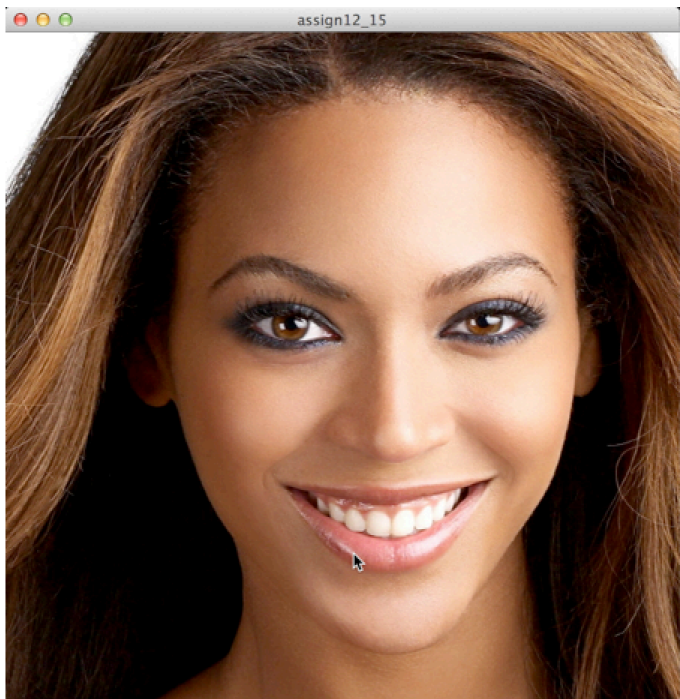


Announcements ...

- No class Monday – President's Day
- Next homework:



```
assign12_15 | Processing 2.2.1
assign12_15
Image baseIm;
color c = color(255,0,0);
boolean check = true;

void setup( ) {
  size(600,595);
  background(255);
  baseIm = loadImage("queenbey.jpg")

void draw( ) {
  if(check) {
    image(baseIm, 0, 0);
  }
}

190 99 94
190 99 94
24
```

As my mouse moves over Beyoncé's lip, the RGB color of the pixel it's on is shown at the bottom of the program window as 190, 99,



A Better Society Through Computers

*Lawrence Snyder
University of Washington, Seattle*

With Special Thanks to Prof. Richard Ladner

“Computers” + “Social”

- When we think of computers and society at the same time, we usually think of social media – FB, Twitter, Tumblr, Pinterest

“Computers” + “Social”

- ~~When we think of computers and society at the same time, we usually think of social media – FB, Twitter, Tumblr, Pinterest~~
- Instead, think of ways computers make the society better
- Today:
 - Assistive Technologies help people with disabilities
 - Crowd Sourcing harnesses the power of the people

Who's Considered Disabled?

- 650 million people worldwide
 - Sight: blind, low vision, color blind
 - Hearing: deaf, hard of hearing
 - Speech: limited ability to speak, stuttering
 - Mobility: limited ability to walk, use hands, arms
 - Cognition: dyslexia, short-term memory loss, dementia
 - Multiple: deaf-blindness

Assisting The Blind

Ray Kurzweil built first text-to-speech machine

- Think of the problems
 - High resolution scanning of documents
 - Character recognition from bits (OCR)
 - Word identification
 - Speech Synthesis
- + a zillion tough tech problems in between

AMAZING!

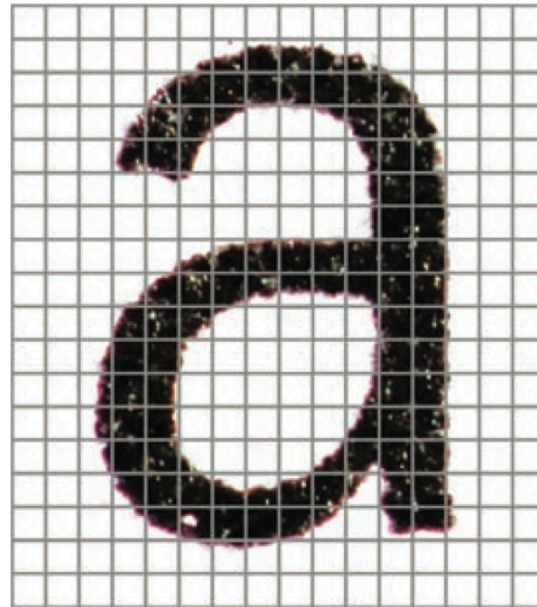


OCR – A Problem

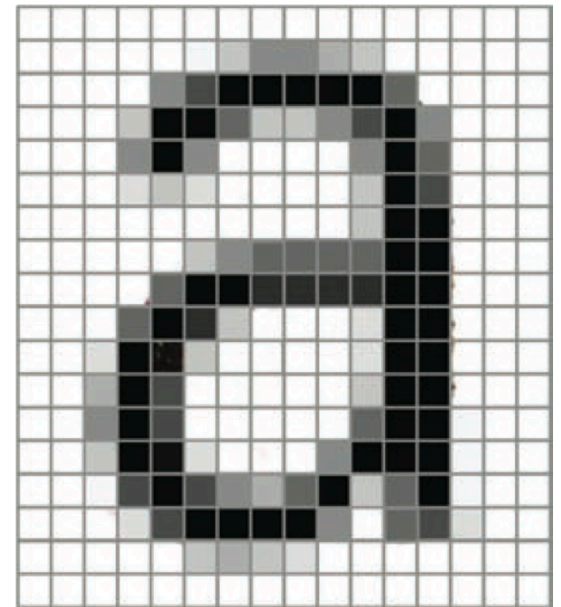
- A scanner produces an array of pixels ... this is not a letter



Print on Paper



Scanner In



Scanner Out

OCR – Another Problem

- Printing is an art form, and font design is a creative field

g g̃ g ǰ g g **g** g g g g g g g g

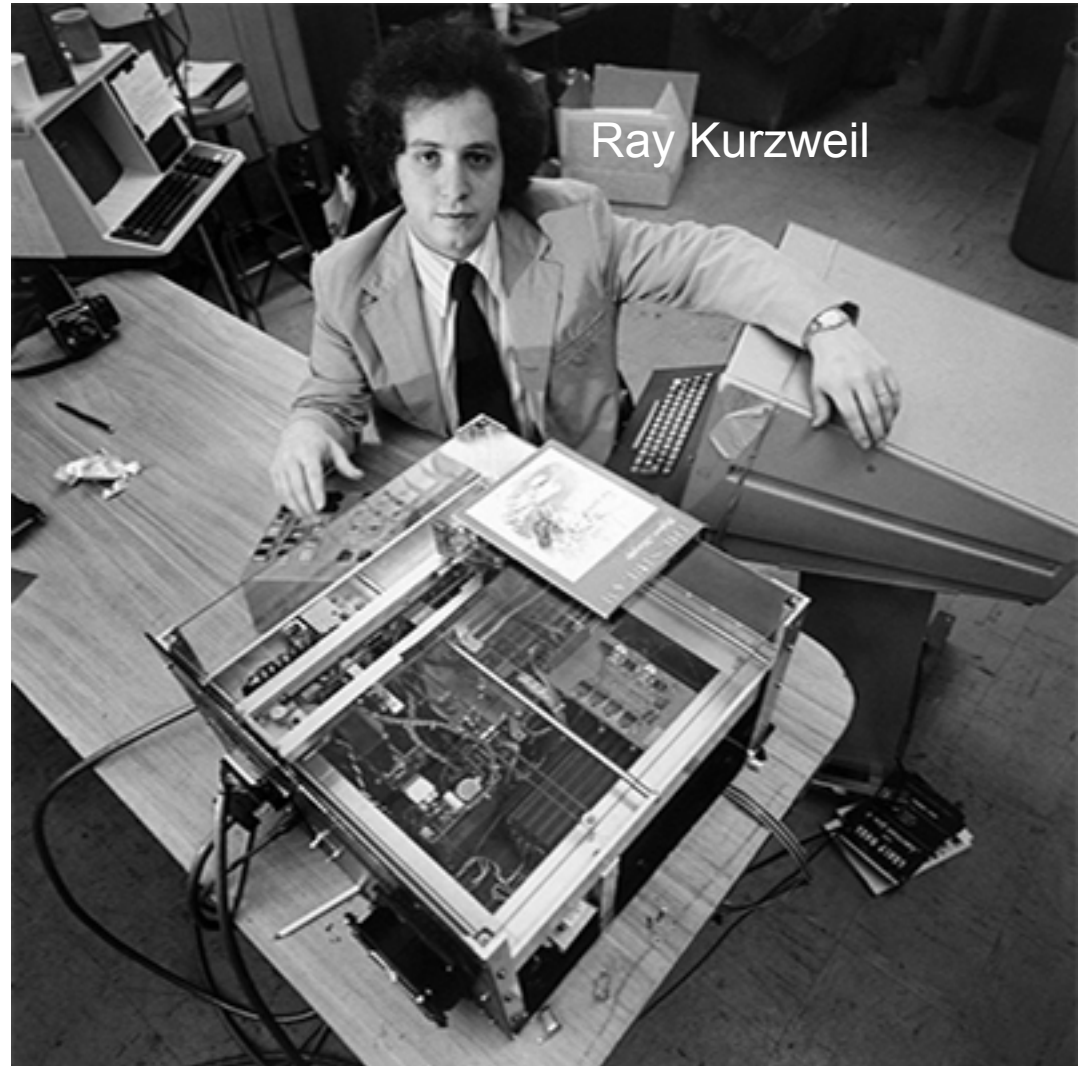
A sampling of 'g' all of 48 point size

Speech Synthesis: A Problem

- After figuring out what the text is, saying it is tough ...
 - 'read' and 'read'
 - 'Job' and 'Job'
 - 'eta' and 'ETA'
 - ...

Kurzweil Reading Machine

Stevie Wonder said: "The Kurzweil Reading Machine was a breakthrough that changed my life. With the Kurzweil Reading Machine, I could read anything I wanted with complete privacy: music lyrics, letters from my children, the latest best sellers and magazines, memos from my business associates. **It gave blind people the one thing that everyone treasures, which is independence.**"



Using The Technology ...



FROM: KURZWEILTECH.COM

KNFB Reader

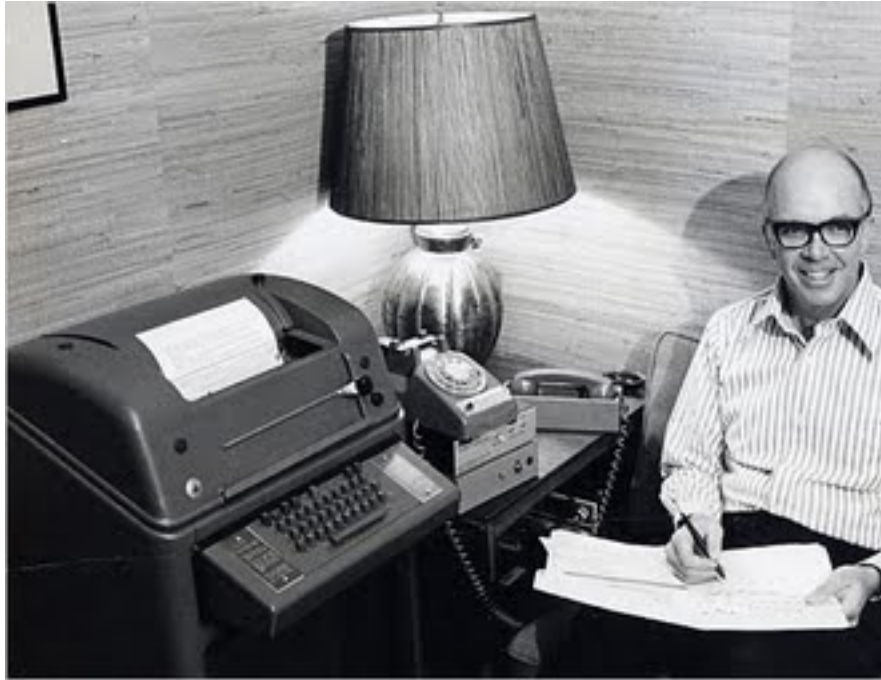


Prismo for iPhone

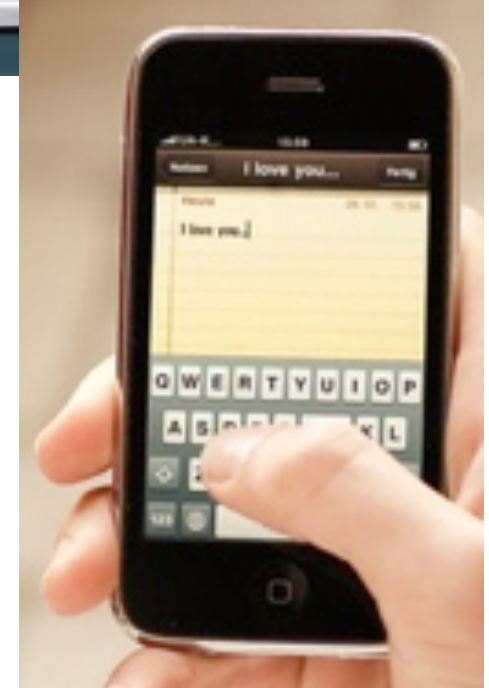


Bookshare

Texting: TTY to SMS



Deaf people need to type/read text when communicating over a distance ... since the invention of the acoustic modem in the '70s this has been possible, but only now is **mobile**



Everyone Benefits:

- Technologies designed to assist the disabled to function in society usually turn out to be extremely useful to everyone!
 - Telephone
 - Texting
 - OCR
 - Speech recognition
 - Speech synthesis
 - Electric toothbrush
 - Sidewalk curb ramps and on and on and on ...

Take Home Message

- Don't think of disabled people as a medical, educational or social "problem" ... think how tech can let them live WELL with a disability

Assisting The Disabled Is Right!
First: Their Lives Are Better
Next: Everyone's Life Is Better

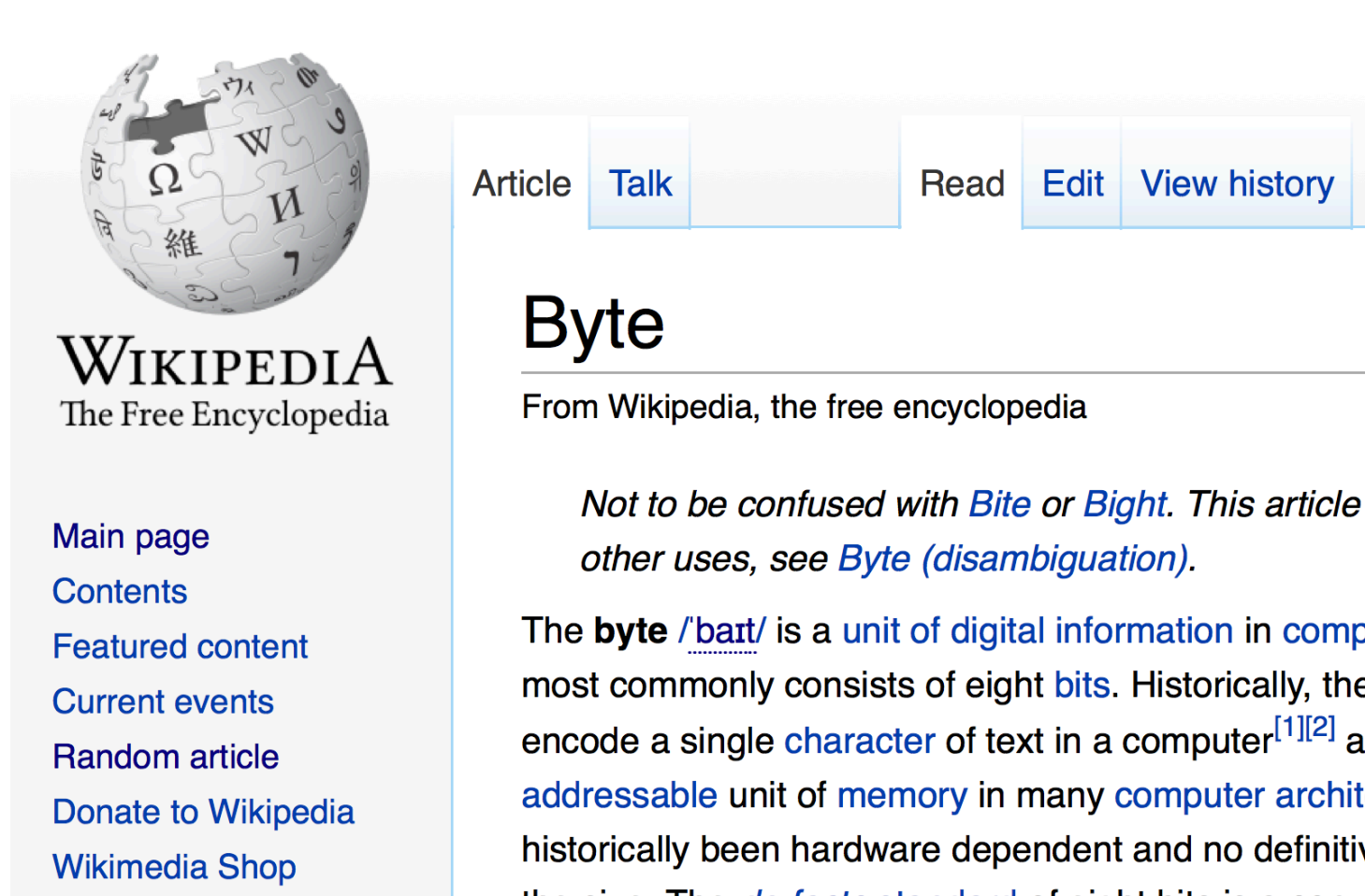
Crowd Sourcing

- Crowd sourcing is a distributed problem-solving and production technique
 - Problems are broadcast to an unknown group of 'solvers'
 - 'Solvers' – the crowd – submit solutions that become the property of the broadcaster
 - They are compensated in some form -- money, prizes, community accolades, intellectual satisfaction and/or skill development
- Computers are the perfect 'agent' for this!

Before There Were Computers ...

- Crowd sourcing doesn't need computers ...
- The Oxford English Dictionary (OED), started in 1857, is an example. (It has EVERY English word in it; it's so huge a person would need 120 years to type it in!)
- OED gave a general call for people to find the earliest use of each word ... so, for example, *byte* was first used in 1964
- 1,000s and 1,000s of people have helped out, and continue to

More Familiarly ...



The image shows a screenshot of the Wikipedia article for 'Byte'. On the left is the Wikipedia logo, a globe made of puzzle pieces with various characters, and the text 'WIKIPEDIA The Free Encyclopedia'. Below the logo is a list of navigation links: 'Main page', 'Contents', 'Featured content', 'Current events', 'Random article', 'Donate to Wikipedia', and 'Wikimedia Shop'. On the right is the article content. At the top, there are tabs for 'Article', 'Talk', 'Read', 'Edit', and 'View history'. The title 'Byte' is prominently displayed. Below the title is the text 'From Wikipedia, the free encyclopedia'. A note in italics says 'Not to be confused with *Bite* or *Bight*. This article , other uses, see *Byte (disambiguation)*.' The main text begins with 'The **byte** /ˈbaɪt/ is a unit of digital information in comp most commonly consists of eight bits. Historically, the encode a single character of text in a computer^{[1][2]} an addressable unit of memory in many computer archite historically been hardware dependent and no definitiv the size. The de facto standard of eight bits is a convu'.

- The database of knowledge

More Familiarly ...

■ freerice.com

The screenshot shows the freerice.com website interface. At the top, there is a navigation bar with links: HOME, SUBJECTS, GROUPS, RICE!, SIGN UP, LOGIN, ABOUT, SPREAD THE WORD, and ENGLISH. Below the navigation bar is a green banner with the text: "For each answer you get right, we donate 10 grains of rice through the World Food Programme to help end hunger".

Below the banner is a login/sign up section with the text: "login | sign up (track your totals, join and create groups and more)".

The main content area is divided into three columns:

- Left Column:** Features three images of rice. The top image is a small pile of rice with the text "1 right = 10 grains". The middle image is a larger pile of rice with the text "5 right = 50 grains". The bottom image is a large pile of rice with the text "Play and feed hungry people".
- Middle Column:** Titled "English Vocabulary" and "New Subjects! ▶". It displays a vocabulary question: "rotate means:" followed by a speaker icon. Below the question are four multiple-choice options: "want", "creep", "amuse", and "turn". At the bottom of this column, it states: "7359720 grains of rice donated yesterday. Over 97 billion grains donated to date (see totals)." with a link to "totals".
- Right Column:** Titled "How to Play" and contains a list of instructions:
 - Click on the right answer in the middle of this page.
 - If you get it right, you get a harder question. If you get it wrong, you get an easier question.
 - For each answer you get right, we donate 10 grains of rice to the [United Nations World Food Program](#).A warning message follows: "WARNING: This game may make you smarter. It may improve your speaking, writing, thinking, grades, job performance... ([more](#))".

■ UN Food Program gets rice; Users learn vocab