

SI 201 Final Project Plan

a. What is your group's name?

SI201 foodies

b. Who are the people in the group (first name, last name, umich email for all members)?

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c. What APIs/websites will you be gathering data from? The base URLs for the APIs/websites must be different for them to count as different APIs.

Spoonacular API (restaurant/meal nutrition + ingredients), <https://spoonacular.com/food-api>

Kroger Catalog API

<https://developer.kroger.com/api-products/api/catalog-api-v2#tag/Catalog-V2/parts/~1catalog~1v2~1products/get>

d. What data will you collect from each API/website and store in a database? Be specific.

Spoonacular API: meal name, calories, protein, fat, carbs, cuisine label, nutritional comparison

Field	Description	Example
meal_id	Unique ID from Spoonacular	715538
meal_name	Full recipe/meal title	"Chicken Alfredo Pasta"
serving_size	Standard serving amount	"1 plate"
calories	Total calories per serving (numeric)	520
protein_g	Grams of protein per serving	32
fat_g	Grams of fat per serving	18
carbs_g	Carbohydrates per serving	46
cuisine_type	Detected cuisine label	"Italian"
health_score	Spoonacular health score rating	65
diet_labels	Tags like vegetarian, keto, gluten free	["high protein", "low sugar"]

<code>ingredients_list</code>	Parsed ingredient list	<code>["chicken breast", "cream", "pasta"]</code>
<code>meal_url</code>	Link to full recipe page	https://spoonacular.com/...
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Kroger's API: grocery producy info, product availability, prices		
<code>calculate_price_per_unit</code>	Computes price per unit (e.g., 0.12 (dollars per oz) per ounce/gram)	
<code>find_cheapest_in_category</code>	Finds the cheapest product in "Organic Milk 1 gal" a given category	
<code>average_price</code>	Computes the average price for a category or all products	3.45
<code>price_trend</code>	Returns historical prices of a product over time	<code>[{"date":"2025-11-01","price":3.99}, {"date":"2025-11-08","price":3.79}]</code>
<code>available_products</code>	Lists products available at a specific store	<code>["Eggs Large Dozen", "Whole Milk 1 gal", "Bananas 1 lb"]</code>
<code>compare_brands</code>	Compares brands in a category by price and availability	<code>[{"brand":"Brand A", "avg_price":2.99}, {"brand":"Brand B", "avg_price":3.49}]</code>
<code>best_value_bundle</code>	Finds the product with the lowest price per unit	"Chicken Breast 3 lb pack"

search_products	Searches products by keyword	["Almond Milk 32oz","Soy Milk 32oz"]
product_summary	Returns a summary of a product's details	{"brand":"Kroger","description ":"2% Milk 1 gal","price_per_unit":0.12,"available":True}

e. What data will you be calculating from the data in the database? Be specific.

Spoonacular API:

- Macronutrient percentage breakdowns for protein, fat, and carbs based on total calories
- Protein density value calculated as protein grams divided by total calories
- Average calories, protein, and health score grouped by cuisine type
- Health category classification label for each meal (“healthy,” “moderately healthy,” or “less healthy”) based on calorie and health score thresholds
- Overall nutrition index ranking score using a weighted combination of protein density and health score

Kroger Catalog API Calculations

- Price per unit for all products
- Cheapest and most expensive products in each category
- Average price per category or store
- Price trends over time for selected products
- Brand comparison for pricing and availability

- Best value bundles (largest size, lowest price per unit)

f. What visualization package will you be using (Matplotlib, Plotly, Seaborn, etc)?

Matplotlib

g. What graphs/charts will you be creating?

Spoonacular API:

- Bar chart comparing average calories across different cuisine types
- Stacked bar chart displaying macronutrient percentage breakdown (protein, fat, carbs) for selected meals
- Scatter plot comparing total calories vs protein density to show nutrition efficiency

Kroger API Visualizations

- Bar chart of average price per category
- Line chart showing price trends over time for selected products
- Comparison chart of price per unit across brands

h. What functions are you creating and who is responsible for each function? What input and output does each function take? Include a function diagram with this information on it.

Function Name	Purpose	Inputs	Outputs	Assigned To
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<code>fetch_meal_data_spoonacular()</code>	Retrieve recipe + nutrition data from Spoonacular API	API key, search parameters	Raw JSON meal data	Vittorio
<code>fetch_product_data_kroger()</code>	Retrieve grocery product, price, and availability data from Kroger API	API key, query term, location/zip	Raw JSON grocery data	Jack
<code>clean_and_transform_meal_data()</code>	Extract fields needed for DB from Spoonacular JSON	Raw JSON data	Python dict with fields from part (d)	Jack
<code>clean_and_transform_kroger_data()</code>	Extract price, product name, brand, and availability	Raw JSON data	Structured dict formatted for DB	Vittorio
<code>store_data_db()</code>	Insert cleaned results for both APIs into SQLite database	Dict of meal data + dict of product data, DB cursor	SQLite rows for both tables	Both (pair-program)
<code>calculate_metrics()</code>	Compute macronutrient ratios, cuisine averages, nutrition index, health labels	Stored DB values	Python dict or new DB columns	Jack
<code>generate_visualizations()</code>	Produce charts using Matplotlib	Calculated values	Displayed PNG charts	Both
<code>main()</code>	Executes entire pipeline in correct order	None	Calls all other functions	Both

