The Digital Revolution and the Hackers Culture.

Elective course
3rd module (Feb-Mar) 2019
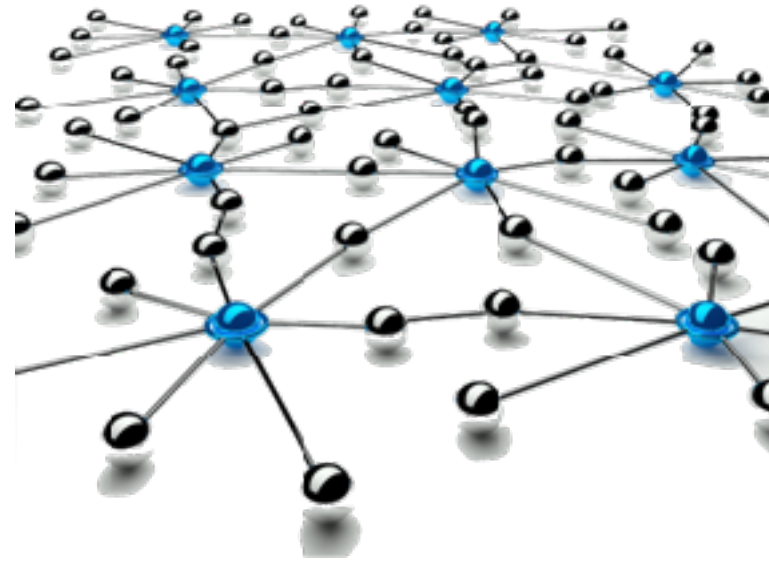
Fabio Grazioso

Introduction

Aims of the Course

- To study of the history and evolution of digital technologies

- To learn the details of some examples of digital technologies and digital media

- To read authors who have contributed to the debate on digital technologies

- To develop critical thinking with regards to technology (in particular digital technology)

Digital Technology

- Computers

- Computer Networks

- Mobile phones

- eBooks

- Podcasts

- Music

- Movies

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some consequences
of digital technology

- easy to copy

- easy to transmit (error correction)

- question identity

- question reality

- digital is "less natural" (e.g. writing)

question identity => identity theft
question reality => Philip K. Dick

New "questions"

- ownership

- authenticity

Postmodernism

From Wikipedia:

«[…] postmodernism is generally defined by an attitude of skepticism, irony, or rejection toward the meta-narratives and ideologies of modernism, often calling into question various assumptions of Enlightenment rationality. Consequently, common targets of postmodern critique include universalist notions of objective reality, morality, truth, human nature, reason, language, and social progress.»

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Postmodernism

From Wikipedia (criticism):
«Postmodernism, the school of 'thought' that proclaimed '**There are no truths**, only interpretations' has largely played itself out in absurdity, but it has left behind a generation of academics in the humanities disabled by their distrust of the very idea of **truth** and their disrespect for **evidence**, settling for 'conversations' in which nobody is wrong and nothing can be confirmed, only asserted with whatever style you can muster.» - Daniel Dennett

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early disclaimer about hacking

- definition of hacking

- mainstream idea

early disclaimer about hacking

hack¹ | hak |

verb

1 [with object] **cut with rough or heavy blows:** *I watched them hack the branches* | [no object] : *men* **hack at** *the coalface.*
  • kick wildly or roughly: *he had to race from his line to hack the ball into the stand.*

2 [no object] **gain unauthorized access to data in a system or computer:** *they* **hacked into** *the tank's computer* | [with object] : *someone hacked his computer from another location* | (**as noun hacking**) : *outlawing hacking has not stopped it.*
  • program quickly and roughly.

3 [no object] **cough persistently:** *I was waking up in the middle of the night and coughing and hacking for hours.*

4 [usually with negative] (**hack it**) *informal* **manage; cope:** *lots of people leave because they* **can't hack it**.

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early disclaimer about hacking

noun

1 a rough cut, blow, or stroke: *he was sure one of us was going to take a hack at him.*
   • (in sport) a kick or a stroke with a stick inflicted on another player.
   • a notch cut in the ice, or a peg inserted, to steady the foot when delivering a stone in curling.
   • a tool for rough striking or cutting, e.g. a mattock or a miner's pick.
   • *archaic* a gash or wound.

2 *informal* an act of computer hacking: *the challenge of the hack itself.*
   • a piece of computer code providing a quick or inelegant solution to a particular problem: *this hack doesn't work on machines that have a firewall.*
   • a strategy or technique for managing one's time or activities more efficiently: *another hack that will save time is to cover your side mirrors with a plastic bag when freezing rain is forecast.*

The Digital Revolution

Social Cycle Theory

History as a linear progression

- some history model represent history as a linear progress

Cycles in history

- some scholars have individuated a **cyclic nature** of history

I am not an expert…

Cycles in history

- some scholars have individuated a **cyclic nature** of history

Sima Qian
Born c. 145 or 135 BC
Died c. 86 BC

I am not an expert…
historians as old as

Cycles in history

- some scholars have individuated a **cyclic nature** of history

Gianbattista Vico
Born 23 June 1668
Died 23 January 1744

I am not an expert…
Response to the Cartesian Method
«the realms of verifiable truth and human concern share only a slight overlap.»
To introduce geometrical method into practical life is "like trying to go mad with the rules of reason,"

Cycles in history

- some scholars have individuated a **cyclic nature** of history

Nikolai Dmitriyevich Kondratiev
(Никола́й Дми́триевич Кондра́тьев)
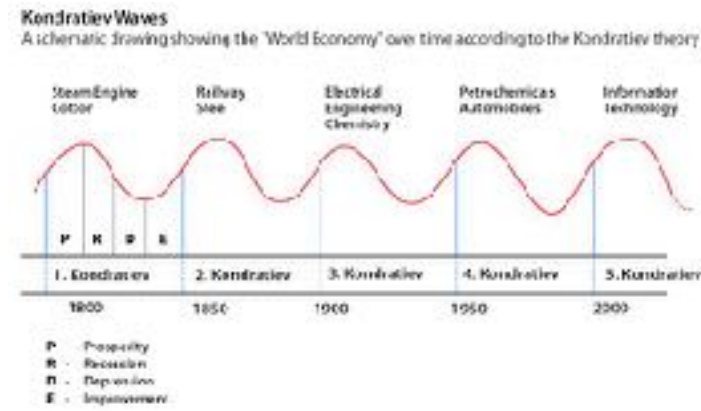Born 4 March 1892
Died 17 September 1938

I am not an expert…
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Kondratiev cycles

The theory that historical changes occur in cycles of roughly 50 years.
Prosperity - Recession - Depression - Improvement

Kondratiev cycles

- The Industrial Revolution—1771

- The Age of Steam and Railways—1829

- The Age of Steel and Heavy Engineering—1875

- The Age of Oil, Electricity, the Automobile and Mass Production—1908

- The Age of Information and Telecommunications—1971

Each cycle is characterized by the main technology used

Information cycle
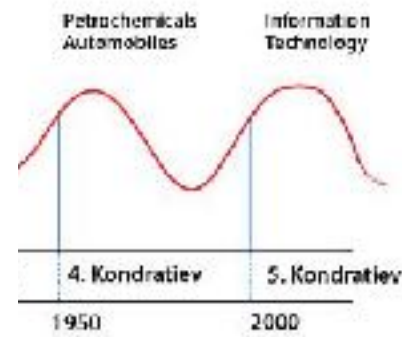
We are at the end of the petro-chemical and auto-motive wave, and in the Digital cycle.

Timeline of
Digital Revolution

Timeline

- 1947 - the transistor was invented

- 1969-1971 - the microprocessor was created

- 1969 - ARPANET (then became the internet) was created

- 1978 - Space Invaders (videogame) was created

- 1983 - the first mobile phone

- 1990 - HDTV first broadcast (World Cup)

- 1993 - the first web browser with images

- 2005 - the population of the Internet reached 1 billion

- 2007 - Apple Inc. introduced the iPhone

- 2012 - the population of the Internet reached 2 billions

- 2015 - tablets and smartphones exceed personal computers in Internet usage

- 2016 - half of the world's population is connected

McLuhan proposes that a medium itself, not the content it carries, should be the focus of study. He said that a medium affects the society in which it plays a role not only by the content delivered over the medium, but also by the characteristics of the medium itself.

This concept can be extended to technology in general.

McLuhan understood "medium" in a broad sense. He identified the light bulb as a clear demonstration of the concept of "the medium is the message". A light bulb does not have content in the way that a newspaper has articles or a television has programs, yet it is a medium that has a social effect; that is, a light bulb enables people to create spaces during nighttime that would otherwise be enveloped by darkness. He describes the light bulb as a medium without any content. McLuhan states that "a light bulb creates an environment by its mere presence."

The Hackers Culture

Richard Stallman

From Stallman website: a definition of hacking:

"It is hard to write a simple definition of something as varied as hacking, but I think what these activities have in common is playfulness, cleverness, and exploration. Thus, hacking means exploring the limits of what is possible, in a spirit of playful cleverness. Activities that display playful cleverness have "hack value"."

It is hard to write a simple definition of something as varied as hacking, but I think what these activities have in common is playfulness, cleverness, and exploration. Thus, hacking means exploring the limits of what is possible, in a spirit of playful cleverness. Activities that display playful cleverness have "hack value".
The concept of hacking excludes wit and art as such. The people who began to speak of their activities as "hacking" were familiar with wit and art, and with the names of the various fields of those; they were also doing something else, something different, for which they came up with the name "hacking". Thus, composing a funny joke or a beautiful piece of music may well involve playful cleverness, but a joke as such and a piece of music as such are not hacks, however funny or beautiful they may be. However, if the piece is a palindrome, we can say it is a hack as well as music; if the piece is vacuous, we can say it is a hack on music.

Yet when I say I am a hacker, people often think I am making a naughty admission, presenting myself specifically as a security breaker. How did this confusion develop? Around 1980, when the news media took notice of hackers, they fixated on one narrow aspect of real hacking: the security breaking which some hackers occasionally did. They ignored all the rest of hacking, and took the term to mean breaking security, no more and no less. The media have since spread that definition, disregarding our attempts to correct them. As a result, most people have a mistaken idea of what we hackers actually do and what we think.

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Free software movement

The free software movement (FSM) or free / open source software movement (FOSSM) or free / libre open source software (FLOSS) is a social movement with the goal of obtaining and guaranteeing certain freedoms for software users, namely the freedom to run the software, to study and change the software, and to redistribute copies with or without changes. Although drawing on traditions and philosophies among members of the 1970s hacker culture and academia, Richard Stallman formally founded the movement in 1983 by launching the GNU Project. Stallman later established the Free Software Foundation in 1985 to support the movement. The philosophy of the movement is that the use of computers should not lead to people being prevented from cooperating with each other. In practice, this means rejecting "proprietary software", which imposes such restrictions, and promoting free software, with the ultimate goal of liberating everyone in cyberspace – that is, every computer user.

**GNU
project**

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Unix

Unix is <u>a family</u> of multitasking, multiuser computer operating systems that derive from the original AT&T Unix, development starting in the 1970s at the Bell Labs research center by

Ken Thompson, Dennis Ritchie, and others.
Initially intended for use inside the Bell System, AT&T licensed Unix to outside parties in the late 1970s, leading to a variety of both academic and commercial Unix variants from vendors like the University of California, Berkeley (BSD), Microsoft (Xenix), IBM (AIX), and Sun Microsystems (Solaris).

Linus Torvalds

Linus Torvalds is a Finnish-American software engineer who is the creator, and for a long time, principal developer of the Linux kernel, which became the kernel for operating systems such as the Linux operating systems, Android, and Chrome OS. He started reading the book of professor Andrew Tanenbaum's "Operating Systems: Design and Implementation", in which Tanenbaum describes MINIX, a version of Unix. Torvalds then started to create his own operative system: his M.Sc. thesis was titled "Linux: A Portable Operating System".

the Linux logo

Unix is an operative system that

The Cathedral and the Bazaar

This is an essay, and later a book, by Eric S. Raymond on software engineering methods, based on his observations of the Linux kernel development process and his experiences managing an open source project Fetchmail. It examines the struggle between top-down and bottom-up design.

The essay contrasts two different free software development models:

The Cathedral model, in which source code is available with each software release, but code developed between releases is restricted to an exclusive group of software developers. GNU Emacs and GCC were presented as examples.

The Bazaar model, in which the code is developed over the Internet in view of the public. Raymond credits Linus Torvalds, leader of the Linux kernel project, as the inventor of this process.

The essay's central thesis is Raymond's proposition that "given enough eyeballs, all bugs are shallow" (which he terms Linus's Law): the more widely available the source code is for public testing, scrutiny, and experimentation, the more rapidly all forms of bugs will be discovered. In contrast, Raymond claims that an inordinate amount of time and energy must be spent hunting for bugs in the Cathedral model, since the working version of the code is available only to a few developers.
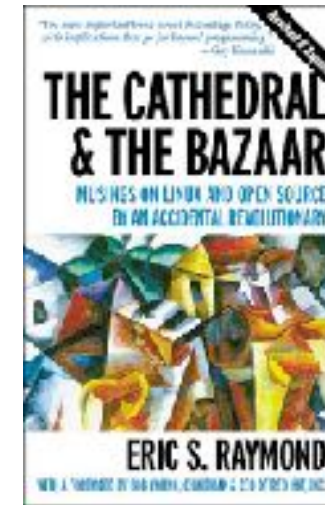
Guido van Rossum

Python is an interpreted high-level programming language for general-purpose programming. Created by Guido van Rossum and first released in 1991, Python has a design philosophy that emphasizes code readability, notably using significant whitespace. It provides constructs that enable clear programming on both small and large scales.

Guido van Rossum is a Dutch programmer, the author and "Benevolent Dictator For Life" (BDFL) of the Python project, which means he continues to oversee Python development, making decisions when necessary. From 2005 to December 2012, he worked at Google, where he spent half of his time developing the Python language.

Science Fiction

and other cultural references

Novels, fiction, books

- Edward Forster - "The machine stops" (1909)

- William Gibson - "Burning Chrome" (1982)

- William Gibson - "Neuromancer" (1984)

- Eric Raymond - "The Cathedral and the Bazaar" (1999)

- Kevin Mitnick - "The Art of Deception" (2002)

- Donald Norman - The Design of Everyday Things (2002)

- Aaron Swartz - Wikimedia at the Crossroads (online essay) (2006)

- Evgeny Morozov - "The Net Delusion: The Dark Side of Internet Freedom" (2011)

- Richard Stallman - "Free Software, Free Society" 3rd Ed. (2015)

Burning Chrome is also a collection of short stories, which include Johnny Mnemonic

The Art of Deception - (the art of social engineering)
All, or nearly all, of the examples are fictional, but quite plausible. They expose the ease with which a skilled social engineer can subvert many rules most people take for granted. A few examples:
• A person gets out of a speeding ticket by fooling the police into revealing a time when the arresting officer will be out of town, and then requesting a court date coinciding with that time.
• A person gains access to a company's internal computer system, guarded by a password that changes daily, by waiting for a snowstorm and then calling the network center posing as a snowed-in employee who wants to work from home, tricking the operator into revealing today's password and access through duplicity.
• A person gains lots of proprietary information about a start-up company by waiting until the CEO is out of town, and then showing up at the company headquarters pretending to be a close friend and business associate of the CEO.
• A person gains access to a restricted area by approaching the door carrying a large box of books, and relying on people's propensity to hold the door open for others in that situation.

films

- Tron (1982)

- Wargames (1983)

- Ghost in the Shell (1995)

- Pirates of silicon valley (1999)

- Swordfish (2001)

- The Social Network (2010)

- Blackhat (2015)

- Steve Jobs (2015)

- Snowden (2016)

- The Circle (2017)

Philip K. Dick

Themes

- The fragile nature of what is real

- The construction of personal identity

- The everyday world is actually an illusion assembled by powerful external entities

- "What constitutes the authentic human being?"
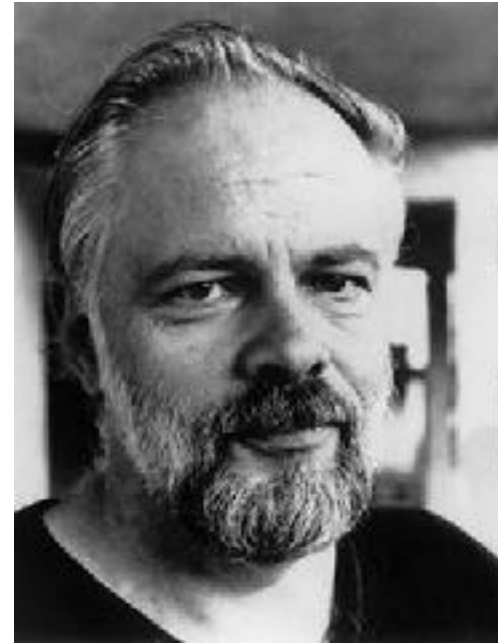
Philip K. Dick

Works

- "Do Androids Dream of Electric Sheep?". (film: Blade Runner)

- "We Can Remember It for You Wholesale". (short story) (film: Total Recall)

- "The Minority Report" (short story)

- "Flow My Tears, the Policeman Said,"