Introduction to Graphics

Elements of Graphics
CS324e
Spring 2021
What is Graphics?
Graphics and Visualization

- Computer graphics creates imagery through computing
  - Simulation
  - Modeling
  - Games
  - Artist tools
- Computer Visualization conveys messages or information through computer graphics
  - Medical
  - Sociological
  - Biological
  - Physical
Big Hero 6 (Disney)

Combustion Engine (Sandia)
Topics Covered

❖ Processing language
❖ Graphics programming
❖ Image manipulation
❖ Data visualization
❖ Object-oriented programming
❖ Animation
❖ Simulation
❖ Interactivity
❖ WebGL and shaders
Elements of Graphics Class Format

- In this class, we will focus on group exploration and discussion rather than lecture
- Thus the day’s format will be:
  - 10 minute presentation of student work
  - 20-30 minutes of class material
  - Periodic quizzes to test understanding
  - 10-20 minutes of in-class work (groups encouraged)
Class Expectations

❖ Project-based work
  ❖ Team projects and reports
❖ Engaged and helpful attitude
  ❖ Mandatory attendance
  ❖ Ask and answer questions on Piazza/Discord
❖ Academic honesty
❖ Positive teamwork and interactions
❖ Preparedness for presenting your work in class
❖ Ability to read syllabus and schedule on your own
In-Class Presentations and Quizzes

- Attendance and discussion will be done using Instapoll
- Be prepared/on time to present!
- Students can volunteer to show off their work

In-class quiz grades are participation (wrong answers are not penalized)

- Checks individual attendance
- Checks understanding of material

- Instapoll will run for 24 hours if you have a scheduling conflict/timezone issue
Processing

- Java-based language for visualization
- Designed for non-programmers
- All documentation can be found at https://processing.org/
- Recommended reading: Processing by Casey Reas and Ben Fry
Processing Examples

❖ Avena+ Test Bed (http://benedikt-gross.de/log/2013/06/avena-test-bed_agricultural-printing-and-altered-landscapes/)
❖ City Symphonies (http://markmckeague.com/work/city-symphonies/)
❖ Wayfarer (http://benhem.com/games/wayfarer/)
❖ Non-linear Code (http://dextro.org/default_h.html)
Processing Languages

- Processing.py allows for Python-style syntax within the Processing language
- p5.js is the Javascript version, which works well with HTML5
- Class examples will be done using Java-based Processing
- Projects (except final) should be in Java Processing
- Note: we will use Javascript when working with WebGL
Processing “Hello World”
Next Class: Online Meet and Greet!

❖ Even though we’re working remotely, this is not an “online class”
❖ You’re here to make friends, work on a team, and get a full classroom experience beyond just learning
❖ Before next class take (or pick out) 2-3 images that “represent” you
❖ You do not have to share your face, but do make sure all of the images are work-appropriate
❖ We will meet next time in the Discord voice and text channels in medium groups where you will share these pictures and explain how they represent you
In-Class Exercise

- Install Processing on your laptop
- Create `void setup()` and `void draw()` functions
  - Look on the Processing website to see some of the available calls to use within these functions
- What is the difference between `setup()` and `draw()`?