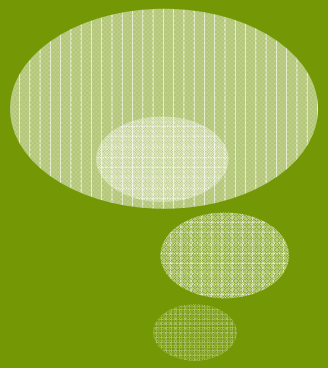

Moving the Principles Course into High School

Michelle Friend Hutton


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friendField.ge
riend(friendField.getText());
urrentProfile != null) {
vas.displayProfile(currentProfile);
} el
no le();
}
}
private void create le(String name) {
// Create a FaceP tProfile with that name
if (! database.conta ofile(name)) {
database.addProfil FacePamphletProfile(name));
canvas.showMessage(" rofile created");
} else {
canvas.showMessage("The p e for "+ name + " al
}
currentProfile = database.getProf me);
}
ivate void deleteProfile(String name) {
//Delete the user named in name box to the
/Removes as a friend from everyone who s/he ends w
database.containsProfile(name)) {
base.deleteProfile(name);

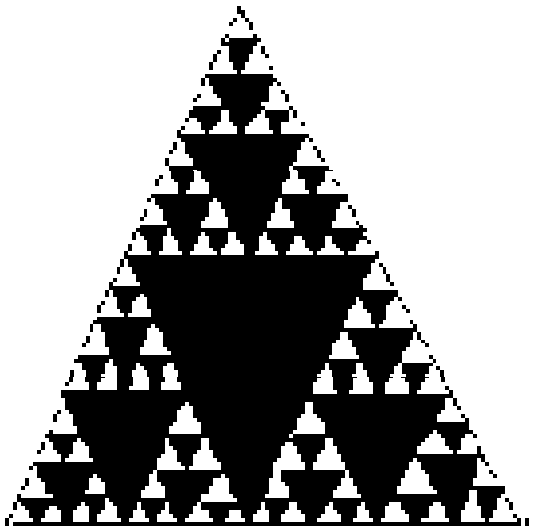
Big Ideas
(abstract version)

1. Computing -> innovation & exploration
2. Abstraction
3. Data & Information -> Knowledge
4. Algorithms
5. Programming
6. Systems & automation
7. Computing -> Innovation in other fields

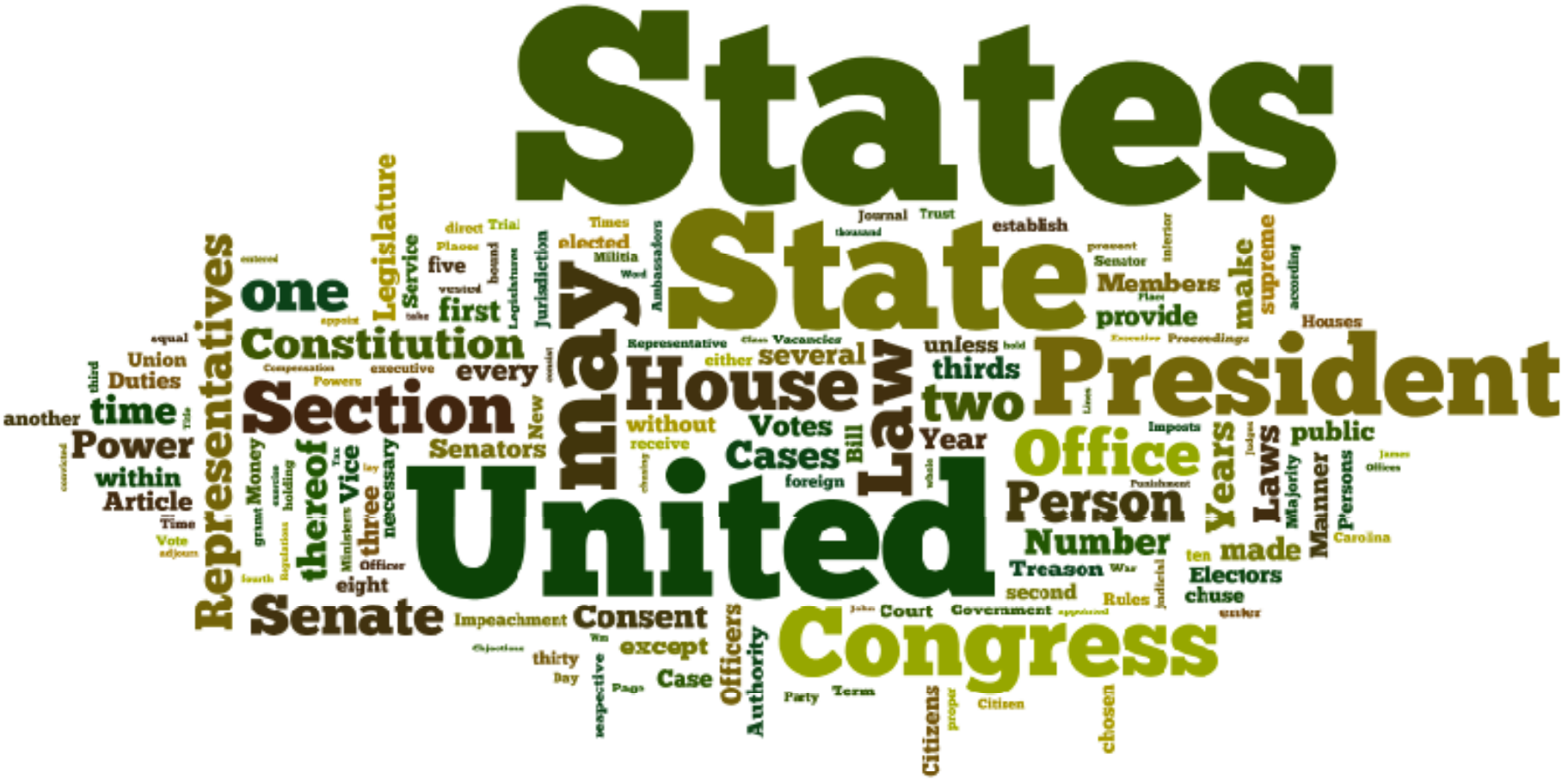
Computing is a creative activity that engenders innovation & exploration

- Timeline of technology with timeline of student families on top of it
- Investigation into how new media has changed the art world, communication, etc.
- Data mining
- Wordle
- Discussions around the assumptions made by artifact designers & artifact users

Fractal Art



Wordle.net
US Constitution



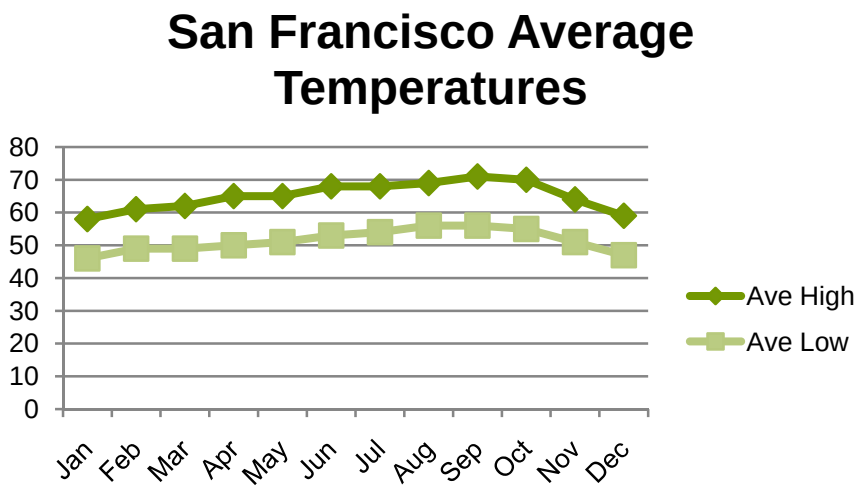
Models of Pizza

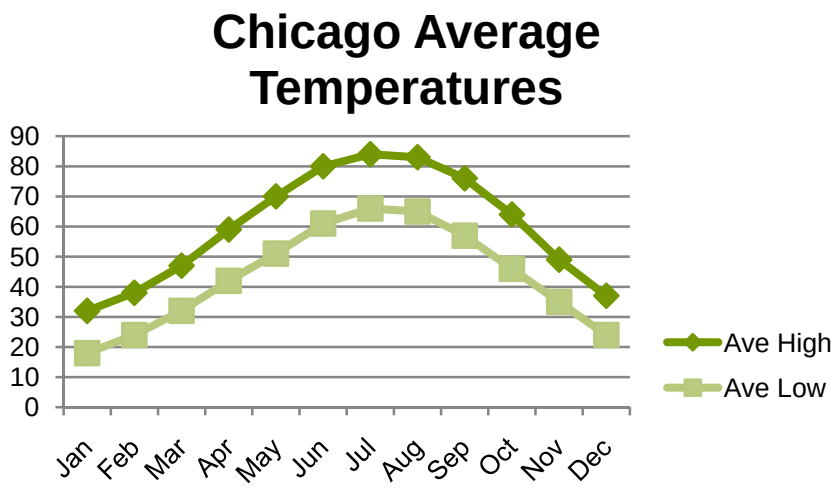
Abstraction reduces detail to solve problems

- Models & Simulations
- Natural language processing

Weather modeling

Weather Predictions						
	Chicago			San Francisco		
	Ave High	Ave Low	Ave Precip	Ave High	Ave Low	Ave Precip
Jan	32	18	2.17	58	46	4.72
Feb	38	24	1.77	61	49	4.15
Mar	47	32	3.01	62	49	3.4
Apr	59	42	3.65	65	50	1.25
May	70	51	3.7	65	51	0.54
Jun	80	61	4.3	68	53	0.13
Jul	84	66	3.68	68	54	0.04
Aug	83	65	3.86	69	56	0.09
Sep	76	57	3.21	71	56	0.28
Oct	64	46	2.71	70	55	1.19
Nov	49	35	3.32	64	51	3.31
Dec	37	24	2.63	59	47	3.18
	Data from www.weather.com					

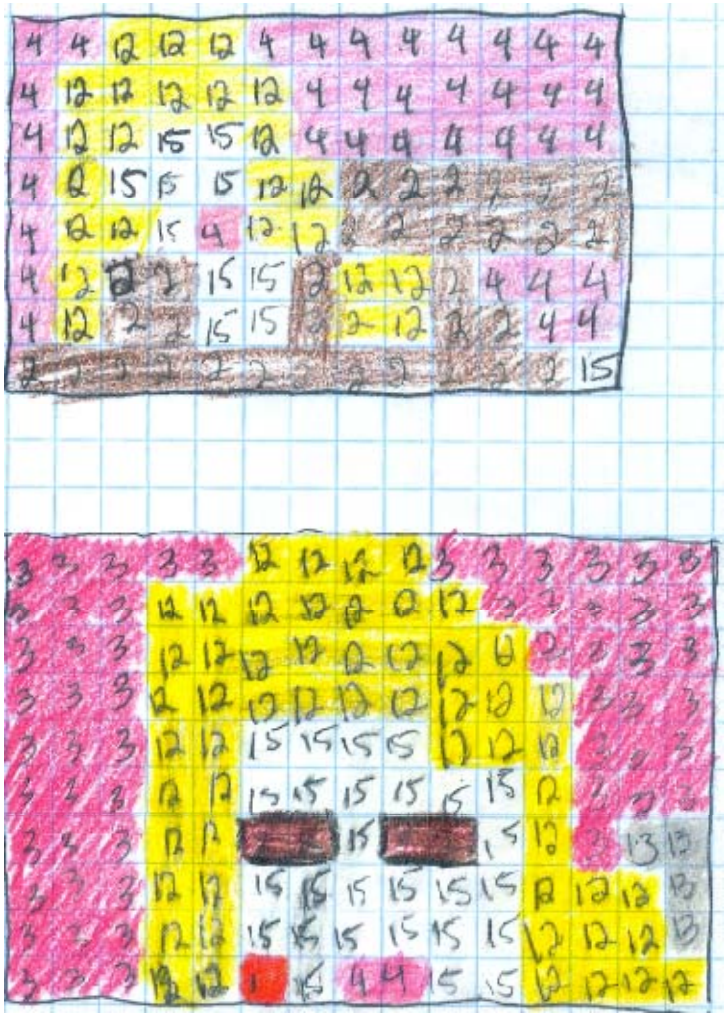


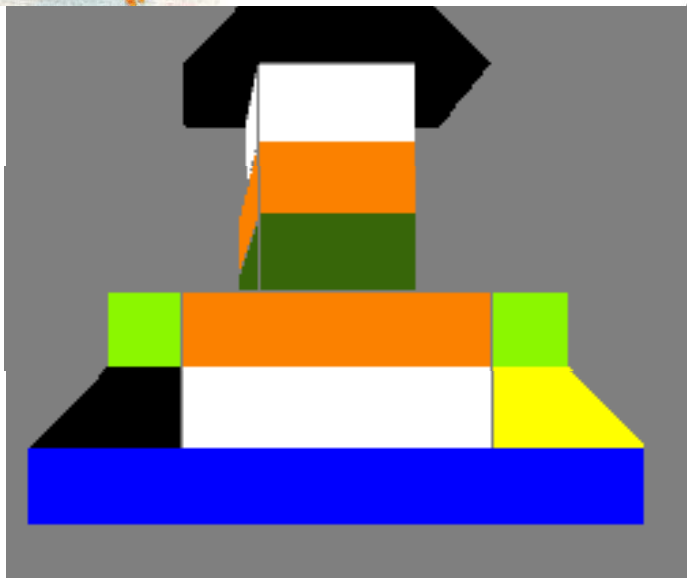


Data and information facilitate the creation of knowledge

- Digitizing data
- Excel spreadsheets

Digitizing Data





Algorithms express solutions to computational problems

- Create algorithms. Use different levels of abstraction
- Discussion: what problems are computers good at solving? What are they bad at solving? What can computers not do?
- Compare algorithms for solving the same problem

Imagine you are a judge at an egg drop contest…

- *Solution 1: Drop the first contraption from 1 inch. If the egg does not break, drop it from 2 inches, and then 3 inches, etc., until it breaks. Record the last height before the egg breaks.*
- *Solution 2: Drop the first contraption from 128 inches. If the egg does not break, drop it from 192 inches, and then 224 inches, etc., increasing the height by half of the remaining distance to the top each time. When the first contraption breaks, begin dropping the second contraption at a height one inch greater than the height from which the first one did not break, working your way to the height on which the first contraption broke. (So if the first contraption broke at 224 inches high, you would drop the second contraption from 193 inches, then 194 inches, then 195 inches, up to 223 inches.) Record the last height at which the egg was successfully dropped before it broke.*
- *Solution 3: Drop the first contraption from 16 inches high. If it does not break, drop it from 32 inches, then 48 inches, and so on, increasing by 16 inches each time. When the first contraption breaks, begin dropping the second one at a height one inch greater than the height from which the first one did not break, working your way to the height where the first contraption broke. (So if the first contraption broke at 48 inches, drop the second contraption from 33 inches, then 34 inches, then 35 inches etc. up to 47 inches.) Record the last height at which the egg was successfully dropped before it broke.*

Programming produces computational artifacts

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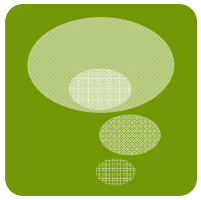
Devices, systems, networks…automate computational solutions

- Cloud computing
- Parallelization
- How the internet works
- Decision trees

Computing enables innovation in other fields

- Big Data
- Bioinformatics & gene sequencing
- “You might also like…”

Research how computing intersects with a field you want to study or work on



Conclusion