

WI21 ITGM 220 CORE PRINCIPLE: PROGRAMMING

ASSIGNMENT 04

4. Visualizing Data (15%)

Learning Outcomes

After completing this Assignment, students will be able to:

- Find and obtain data sets to visualize
- Write code to visualize data
- Utilize arrays to store information

Key skills:

1. Reading datasets from a file.
2. Storing and accessing data in arrays, including through loops.
3. Develop in depth insights into a data set through multiple views providing .

Overview

Create an interactive data visualization of a data set.

Requirements

1. Student's (creator) name must be clearly viewable on the top/bottom/corner of the work.
2. Pattern **must** react to User input.
3. Data set must have **at least 20 unique data points**.
4. At least **3 unique ways** to visualize your data. For example:
 - a. Shapes: Pie/Bar/line chart displayed in turn on mouse clicks.
 - b. Overlays: 1, 2 or 3 set of data overlay on top of the same timeline
 - c. Annotations: Additional data will be displayed to further explain the inner meaning of a data point when mouse over.
 - d. Scope: When pressed <- or -> key, different period of time displayed.

- e. Prediction: When pressed SPACE key, the future trend of this data will be added.

Procedure

1. Research online and find a suitable data set.
 - Refer to Blackboard > Tutorial > Hard to find Data for instruction on how to conduct the research.
 - If no suitable data set can be found, create one based on a real-life situation. For example, the win/lose ratio of 1 month of playing Fortnite.
 - Regardless of the original format of the data set, export the data into CSV file. For example, in Excel you can directly export to CSV.
2. Collect a set of image references that will influence your design, create a mood board.
3. Hand sketch out versions of your ideas. Evolve your design by sketching out the next version. Do not erase old versions as you would need them for documentations. If you are using external images as elements, re-create the final look either through pencil sketches or image editing software.
4. Based on your hand drawn sketch, create a plan for the project in processing:
 - How will your shapes be created / animated ?
 - What colors / fonts will you use?
 - How many data points can you display at once ?
5. Write the code to create your self-portrait in Processing.
 - Stage Size Range: 500 x 500 px (smallest) - 1200 x 800 px(largest)
 - Double check to see if you have met the requirements as stated in the **Requirements** Section.
 - Maintain good code structure as shown in class (Bracket Placements, Comments, Headings, Variable / Function Names)
6. Create Project Presentation Deck.
 - Consult Sample Project Documentation Structure Guide Below.

Submission and Due Date

1. Create an assignment report by Exporting a PDF of your presentation deck.
2. Properly ZIP your saved project.
 - Double Check one last time and make sure the project runs smoothly..
 - Make sure you have included the complete folder content, along with your assignment report pdf.
 - Remember the project might NOT execute if missing essential pdes.
3. Name your submission zip file correctly:
 - WI21_ITGM220_FirstNameLastName_A4datavisualization.zip
 - for example, John Doe would name the file "WI21_ITGM220_JohnDoe_A4datavisualization.zip"
4. Submit this file via the Assessment link in the course menu **before** class starts (8:00 p.m. EST/EDT) on due day

5. Post your 1) Data visualization drawing + 2) Processing rendered data visualization for peer review to the appropriate module discussion forum by 11:59 p.m. U.S. EST/EDT on due date.

Grading

- This Assignment is worth 25 percent of your overall grade in this class.
- Your Assignment will be graded according to the criteria specified in the Data Visualization Rubric below.
- Detailed Rubric Explanation can be found on BB> Course Work Section.

Mood Board	Sketches / Initial design	Data Set	Read into Array	Data read in from text / CSV file	loops	Documentati on	Interaction	Implementati on
10	10	10	10	10	10	10	10	20

Recommended Project Documentation Structure

HOW	<ul style="list-style-type: none">- Document Size: Portrait. (1920 x 1080) or A4- Presentation Deck: I recommend using presentation tools to create: Keynote, Powerpoint, Google Slides etc.- Export Format: PDF (No Doc / Txt)
WHO	<ul style="list-style-type: none">- Reviewer Analysis: Professor will be your primary reviewer.- Presentation: Project will be presented in class via workstations. Students are expected to use a presentation deck to discuss projects.
WHAT	<ul style="list-style-type: none">• TITLE PAGE (1 page)<ul style="list-style-type: none">◦ Student Name, Class Info, Assignment Number◦ Give your work an interesting title. "HOW I LOOK WHEN I SEE MY BEST FRIEND" "ANGRY JIMMY"• IDEA / RESEARCH (1 - 3 pages)<ul style="list-style-type: none">◦ Write a statement explaining the idea.◦ Cite influential sources as your inspirations: Painting, photos, movies, poetry etc.◦ Any relevant pages taken from your sketchbooks.• SOLUTION / EVOLUTION (1 - 3 page)

	<ul style="list-style-type: none"> ○ Pencil / Digital Drawing of your intended Results. ○ Post discarded / older ideas as well. ○ Annotate for clarifications. ● WORK IN PROGRESS (1 page) <ul style="list-style-type: none"> ○ Discuss the evolution of the project by showing at least 1 in-progress screenshot. (Just grab the whole screen) ○ You can begin with Pseudocode or a flow chart, but not necessary. ● FINAL OUTCOME (1+ page) <ul style="list-style-type: none"> ○ Final Output of the code when executed in Processing. ○ Include all unique screenshots to showcase the various aesthetics created.
WHEN	Assignment Submitted to Blackboard before 8:00 pm EST on due day or be considered LATE.

Expectation of an A Assignment:

Before you declare your project finished and ready to deliver, check against the following criterias. Project which qualify for the grade of A should meet most if not all of the following:

Moodboard	Written description of concept includes all features to be implemented. At least 5 different visual references are used. Sketches are included and clearly illustrate the desired visual output. All references and sketches are clearly and individually annotated.
Data Set	Each data set contains at least 20 data points, with at least 3 or more attributes for each point. The data contains information not apparent on cursory observation. This project manages to reveal hidden insights through data visualization.
Use of Arrays	Processing sketch uses arrays to store the data set. Array lengths determined explicitly using automatic means to correspond to the number of data points needed. Types of variables are appropriate for the data types input. Conversions are done with skill. Utilize appropriate built in function calls.
Text / CSV File	Processing sketch reads in data sets from a text or CSV file. The formatting of the file meets expectations as it is the exact number of data that are used in the final sketch.

	Naming of data files are appropriate and allows users to easily discern what the content is.
Use of Loops	<p>Processing sketch uses loops to conduct read/write operations when appropriate.</p> <p>Loops structures are sound, containing clear start and end conditions.</p>
Documentation	<p>Documentations are well organized in a single file.</p> <p>Communicated the development of concept, workflow, code snippets and final output.</p> <p>Documentation describes the concept behind the pattern and clearly shows the development of the pattern using the references and sketches.</p> <p>All necessary images are placed in the document.</p> <p>The Processing code is commented in detail and the comments explain the intent of the code.</p> <p>Materials are organized professionally and are ready to be shared on social media.</p> <p>Ready to be included in the portfolio.</p>
Implementation	<p>3 distinct visualizations are created using the dataset. Graphs are not simply repetitions using different values but convey meaningful information.</p> <p>Appropriate labels and legends are clearly displayed along with the data.</p> <p>The code contains minimal redundancy.</p> <p>The Aesthetic of the resulting sketch is good/excellent. Showcases the designer's ability in layout, balance, palette and font choices.</p> <p>Work is suitable for portfolio purposes.</p>
Interaction	<p>Mouse or keyboard input used to switch between different visualization variations.</p> <p>Interactions well designed .Users can observe update of the viewing experience by executing the inputs.</p> <p>The outcome is visually excited and bring forth delights.</p> <p>Ample feedbacks encourage users to continue to interact with the work.</p>



Excellent on-screen note / hint to help guide the user the goal / method to interact with this work.