

COMPSCI 111 / 111G

An introduction to practical computing

Development of Personal
Computers and Smartphones

Why care about history?

Understand present through the past

How long have computers been around?

what is the difference between Mac and PC?

learn from experience and mistakes of the past

if you write some software, should it be proprietary or open source?

US Census 1880, 1890

1880 Census

- Took 7 years to tabulate data

1890 Census

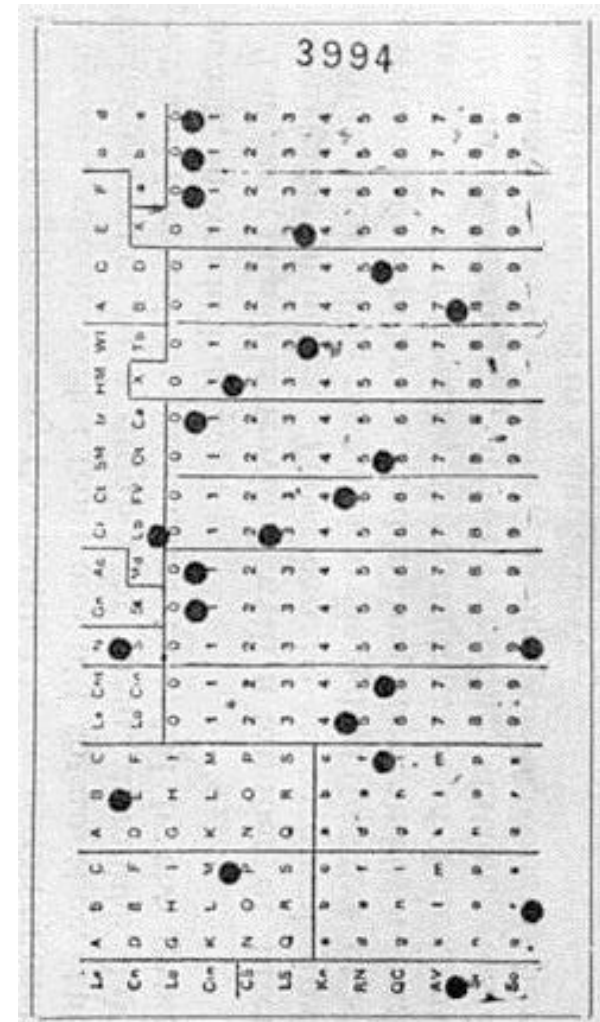
- Predicted to take more than 10 years

Dr. Herman Hollerith

- Developed mechanical punch card tabulator
- Used to tabulate census data
- Completed the 1890 census in 3 years

Tabulating Machine Company

- Formed 1896



http://en.wikipedia.org/wiki/Herman_Hollerith

International Business Machines

Computing Tabulating Recording (CTR) Corporation

Incorporated 1911, as merger of:

- Tabulating Machine Company
- Computing Scale Company
- International Time Recording Company

Thomas Watson Sr.

- President 1915 - 1956
- International Business Machines 1924

Thomas Watson Jr.

- President 1956 - 1971



<http://www.users.cloud9.net/~bradmcc/ibmsongbook.html>

Who built the first computer?

This depends on how you define computer (and on who you ask).

1936-38: The **Z1**, the first programmable computer, originally created by Germany's Konrad Zuse in his parents' living room

1936: An **abstract machine** proposed by Alan Turing became the foundation for theories about computers.

1943: The **Colossus** was the first electric programmable computer, developed by Tommy Flowers at Bletchley Park, UK

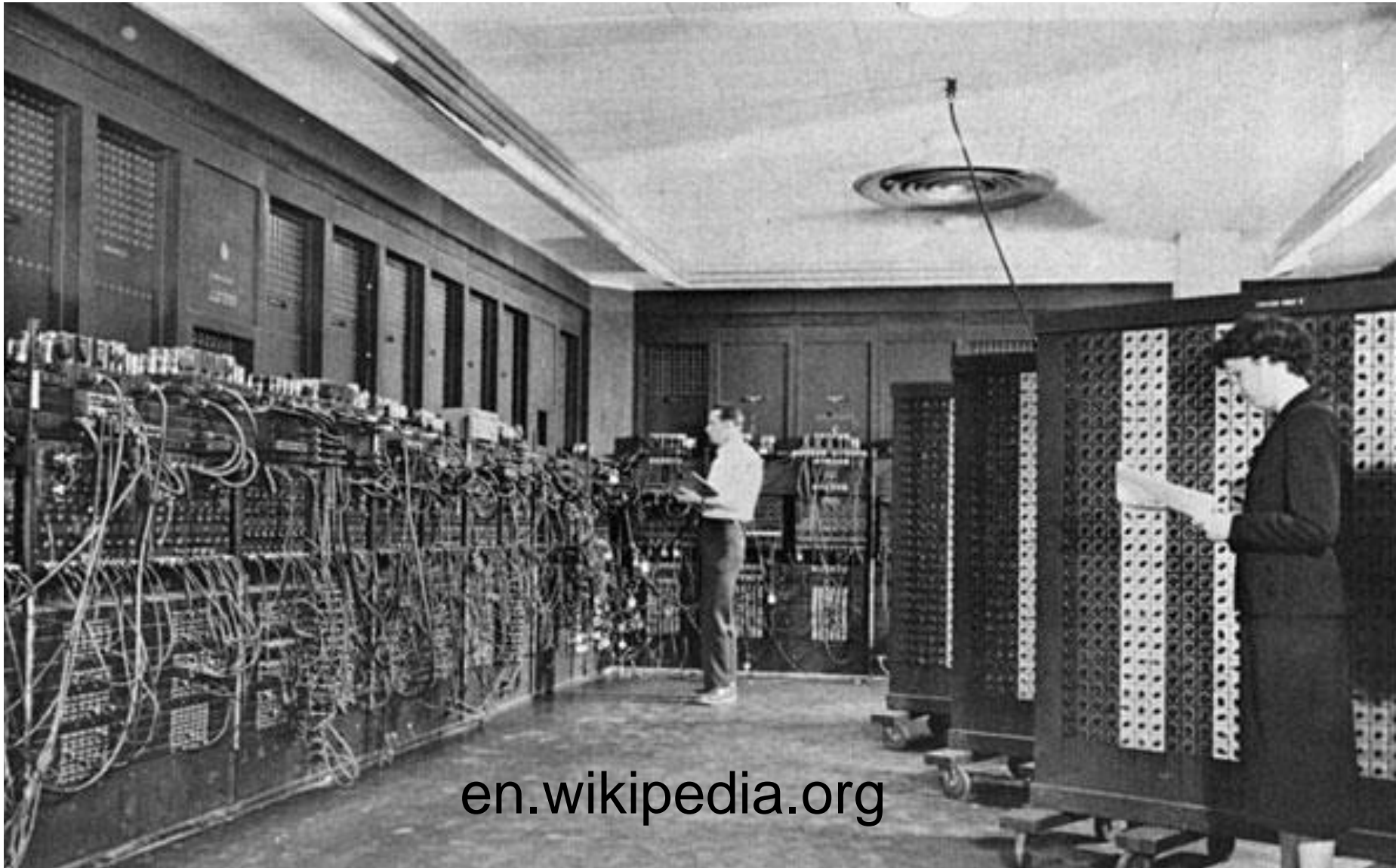
1937-42: The **ABC**, the first digital computer, built by Atanasoff and his student Berry at Iowa State College

1943-46: **ENIAC** at Pennsylvania University. 14000 vacuum tubes, 200 sqm, 50 tons. Considered to be first fully functional computer

1949: **EDSAC** in UK, the first stored-program electronic computer.

computerhope.com/issues/ch000984

ENIAC, Penn University, 1946

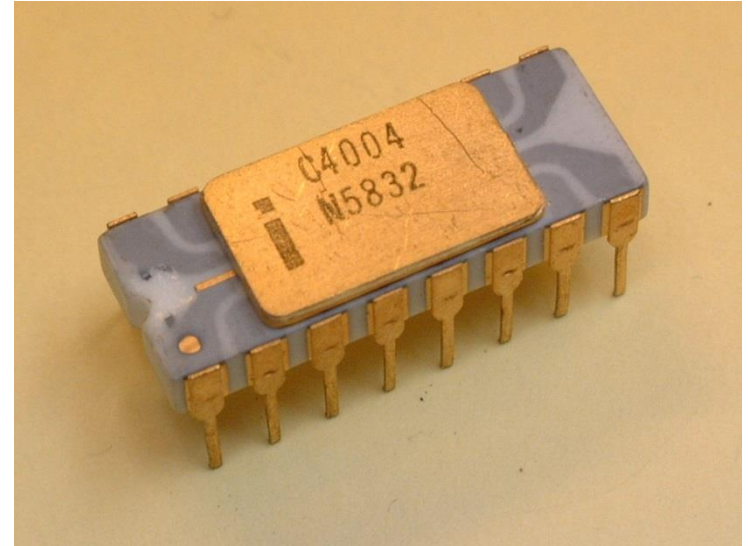


en.wikipedia.org

The first microprocessor

Intel

- Formed 1968
- Gordon Moore
- C4004 released 1971
- 8080 released in 1974
- First micro processors
- Entire CPU in a single chip



Intel C 4004
cpu-zone.com

http://en.wikipedia.org/wiki/Gordon_E._Moore

<http://en.wikipedia.org/wiki/Intel>

Palo-Alto Research Centre

Xerox

- Opened PARC in 1969
- Pure computer research (towards paperless office of the future)

PARC assisted / invented

- Laser printer
- GUI
- WYSIWYG text editor
- Ethernet
- Smalltalk (object oriented programming)
- InterPress (language for the laser printer)
- And lots more...



The first personal computer

Ed Roberts

- MITS in financial trouble
- Altair released as kitset
- January 1975



Photo by Spencer Smith



http://en.wikipedia.org/wiki/Altair_8800

Popular Electronics, Jan 1975

HOW TO "READ" FM TUNER SPECIFICATIONS

Popular Electronics

WORLD'S LARGEST-SELLING ELECTRONICS MAGAZINE JANUARY 1975/75¢

PROJECT BREAKTHROUGH!

World's First Minicomputer Kit to Rival Commercial Models...

"ALTAIR 8800" SAVE OVER \$1000



ALSO IN THIS ISSUE:

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- CCD's—TV Camera Tube Successor?
- Thyristor-Controlled Photoflashers



TEST REPORTS:

- Technics 200 Speaker System
- Pioneer RT-1011 Open-Reel Recorder
- Tram Diamond-40 CB AM Transceiver
- Edmund Scientific "Kirlian" Photo Kit
- Hewlett-Packard 5381 Frequency Counter

wikipedia

Micro-Soft

Micro-Soft

- Formed by Bill Gates and Paul Allen 1975
- BASIC language written for Altair
- Wrote compilers for microcomputers



http://en.wikipedia.org/wiki/Paul_Allen

http://en.wikipedia.org/wiki/Bill_Gates

<http://en.wikipedia.org/wiki/Microsoft>

Apple

Apple

- Formed by Steve Wozniak and Steve Jobs
- Wozniak created Apple I
- Wozniak and Jobs created Apple II
- Apple II released 1977/ 1978

Woz



Apple II



Predicting the future?

So we went to Atari and said 'Hey, we've got this amazing thing, even built with some of your parts, and so what do you think about funding us? Or we'll give it to you. We just want to do it. Pay our salary and we'll come work for you.' And they said "No."

So then we went to Hewlett-Packard, and they said, "Hey, we don't need you. You haven't even made it through college yet."

Steve Jobs, talking about the Apple II

Visicalc

Dan Bricklin, Bob Frankston, 1979

Killer application

Spreadsheet

Proved necessity of owning Apple

Apple captured 50% of market by 1980

C11 (L) TOTAL C1
25

	A	B	C	D
	ITEM	NO.	UNIT	COST
1	MUCK RAKE	43	12.95	556.85
2	BUZZ CUT	15	6.75	101.25
3	TOE TONER	250	49.95	12487.50
4	EYE SNUFF	2	4.95	9.90
			SUBTOTAL	13155.50
			9.75% TAX	1282.66
			TOTAL	14438.16

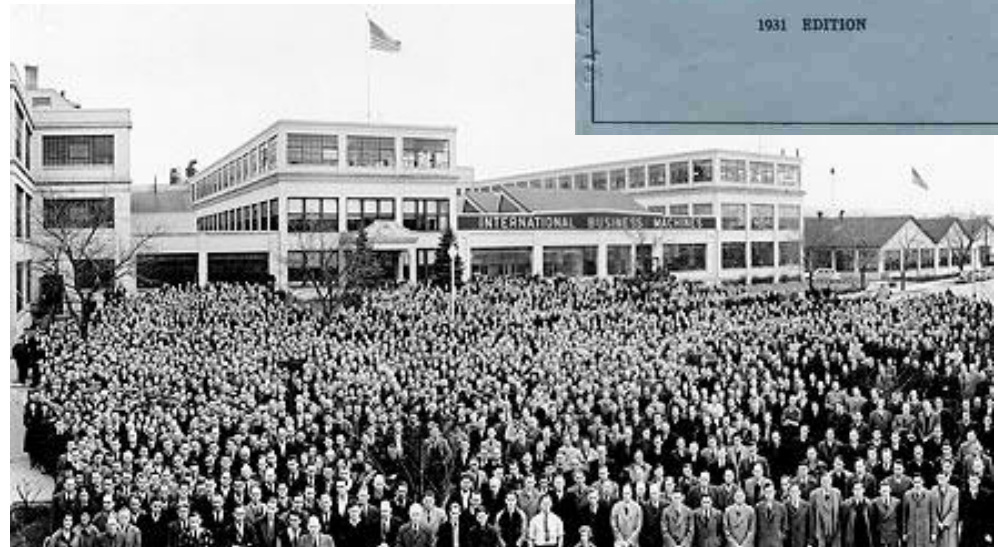
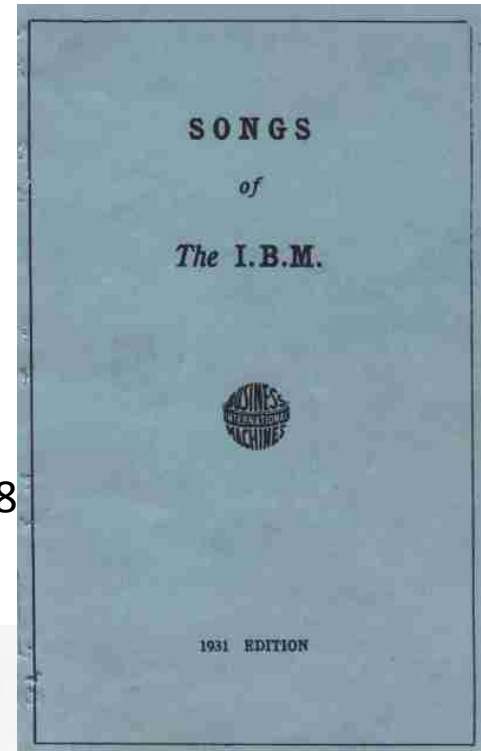
IBM - Development and influence

IBM exemplified corporate America

- Incredibly successful
- Everyone wanted to be IBM
- **1971**
 - 270,000 employees
 - 8 Billion dollar turnover
- HAL computer in “2001- A Space Odyssey” by A. C. Clarke, 1968

Built and maintained large computer systems

- Computers were leased
- Computer time was expensive
- Difficult to get access



IBM enters the market

IBM

- Too slow to compete with Apple
- Forced to use open architecture
- Needed software

Microsoft DOS (Disc OS)

- Only sold languages
- Wanted IBM contract
- Bought DOS from Seattle Computer Products
- Sold DOS to IBM

IBM PC released 1981



IBM PC, 1981

Attack of the Clones

Compaq Portable, 1983

- Same parts as IBM PC
- Reverse-engineered the BIOS (software in ROM, called firmware)

Microsoft DOS

- Retained rights to software
- Licensed to clones

Lotus 1-2-3

- Released 1983
- Based on Visicalc
- Outsold Visicalc same year



Compaq Portable, 1983

Apple

Story of the Macintosh

- Late 1970s PARC developed GUI, published their research
- Steve Jobs given tour in 1979
- Led the Macintosh project
- Macintosh released 1984



<http://www.allaboutapple.com/>

John Warnock

Xerox PARC

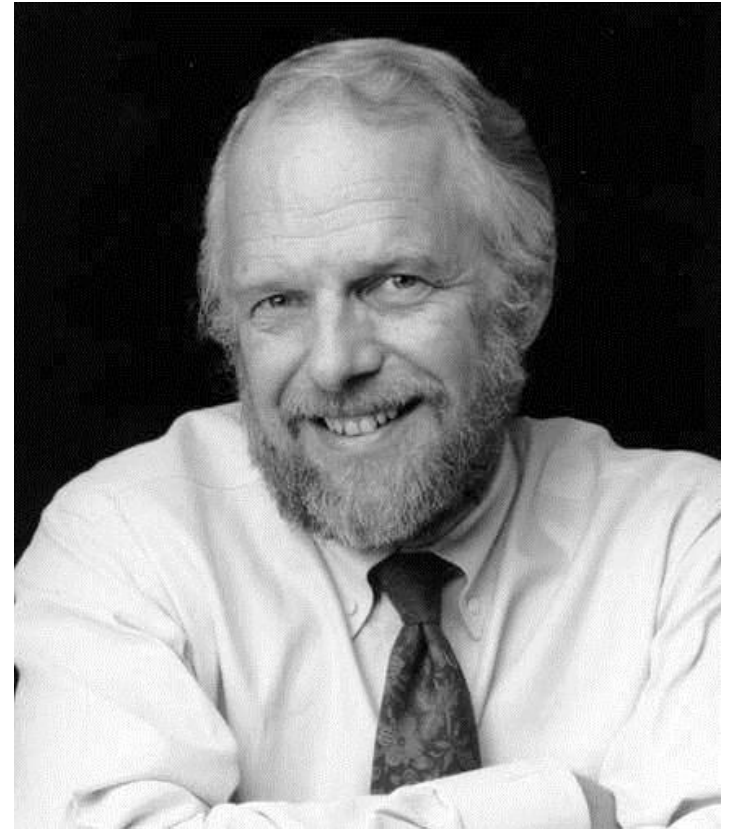
- Warnock started there in 1978
- Developed InterPress

Adobe

- Warnock co-founded it in 1982
- Developed PostScript
- Released in 1984 for LaserWriter

Portable Document Format

- Proprietary standard, 1993
- Open standard, 2008



IBM compatible PC's

Compaq's 386

- In 1986 Compaq beat IBM to release new computer
- first 32bit processor
- Others followed
- IBM stopped competing, made money from licences for patents
- IBM sold PC division in 2005 to Lenovo

Windows

- Version 3.0 of windows released in 1990
- Good enough to compete with Macintosh
- Release of Window 95, Windows 98, Window 2000, Windows ME, Windows XP, Windows Vista, Windows 7, Windows 8

Trouble in paradise

Windows

- Microsoft sold Internet Explorer bundled with Windows
- US Justice department takes legal action
 - Anti-monopoly laws apply to Microsoft
- US Courts suggest breaking MS into 2 companies:
Applications and Operating System
- MS shares halve in value

Apple

- Steve Jobs fired in 1985 by CEO John Scully (former Pepsi)
- goes on to found NeXT
 - Apple share values dropped steadily
- Steve Jobs re-hired by Apple 1998, they by NeXTSTEP OS
 - Apple makes comeback
- OS X, Apple iPod, iPhone, iPad

Smartphones

A **smartphone** is a mobile phone with advanced computing capability and connectivity, such as

- a personal digital assistant (PDA)
- a media player
- a digital camera
- a GPS navigation unit
- web browsing
- Wi-Fi
- 3rd-party apps and accessories

Early Days

In 1974, the concept of a **phone** integrating computing capability was developed.

1992 The first mobile phone with **PDA** (personal digital assistant) features was developed by IBM.

1994 BellSouth produced the “**Simon Personal Communicator**”, a mobile phone capable of sending and receiving faxes and e-mails through its touch screen display.

1997 The term “**smartphone**” was coined by Ericsson for its GS 88 “Penelope”.

2000-now The operating systems such as Palm OS, BlackBerry OS or Windows CE/Pocket PC developed for PDAs evolved into mobile operating systems.

Mobile operating systems

BlackBerry (1999), Research In Motion Limited

iOS (2007), Apple for iPhone

Android (2008), Google

Windows Phone (2010), Microsoft

Firefox OS (2012), Mozilla

Near Future

Smartphones

designed entirely for identity protection (security, encryption)

with curved organic light emitting diode (OLED) technology

foldable

energy from radio, television, cellular or Wi-Fi signals

dustproof and waterproof up to one-meter underwater depth



Far future

What will historians of the far future write about us?

Maybe this?

“Few records survive from that time. It is believed that people got obsessed with machines processing sequences of 0s and 1s, thereby entirely missing the fact that the sea level was rising.”