26, 2022
- Ethical cases analysis : Dec 26, 2022
- Term paper first draft: Feb 8, 22
- Term paper final version + similarity report + recorded presentation Feb. 14

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- *ACM*
- *IEEE*
- *Web of Science*
- *Lectures*

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Hardware, software, networking, internet and ethics

history

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- Intellectual property
- Security and privacy
- Legal issues
- Research methods and ethics

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Topic #1

History of Computing and Ethics

Items

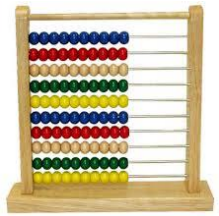
- Development in Hardware
- Development in Software
- Development in the internet
- Development in WWW
- Development in IoT –**self study**
- Development in Social Media- **Self study**
- **Computer viruses**
- **Cyberspace and syber vandalism**
- **Definition of Computer Ethics**
- **Why do we study computer Ethics**

History of Hardware -1

Prime numbers

Number systems

abacus



Zero

-ve numbers

Mechanical calculators

Punched cards

20K BC

18K BC

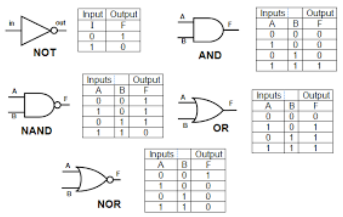
1K BC

300 BC to 500 AD

1500 to 1800 AD

History of Hardware -2

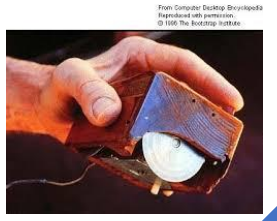
Analytical Engines (Babage)



Boolean Algebra

Paper tape (large data)

Machine logic (Stanely)



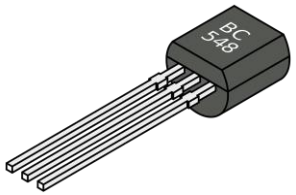
Keyboard and mouse

Logic circuits (Pierce)

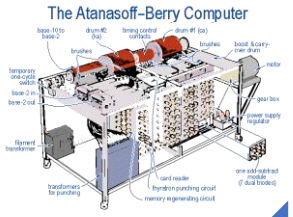
Tabulating machines

1830 | 1840 | 1860 | 1869-1874 | 1886 to 1890

History of Hardware -3



Vacuum tubes and transistors



TMs and electromechanical computers

Mainframes

Miniframes and networking

4004, 8008, 8080, Z80

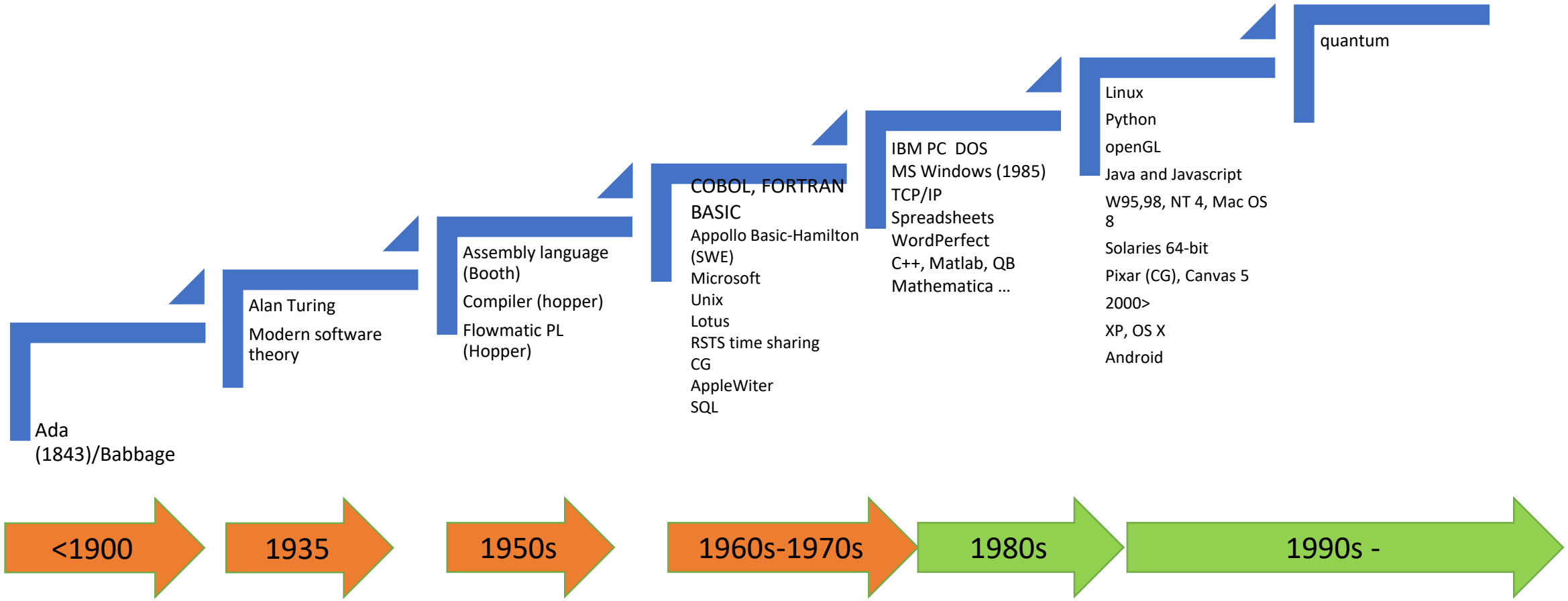
multicore

quantum

https://www.youtube.com/watch?v=nizDYGDdfyY

1900-1930s → 1938- → 1950s → 1960s → 1970s

History of Software



History of Internet

Telegraph, telephone and Radio

Computers

Galactic networks (packets)

WAN-1965

DARPA-1962

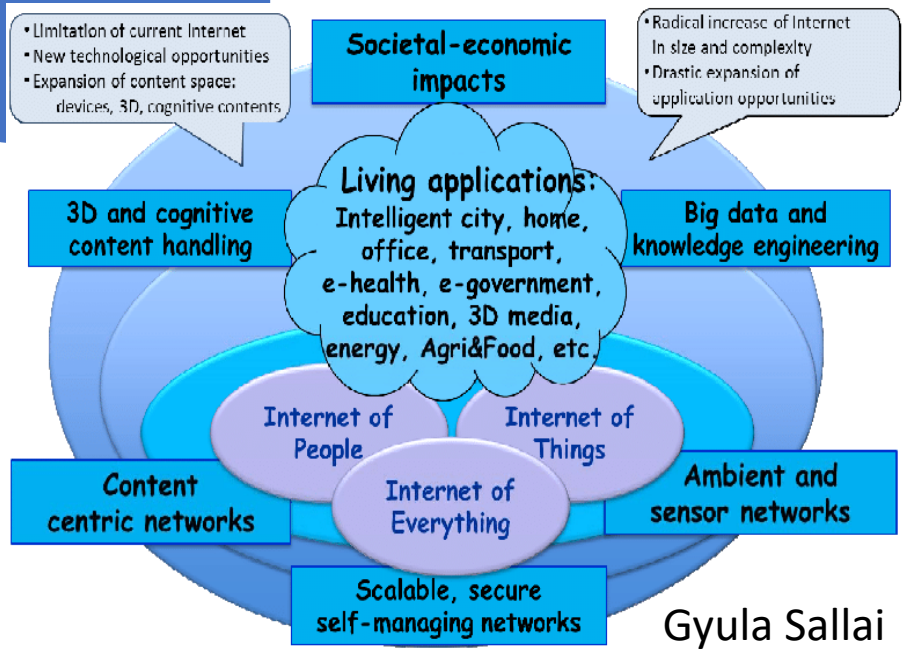
4-nodes (1969)

TCP/IP (Kahn, 1983)

NSFNet(1984)

Free internet

1994



Gyula Sallai

History of www

- 1989 – Hypertex CERN web browser -Tim Berners Lee –Physics
  - “Information Management: A Proposal”
  - HTML
  - URI: Uniform Resource Identifier i.e. URL.
  - HTTP: Hypertext Transfer Protocol. Allows for the retrieval of linked resources from across the web
- 1991 –one page “WorldWideWeb.app”
- 1992- 50 servers
- 1993 MOSAIC GUI
- 1999 720 K
- 2001 > 24M
- 2015 > 4BN
- Now >2/3

IoT

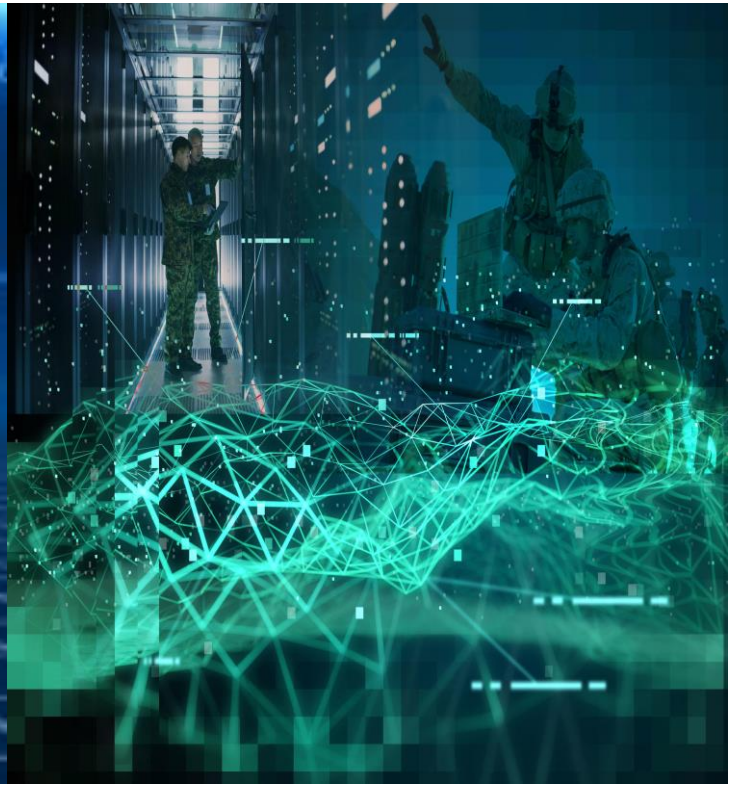
- Develop a one-single slide which highlights the main achievements in IoT

Social Media

- Develop a one-single slide which highlights major developments in social media

Computer Ethics

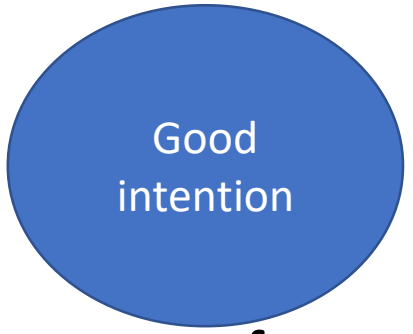
Cyberspace



Computer Crime

- The history of computer crimes started with the invention of the computer virus.
- Virus
  - in Latin = poison
  - In medicine = microscopic entities that have a core of genetic material, either DNA or RNA. The core is covered with a capsid, a protective coat made of protein.
    - They d not produce ATP , proteins and thus they can not reproduce outside living animals/plants
    - COVID 19
  - Computer virus: self propagating computer program designed to alter or destroy a computer system resource
    - First quoted in 1972 in science fiction: when harly was one by David Gerrod: a piece of unwanted computer program

Computer virus timeline



- Creeper system in 1971
- Fred Cohen in 1983 +Alen Adleman
- Brain MS-DOS in 1986-Brothers of Pakistan,, boot sector removal, to protect from making replica
- The Morris: what is the size of internet in 1988? Used sendmail
- 1991 Michelangelo : activates on March 6 every year by overwriting the first 100 sectors with 0 : 20k computers
- 1998 : CIH : 60 M
- 1999: Melissa: email servers exploitations by a Word macro
- Recent: backdoor viruses, bitcoin ransomware, pegasus
- Visit https://en.wikipedia.org/wiki/Timeline_of_computer_viruses_and_worms

For up-to-date timeline sample.

The present status

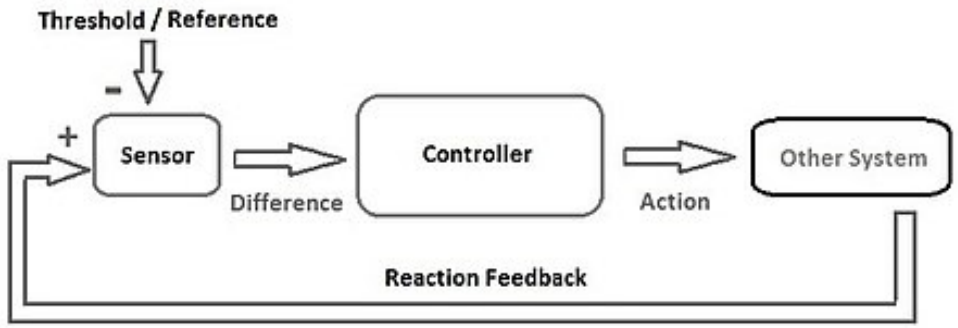
- Cyberspace reliance
- Vulnerability
- Insecurity
- Critical components of national and international infrastructure
- Vandalism= act of deliberate destruction of or damage to public or private property.
- Rate of cyber vandalism is increases due to:
  - Weakness in Infrastructure and telecommunication protocols
  - Limited knowledge of average user
  - Dependency on unknowns
  - Best practice comes after attacks ➔patching loophalls

Why national cybersecurity policy is needed?

1. Raise awareness on vulnerability and consequences on our well-being.
2. Ensure preparedness to cyber attacks
3. Improving detection, prevention and handling of cyber attacks
4. Improving regulatory and legal frameworks to handle cyberspace's social consequences.

Computer Ethics

- Since 1940s
  - MIT professor Norbert Wiener,
    - ➔ cybernetics “WWII”
    - The human use of human being



A Cybernetic Loop

- It is the analysis of the nature and social impacts of computer technology and the corresponding formulation and justification of its ethical use.
  - First coined by James Moore.

Why should we study CE?

- Existence of policy vacuum 🡐 what shall be done?
- reason : confusion between what is presented and knpwn policies
- Example : Is software a product or is it a service?
- Computer professionals are not well prepared to deal with ethical impacts of what they are producing
- How?
  - Two schools of thought
  - CE is a remedial moral education
    - Learning makes us more professional
    - To avoid abusive use and catastrophes
  - Separate independent field.
    - Advances of Computer Technology
    - Permanent ethical impacts
    - Largely emergent complex issues

Cyber attack
Why it continues to exist?

- Weak infrastructure and communication protocols
- Limited user knowledge on networks
- Increase addiction to unstable infrastructure
- Absence of long-term public literacy policy
- Limited # of remedies
  - Patching loopholes
- Unpredictability of cost
- Limited case reporting

Concerns

- On individuals and society : security+ privacy+ civil liberty
- ➔ National and international cyberspace policy
  - Raise awareness
    - Vulnerability
    - Consequences
  - Support preparedness for cyberattack
    - Detect
    - Prevent
    - Handle
  - Devise and update legal and regulatory frameworks
    - To handle cyberspace social consequences

Drill: What is Computer Ethics?

- Definition
- Schools
  - A standalone domain
  - Remedial

Drill: Why we need CE?

- Decision making under policy vacuum

Argue: Why there is a policy vacuum?

- Confusion between known policy and presented policy
  - E.g. Software as a product or as a service?
- Technology continue to develop. We cannot stop it. ➔ muddle.

To be continued

- This is the end of Chapter 1
- Next issue is about **morality and ethics**.