CSCI 215 Social & Ethical Issues In Computing

Class 18 – (some) General History
Notes

- Final Tomorrow
Review

• If I don’t hug you because I don’t want you to hug me, which ethical guideline am I following?
Question

What was the first computer?
“Computer”

• “Computer” comes from “Compute”, which comes from 1630’s France

• “Compute” derived from Latin “computare”, which means to count, sum up

• “Computer” in relation to an electrical machine didn’t occur until 1946
~ 1300 BC Abacus

- Counting Frame / Calculating Tool
|    | 1   | 2   | 3   | 4   | 5   | 6   | 7   | 8   | 9   | 10  | 11  | 12  | 13  | 14  | 15  | 16  | 17  | 18  | 19  | 20  |
|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 1  | 1   | 2   | 3   | 4   | 5   | 6   | 7   | 8   | 9   | 10  | 11  | 12  | 13  | 14  | 15  | 16  | 17  | 18  | 19  | 20  |
| 2  | 2   | 4   | 6   | 8   | 10  | 12  | 14  | 16  | 18  | 20  | 22  | 24  | 26  | 28  | 30  | 32  | 34  | 36  | 38  | 40  |
| 3  | 3   | 6   | 9   | 12  | 15  | 18  | 21  | 24  | 27  | 30  | 33  | 36  | 39  | 42  | 45  | 48  | 51  | 54  | 57  | 60  |
| 4  | 4   | 8   | 12  | 16  | 20  | 24  | 28  | 32  | 36  | 40  | 44  | 48  | 52  | 56  | 60  | 64  | 68  | 72  | 76  | 80  |
| 5  | 5   | 10  | 15  | 20  | 25  | 30  | 35  | 40  | 45  | 50  | 55  | 60  | 65  | 70  | 75  | 80  | 85  | 90  | 95  | 100 |
| 6  | 6   | 12  | 18  | 24  | 30  | 36  | 42  | 48  | 54  | 60  | 66  | 72  | 78  | 84  | 90  | 96  | 102 | 108 | 114 | 120 |
| 7  | 7   | 14  | 21  | 28  | 35  | 42  | 49  | 56  | 63  | 70  | 77  | 84  | 91  | 98  | 105 | 112 | 119 | 126 | 133 | 140 |
| 8  | 8   | 16  | 24  | 32  | 40  | 48  | 56  | 64  | 72  | 80  | 88  | 96  | 104 | 112 | 120 | 128 | 136 | 144 | 152 | 160 |
| 9  | 9   | 18  | 27  | 36  | 45  | 54  | 63  | 72  | 81  | 90  | 99  | 108 | 117 | 126 | 135 | 144 | 153 | 162 | 171 | 180 |
| 10 | 10  | 20  | 30  | 40  | 50  | 60  | 70  | 80  | 90  | 100 | 110 | 120 | 130 | 140 | 150 | 160 | 170 | 180 | 190 | 200 |
| 11 | 11  | 22  | 33  | 44  | 55  | 66  | 77  | 88  | 99  | 110 | 121 | 132 | 143 | 154 | 165 | 176 | 187 | 198 | 209 | 220 |
| 12 | 12  | 24  | 36  | 48  | 60  | 72  | 84  | 96  | 108 | 120 | 132 | 144 | 156 | 168 | 180 | 192 | 204 | 216 | 228 | 240 |
| 13 | 13  | 26  | 39  | 52  | 65  | 78  | 91  | 104 | 117 | 130 | 143 | 156 | 169 | 182 | 195 | 208 | 221 | 234 | 247 | 260 |
| 14 | 14  | 28  | 42  | 56  | 70  | 84  | 98  | 112 | 126 | 140 | 154 | 168 | 182 | 196 | 210 | 224 | 238 | 252 | 266 | 280 |
| 15 | 15  | 30  | 45  | 60  | 75  | 90  | 105 | 120 | 135 | 150 | 165 | 180 | 195 | 210 | 225 | 240 | 255 | 270 | 285 | 300 |
| 16 | 16  | 32  | 48  | 64  | 80  | 96  | 112 | 128 | 144 | 160 | 176 | 192 | 208 | 224 | 240 | 256 | 272 | 288 | 304 | 320 |
| 17 | 17  | 34  | 51  | 68  | 85  | 102 | 119 | 136 | 153 | 170 | 187 | 204 | 221 | 238 | 255 | 272 | 289 | 306 | 323 | 340 |
| 18 | 18  | 36  | 54  | 72  | 90  | 108 | 126 | 144 | 162 | 180 | 198 | 216 | 234 | 252 | 270 | 288 | 306 | 324 | 342 | 360 |
| 19 | 19  | 38  | 57  | 76  | 95  | 114 | 133 | 152 | 171 | 190 | 209 | 228 | 247 | 266 | 285 | 304 | 323 | 342 | 361 | 380 |
| 20 | 20  | 40  | 60  | 80  | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 |
1801 Jacquard looms

• Used replaceable punch cards to weave complex patterns in textiles
1791 – 1871 Charles Babbage

- **Difference Engines**: create tables of polynomials
- **Analytical Engines**: steam-driven, general purpose machines
1815-1852 Ada Lovelace

- Never met her father, who was a poet. Her mother, not wanting her to end up like her father, pushed Ada towards mathematics.
- She set to work translating Babbage’s analytical engine, appending her own notes, which described the promise of a general computer and even proposed it would be able to generate music.
- Published description of a stepwise sequence of operations for solving certain mathematical problems.
- Ada is often referred to as 'the first programmer'.
1860 - 1929 Herman Hollerith

1890 census: Designed a punch card system to calculate the US census
Took just 2.5 years (compared to previously 7)
Saved the government $5 million
He establishes a company that would ultimately become IBM
The 60 million cards fed manually into machines like this for processing.
An average operator could process about 7,000 cards a day, at least ten times faster than manual methods.
1912 – 1954 Alan Turing
Vacuum Tubes (1906)
1903 - 1957 John von Neumann

- Credited with realizing computers can both execute instructions and store memory - **von Neumann Architecture**
- Created the idea of self-replicating automata (by pencil and paper) – remember viruses?
- *Unofficially* credited with being the creator of Merge Sort Algorithm
1946 ENIAC

- First electronic general-purpose computer
- Used to calculate artillery firing tables
- Also, calculate the feasibility of the hydrogen bomb.
1951 - UNIVAC 1

- **UNIV**ersal **A**utomatic **C**omputer, commercial computer
- Used for the 1951 Census
- CBS’s Univac famously predicted Eisenhower would win 438 votes to 93 votes for Stevenson, despite being “experts” predicting Stevenson the winner
- Actual results were 442-89 (obviously in favor of Eisenhower)
Moore’s Law

• 1965 co-founder of Intel **Gordon Moore** wrote a paper called ‘Cramming more components onto integrated circuits’

• In this paper, he observed that the number of transistors per square inch on integrated circuits had doubled every other year since the integrated circuit was invented

• Original prediction thought it would last for 10 years (still holds 50 years later)

• Current definition refers to doubling every 18 months (a redefinition that Moore approves of)
"Frankly, I didn't expect to be so precise."

Gordon Moore
Intel co-founder and author of Moore's law
In the Beginning (1800s)
Outsourcing (1970-80s)

- Outsource to India
- Outsourcing shifts to China

Cumulative U.S. jobs displaced by growing goods trade deficit with China, 2001–2013 (in thousands of jobs)

Flat world

- https://www.ted.com/talks/pankaj_ghemawat_actually_the_world_is_not_flat?language=en