Is there a frill in your bill? How have your grocery bills increased over time?

Abstract

The motivation behind doing this project is watching the price of my burger king deals go up over the years. We are trying to present the data of prices of various grocery foods in various countries in an easily digestible fashion such that people can correlate their experience and see whether or not what they feel is a change in price is an actual change in price. My goal is to properly show the actual changes such that people would not exaggerate nor undermine the changes in prices. It is also nice to be able to pinpoint the exact goods that have a majorly increased price and also identify which goods do not change much in price for the future.

The current planned dataset is https://www.statcan.gc.ca/en/topics-start/food-price. The dataset includes the price of Canadian grocery goods along with the month that it comes from. There is also provincial information in it. We are planning to use it to find the average rate of change over the years and months of the various grocery goods that are listed in the dataset. Other than that dataset, it would also be great to get datasets for other countries in the future in order to contrast and compare the changing food prices in various countries.

Team Agreement

CS Project Team Agreement

Communication

- Use discord as primary communication, use @ for urgent needs. Teams should read messages by at least 48 hours.
- Weekly Team meetings held in discord at Thursday, time undecided in order to review all materials before submission.
- Task updates or blockers will be sent to Discord

Code Guidelines

- camelCase, use convention described in textbook
- Comment workaround or technical debt, along with core functionalities if required

Tasks

- Task assigned on Thursday right after confirming submission of previous week task. Will be divided into weekly meetings.
- Update task completion on discord so that team members will know when to pull and merge

Version Control

- Main branch protected - no direct commits. Make changes on individual branches.
- Commit messages must be descriptive. Pull request must also be descriptive.
- Use github version control to ensure main does not have errors

Quality Standards

- All code must follow syntax similar to the ones in the textbook
- All pages need to at least be eye tested and seen working before being pushed to main.
- Use extension Prettier to make code look cleaner

Team

Member: Jason Sastra Date: 2025-02-26

Signed: ___Jason Sastra_____

Member: Khoa Pham Date: 2025-02-26

Signed: ___Khoa Pham_____

Member: Gursewak Sandhu Date: 2025-02-26

Signed: ___Gursewak Sandhu_____

Detailed Project Plan

- **Basic Info**.

Title = Is there a frill in your bill? How have your grocery bills increased over time?

Team Name = Foodies Data

Names and Emails =

- Jason Sastra, jason.sastra@mail.utoronto.ca
- Gursewak Sandhu, gursewak.sandhu@mail.utoronto.ca
- Khoa Pham, khoat.pham@mail.utoronto.ca

- **Background and Motivation.** Discuss your motivations and reasons for choosing this project, especially any background or research interests that may have influenced your decision.

- The background behind this project is observing the surge in price of fast food deals over the years. This ignites our interest in finding whether a surge in price is a macro trend in the food industry as fast food is known for being the cheap alternative to cooking.
- Our motivation is to detect whether or not what they feel is a change in price of grocery is an actual change in price and properly show the actual changes such that people would not exaggerate nor undermine the changes in prices.

- **Related Work.** Anything that inspired you, such as a paper, a website, visualizations we discussed in class, etc.

The recent events in the USA of a massive increase in the price of eggs is something that inspired us.
https://www.usatoday.com/story/graphics/2025/02/04/egg-price-increase-history/78063370007/

The average feeling of fast food prices everywhere generally feeling more expensive as we are aging such as Osmow's, McDonalds, etc
https://www.visualcapitalist.com/charted-mcdonalds-price-inflation-2014-2024/

Want to visualize these feelings, instead of just guessing from experience how much prices have been changing for food.

- **Data**. From where and how are you collecting your data? If appropriate, provide a link to your data sources.

Data will be collected from Statistics Canada which has a dataset called “Monthly average retail prices for selected products”. It contains the monthly average cost of several food items such as meat, fruits and vegetables and dairy products. Data ranges from January 2017 - December 2024. Data also contains averages for individual provinces and Canada as a whole.

https://www.statcan.gc.ca/en/topics-start/food-price

- **Data Cleanup**. Do you expect to do substantial data cleanup? What quantities do you plan to derive from your data? How will data processing be implemented? Try to minimize the amount of cleanup you have to do by finding cleaned and ready-to-go data sources whenever possible.

For the data cleanup, we do not expect to do substantial data cleanup. The data comes from statcan and looks very variable. In terms of cleanup, we will have to clean up all the non food related grocery goods from the data. In terms of processing, we will have to categorize the foods inside the datasets into various food types such as dairy, meat, vegetables, etc.

1. Who is your audience? Come up with **at least three** options and pick one target audience.

- Middle Class Canadian who is worried about grocery price
- **Economist, Interested in managing inflation and seeing the influence rising costs may have on the economy.**
- Students, Low budget and are interested in planning for the future

2. Describe your target audience in more detail. What do they know? What are their interests? What visualization literacy do they have? At what level of detail will you present information to them?

- Our target audience is Economists.
- They understand the cause and effect relationship that grocery prices have and the consequences they have both economically and on people.
- Economists would be interested in the production of goods within Canada. This means they'd be interested in tracking how changes in grocery prices have been affected by other economic factors such as inflation. They could also be interested in how it may play a factor in cost of living and affordability.
- Economists would be fairly visually literate due to the position requiring high levels of post secondary education. Economics is also a field that involves a lot of numerical and statistical data so they would be able to understand the meaning behind the values presented to them.
- Economist is also very interested details, so having lot of drilldown/tooltip of the exact values of the data would be useful

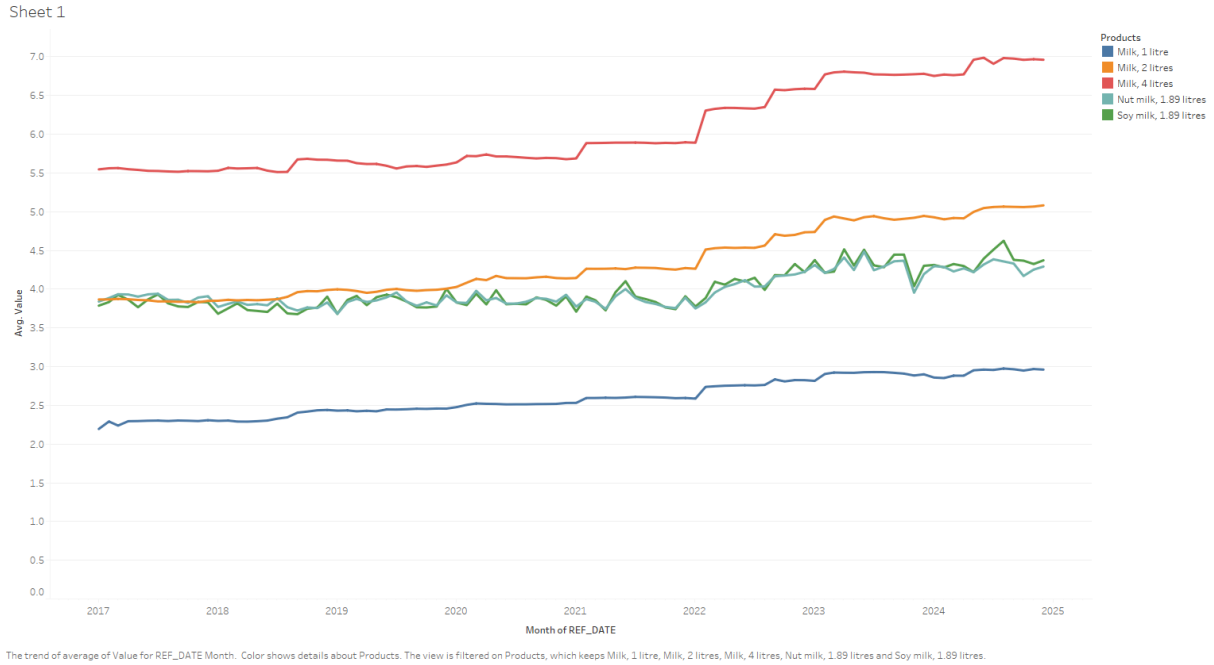
3. What questions about your data will be interesting for your audience? Come up with a list of interesting questions that your audience may have about your data. The more, the better, but your team should come up with **at least ten questions**.
- What province is grocery the most expensive?
- What months do groceries see a rise in price? Does it go back dow n?
- How do year over year price increase compare to the rate of inflation?
- What category of food has seen has seen the greatest increase price? What could be the influences?
- How does the cost of imported food compare to domestic product?
- When have grocery items been at their most expensive?
- What are the trends of each grocery items in terms of price increase?
- What are the prices that might have a chance to decrease in the future?
- Has COVID affected grocery prices differently?
- How does the winter affect grocery prices in different regions
- Which bulk food would be the most effective to buy and store
- How has different types of milk been performing in the market (has soymilk been more relevant?)

4. What data do you have? Look at it in Excel or Google spreadsheet and briefly describe each attribute and its data type (categorical, ordinal, or quantitative) in your

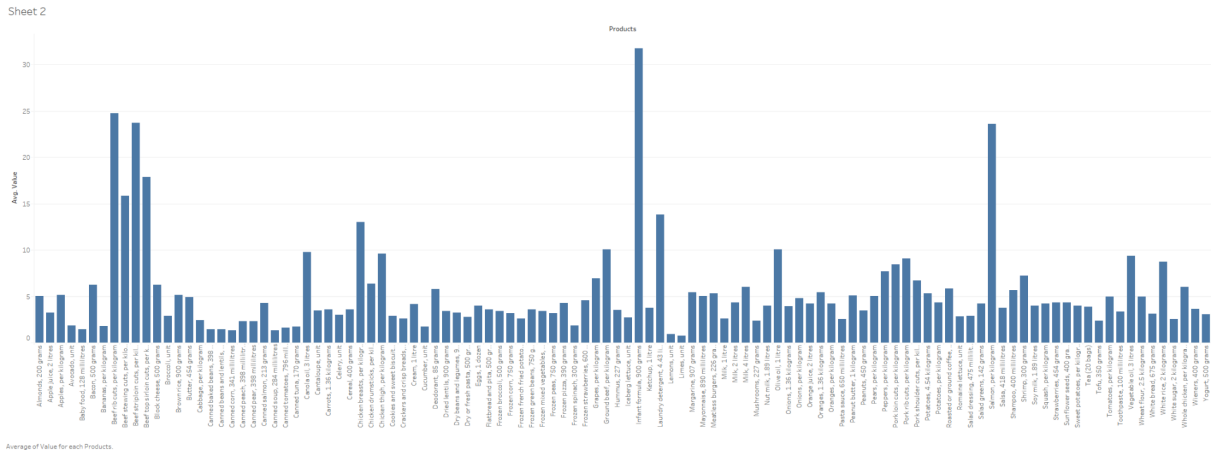
process book. It's OK if you are unsure about the data type for some attributes - you can simply describe them (e.g., geographic location).

- We have date which is ordinal
- We have the price which is quantitative
- We have the type of item which is categorical
- We have the province which is categorical (geographic location)

Jason's Visuals

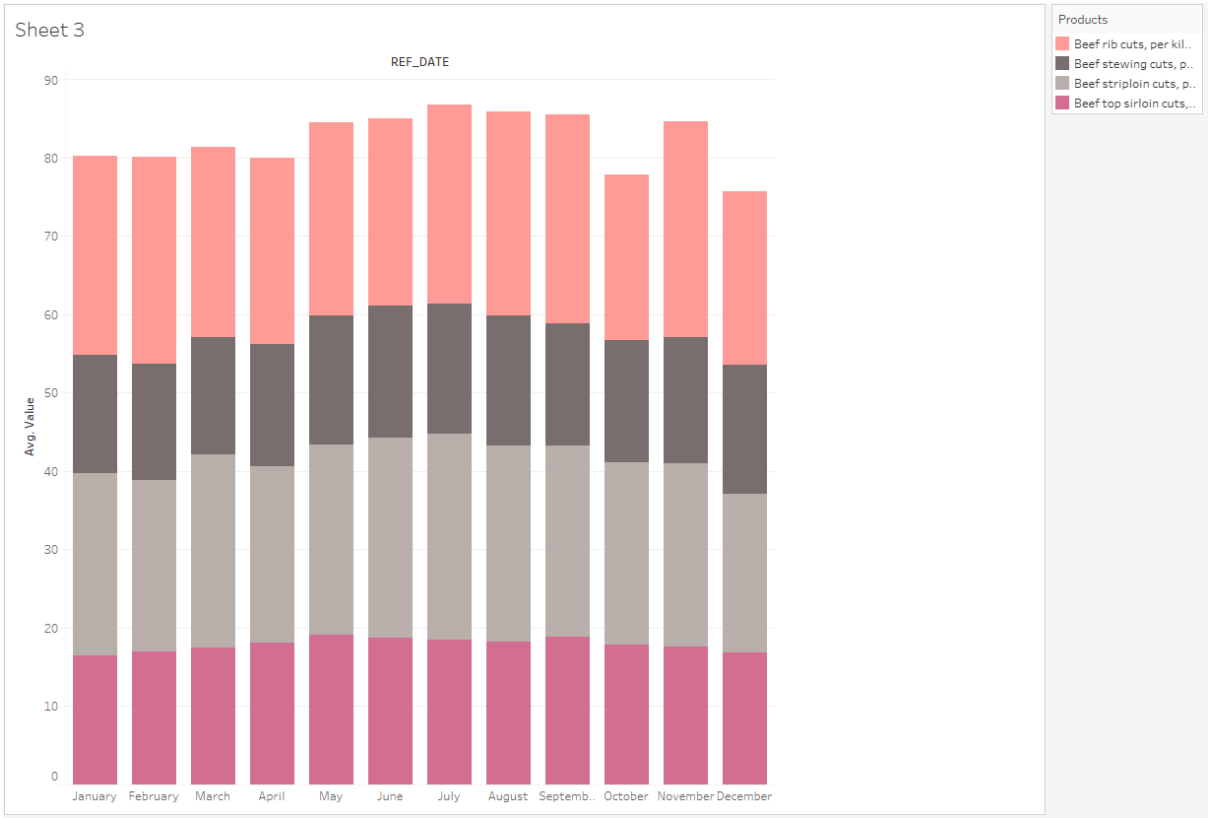


Here, I answered the average prices of the different kinds of milk. Though the data does not have the same litre measurement for the milk, which makes it so that it does not effectively compare the exact prices. Instead, it is interesting to see how the price of milk jumped during 2022 (Covid), and that there was a time where the price of soy milk dropped. It is also interesting to see that in comparison with regular milk whose price is stable, the price of nut milk and soy milk goes up and down a lot between the different months.



Here is a simple visualisation of seeing exactly which goods are most expensive in grocery stores. Though it is important to note that not all items are exactly of the same weight.This visual is not very effective because for example, it is comparing a kilogram of beef with 170

grams of canned tuna. It might be more effective if further data processing is done in order to make it so it is all per kilogram or a similar metric
tred

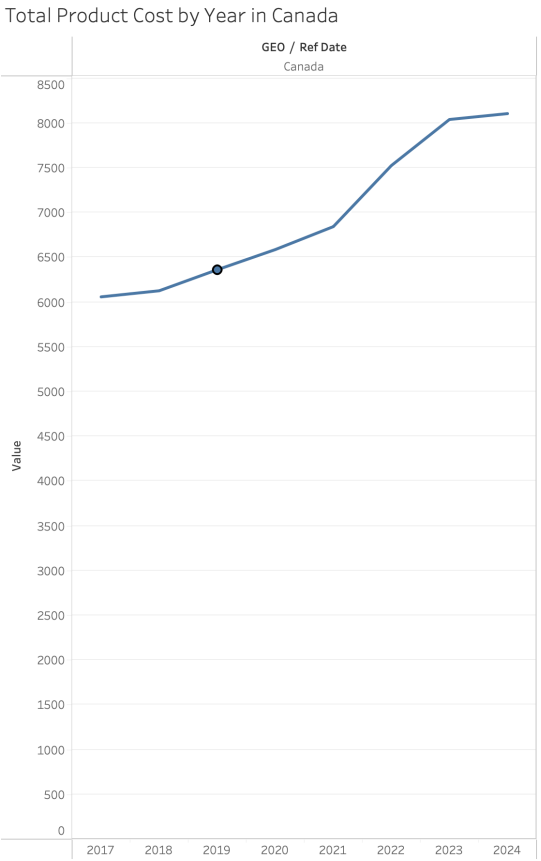


This visualization is a comparison about the prices of meat in different months. It is interesting to note that it answers the question of which weather causes prices to fluctuate a lot. For example, the price of meat is notably cheaper during October and December due to the colder weather. Also, it is most expensive in the peak of summer in July.

Gursewak’s Visuals

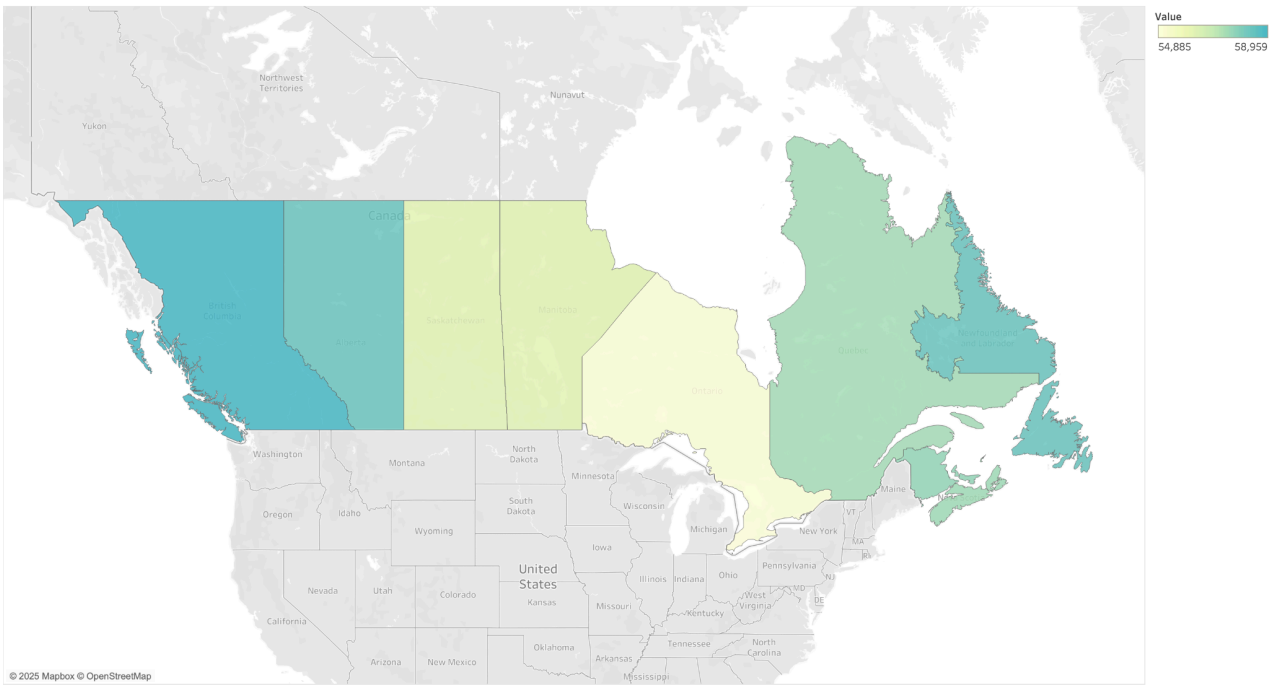
Products	Ref Date	GEO	
Chicken breasts, per kilogram	2024-12	British Columbia	16.150
		Newfoundland and Labra..	15.710
		Alberta	15.330
		Manitoba	15.160
		Saskatchewan	14.700
		Nova Scotia	14.300
		Prince Edward Island	13.910
		New Brunswick	13.700
		Ontario	13.290
		Quebec	11.190

Here I compared the most recent prices of Chicken Breast across the different provinces. It answers the question of how geographical location plays such a large role in pricing, this is similar to question we asked about how prices are different across provinces. For example, It is interesting to note the difference in prices across the different parts of Canada, with Western Canada seeing the highest prices



Here I compared the total cost of all products per year in Canada. This answers the question of If prices have seen a significant increase around Covid. Its interesting to not that from 2020-2021 when Covid began we do not see a huge increase in price compared to 2021-2023 where prices drastically increased.

Total Cost of all grocery items by Province

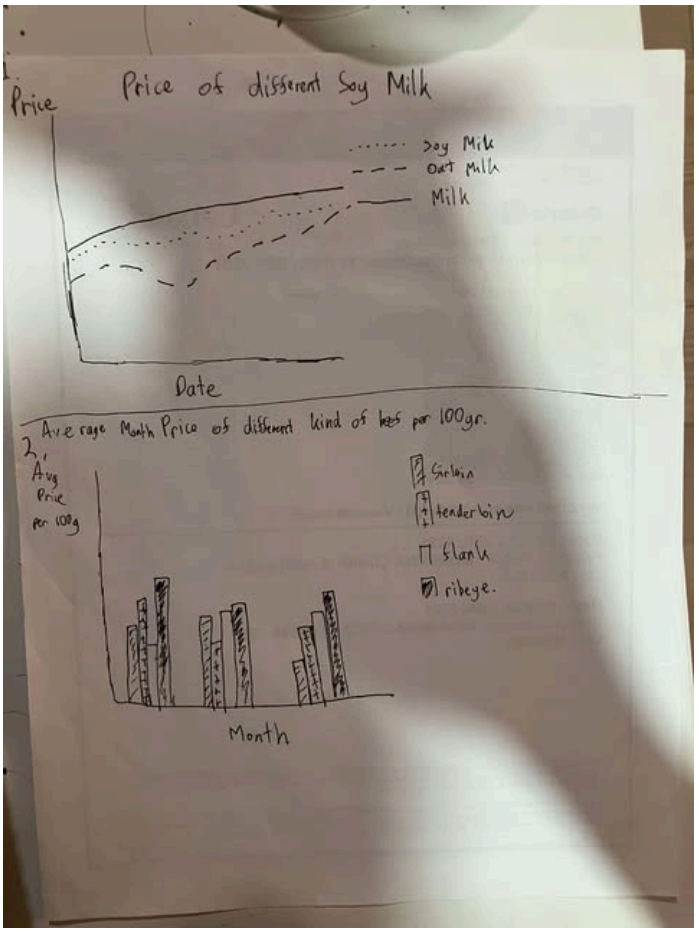


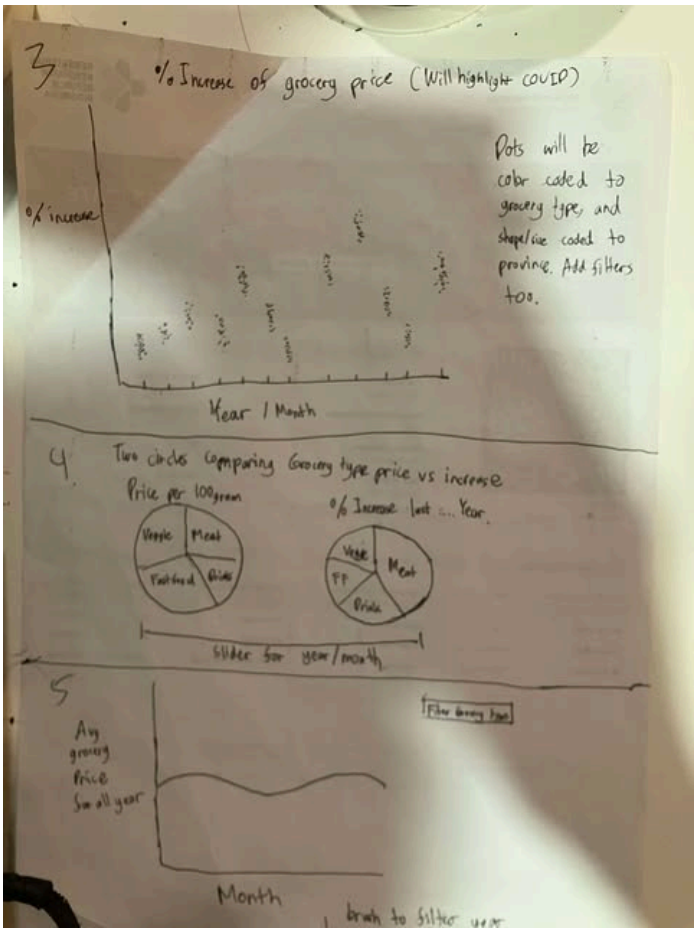
Here we compare the total cost of all grocery products by province. This answers the question which provinces have the most expensive groceries. Something interesting to note from this graph is the Ontario is actually cheapest overall which is unexpected.

The visuals I made answer some of the questions that we came up with above such as looking at trends of price increases (visual 2), or looking at which province is most expensive grocery wise. I stuck with questions we came up with because even though I'm not an economist the questions being asked are understandable by everyone and can help us build an understanding of why are cost of living is the way it is. One error i find with the visuals I've created is that total cost overall years for something like the 3rd visual just isn't very helpful at conveying information about right now.

Data, Sketches, Decide & Storyboard

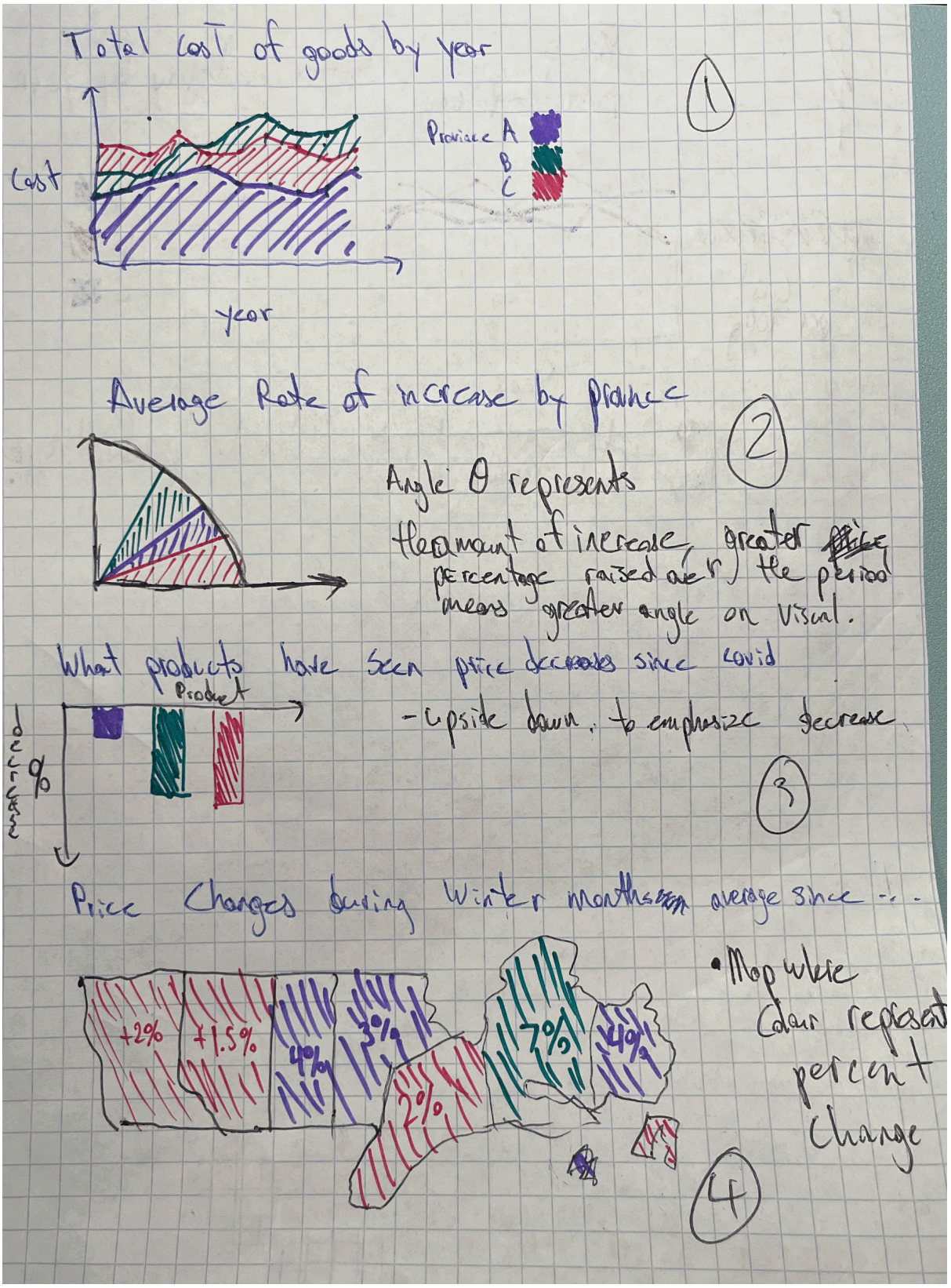
Jason's Sketches

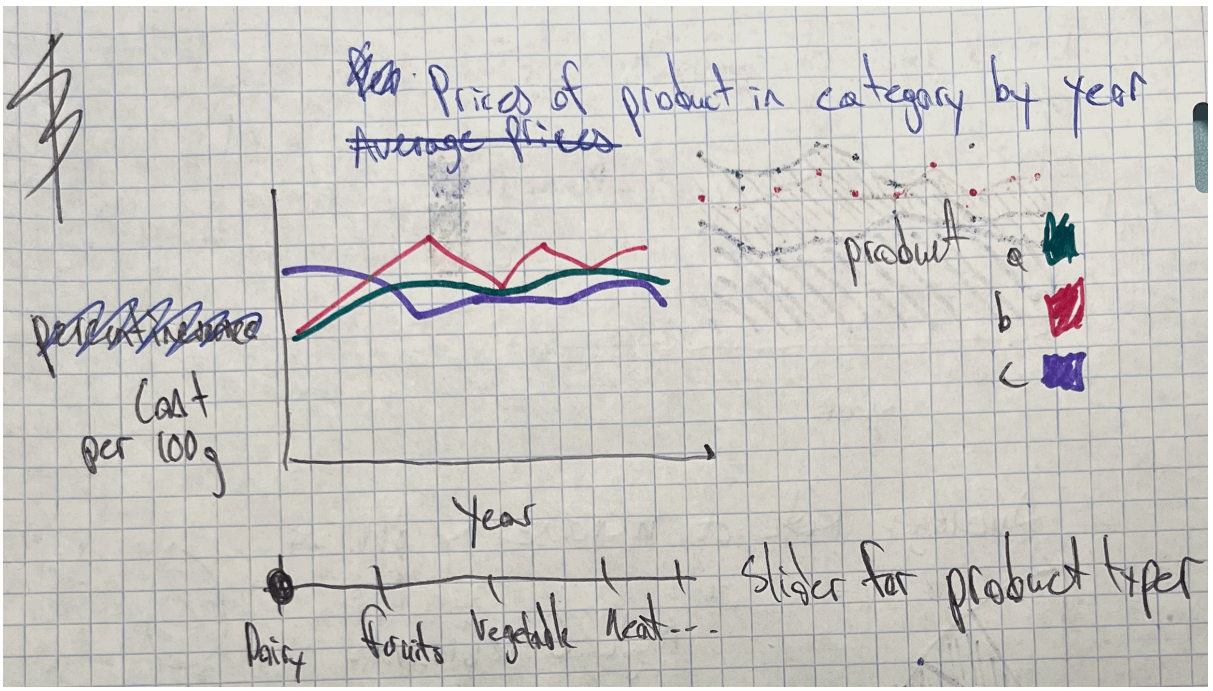




1. Sketch 1 = Performance of Different type of Milk
2. Sketch 2 = What months do groceries price increase (meat specifically) plus in category comparison
3. Sketch 3 = Effects of Covid
4. Sketch 4 = Trends of each grocery item
5. Sketch 5 = Trend of all grocery price during different months

Gursewak's Visuals





Sketch 1 = What province is grocery the most expensive?
Sketch 2 = Which provinces have seen greatest rate of price change?
Sketch 3 = What are the prices that might have a chance to decrease in the future?
Sketch 4 = How does the winter affect grocery prices in different regions
Sketch 5 = How have price changes affected different categories of grocery product

Selected Visuals:
Gursewak # 1 for Opener (Hook prices are increasing across the board)
Gursewak # 4 for Province Overview (Rising insight, different province, different price increase. Make it familiar for people by relating it to the province they live in)
Jason # 3 for Yearly event affecting grocery price (Main message, significant events sometimes increase price)
Gursewak # 3 for aftereffects of events (Show solution, decreasing prices)
Jason # 4 for in depth inspection of certain years effect on both average grocery type and percentage increase (Offer solution, inspect which grocery food you might want to start buying)

Jason's Insights

- After visualizing the milk price I noticed a spike in price during 2022, it gave me the insight that significant events such as COVID are a major cause of grocery price increase
- After visualizing meat price by month, I see the price spike during summer, indicating that monthly changes are also significant event

Gursewak's Insights

- After Visualizing the prices in the winter months I found that quite few products had their prices during the span of the winter and decrease after.

- After visualizing the price by province I noticed that provinces on the western and eastern coast saw greater overall price compared to central provinces
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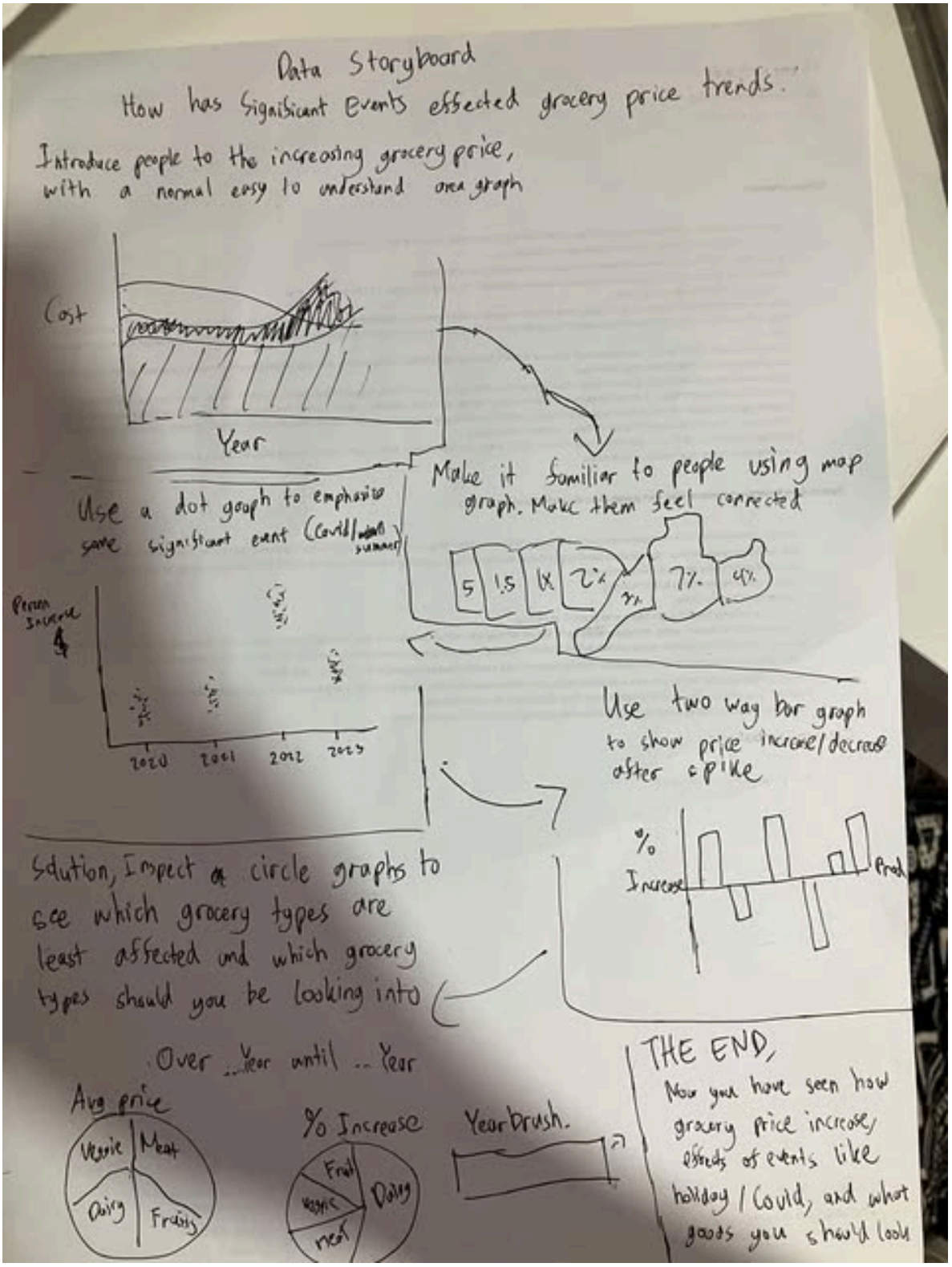
For our visualizations the message we are trying to portray is to see how events have influenced our grocery prices. This means we don't want to specifically focus our attention on a particular product but instead investigate the trends within the categories and time periods. This would allow us to identify what the key factor is in our changing grocery prices such as major events that have made an impact (Covid). The Sketches we've selected convey this as they aren't focused on a particular product but instead an overview of cost in comparison to time periods.

Main Idea:
How have external influences altered the prices of groceries (Seasons, Covid, Events)

Data StoryBoard

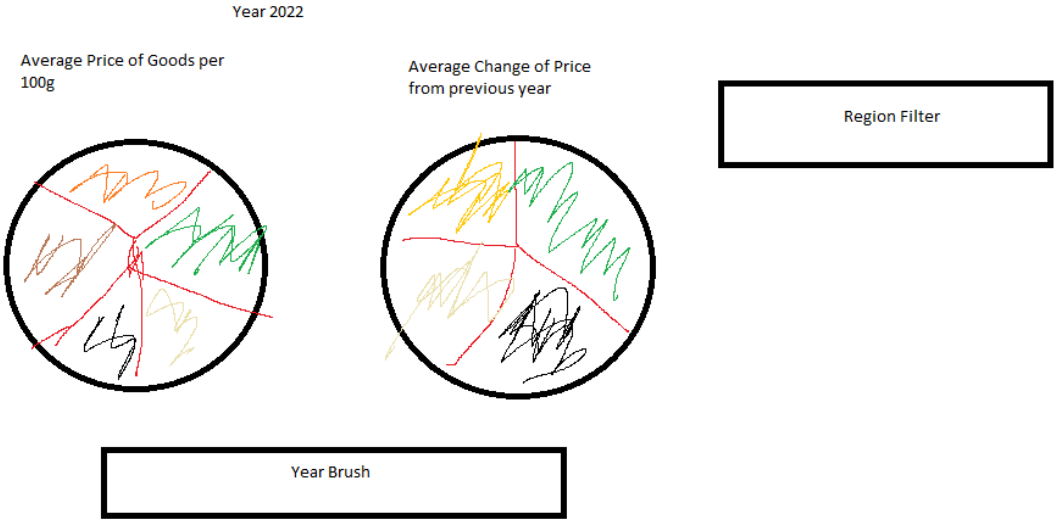


Prototype V1

Innovative Vis

- This is a heatmap visualization that will be placed under the “How has your own province been affected by price change” section of the webpage. It will be the second visualization during our storytelling in our visualizations.
- This visualization will have selectable provinces that will change the rank and bar graph to the right of the map and highlight the province. The bar graph will show the percent increase by grocery category and the rank will indicate how its percent price raise fairs against the other provinces, with a lower rank indicating less of a percent price increase since YEAR.

Interactive Vis



- This is a circle graph that shows the average price of goods of a certain category per 100 g in a certain year and how it has changed since previous year.
- It will be interactive as it allows the user to explore year to year changes and maybe even hone in on specific goods that are relatively cheap/not increasing by much. Just by looking at how big the area is in the circle can show them the relative change in price easily and identify which goods are better priced goods.

Think Aloud Testing Instruction

	Notes (To be filled by project leads)
Tester Name	Farah
Describe any usability issues or confusion the tester encountered while using the prototype.	Not enough labels on Y and X axis. Unclear what the price is.
Was the tester able to understand the main message of the data story? (e.g., Yes/No + why/why not?)	Yes, but they didn't really recognize the spikes. Might need to add text to point it out in that direction
What parts of the interface or visualization did the tester find most engaging or effective?	The tester really liked the tooltip in all the visuals
What parts did the tester find confusing or less effective?	Need more legends and selectors
Did the tester encounter any inconsistencies in design, data, or narrative?	Not
Were there any unexpected interactions or insights that emerged during the session?	Bar graph tooltip can be more descriptive, it can show before after averages
What specific improvements or changes did the tester suggest for the prototype?	Maybe look into something else other than circle bar, need flow improvement
Did the tester suggest any additional insights or visualizations to include?	Need text in order to make the website flow better
General observations or comments from the tester.	In general they would like more user interactions in terms of filters.