1.INTRODUCTION

1.1 Project Overview

The College Food Choices project is an innovative health and wellness analytics initiative designed to uncover and interpret the dietary habits, emotional influences, and nutritional behaviors of college students. Leveraging a robust dataset (food_coded.csv), the project explores a multidimensional view of food preferences, caloric intake, exercise patterns, emotional triggers, and perceived health status among students.

This data-driven effort uses tools like **Tableau** for interactive dashboard creation, **Python and SQL** for data cleaning and transformation, and **Flask** for web integration—culminating in a dynamic platform that visualizes real-world insights and encourages evidence-based decisions.

The final product offers educational stakeholders, health teams, and campus administrators actionable analytics to support nutrition-driven student wellness strategies and curriculum enhancements.

1.2 Purpose

The primary purpose of the College Food Choices project is to empower educational institutions with the ability to:

- **Understand** how emotional and lifestyle factors influence students' food choices and health perceptions.
- **Visualize** behavioral trends through intuitive Tableau dashboards that highlight key areas like comfort food triggers, parental influence, and self-perceived wellness.
- **Integrate** analytical insights into operational systems via a Flask web app, ensuring broad access to meaningful health indicators.
- **Enable** real-time analysis and predictive alerts to identify nutrition gaps, risky patterns, or declining health signals.
- **Support** academic policy development, wellness campaigns, and personalized dietary plans rooted in behavioral evidence.

By transforming raw data into accessible and impactful insights, this project aligns with the broader mission of enhancing student health, academic performance, and long-term well-being.

2. IDEATION PHASE

2.1 Problem Statement

"Comprehensive Analysis and Dietary Strategies with Tableau: A College Food Choices Case Study" is an innovative project aimed at revolutionizing how dietary data among college students is visualized and utilized to drive informed decision-making and enhance student health and academic performance. In today's educational environment, it's crucial to have access to comprehensive insights into dietary trends, nutritional habits, and health impacts to empower stakeholders with actionable information.

This project seeks to create a dynamic and intuitive platform using Tableau, where data from various aspects of student diets, exercise habits, and health perceptions can be transformed into interactive visualizations and insightful analytics. By leveraging Tableau's capabilities effectively, the "Enhancing Dietary Strategies" project aims to empower educational institutions with actionable insights, foster data-driven decision-making, and drive student well-being by facilitating a deeper understanding of dietary dynamics and promoting evidence-based nutritional strategies.

Scenarios:

Scenario 1: Monitoring Nutritional Intake

In a real-time scenario, imagine receiving an alert indicating a concerning trend in nutritional intake among students, such as a significant decrease in fruit and vegetable consumption. Using the College Food Choices data, we can quickly assess the extent and potential impact of this trend, identify contributing factors, and deploy immediate interventions to encourage healthier eating habits. Whether it's through targeted awareness campaigns, adjustments in cafeteria menus, or personalized dietary advice, real-time analysis enables rapid decision-making and proactive measures to promote student health.

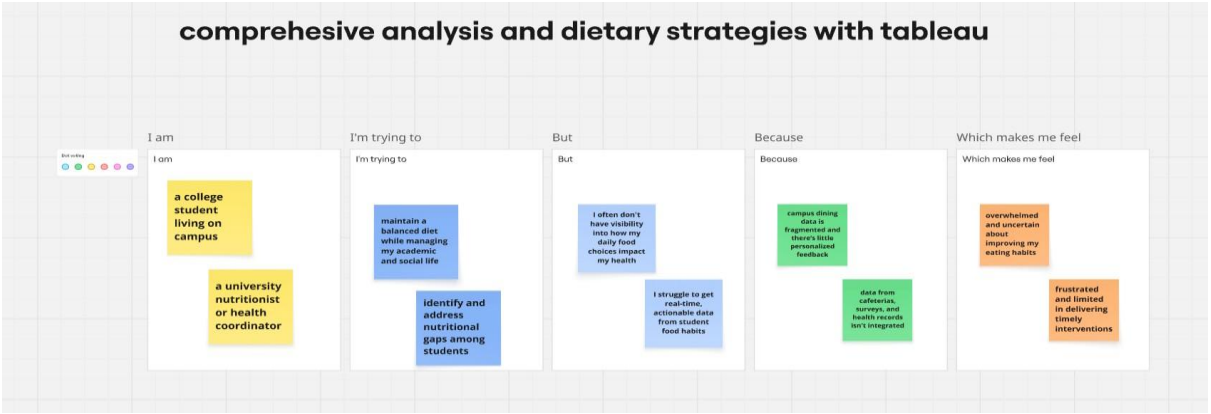
Scenario 2: Addressing Dietary Deficiencies

In the event of identifying widespread dietary deficiencies, such as low vitamin intake or high consumption of unhealthy snacks, real-time access to College Food Choices data enables swift response and management. University health services and nutritionists can utilize the dataset to gather crucial information about the deficiencies, including their prevalence, potential health impacts, and affected student demographics. By leveraging real-time analytics, they can coordinate health promotion efforts, allocate resources effectively, and implement educational programs to address the deficiencies and ensure the nutritional well-being of all students.

Scenario 3: Predictive Analysis and Personalized Nutrition Plans

Leveraging predictive analytics capabilities, College Food Choices empowers universities to anticipate and prevent potential health issues related to poor dietary habits. By analyzing historical data and identifying predictive indicators, health professionals can proactively address nutritional gaps, unhealthy eating patterns, and other risk factors that could lead to health problems. Real-time monitoring of dietary choices, meal consumption patterns, and nutritional intake enables timely interventions, personalized nutrition plans, and continuous support to encourage long-term healthy eating habits among students.

Example:



Problem Statement (PS)	I am (Customer)	I'm trying to	But	Because	Which makes me feel
PS-1	a college student living on campus	maintain a balanced diet while managing my academic and social life	I often don't have visibility into how my daily food choices	campus dining data is fragmented and there's little personalized feedback	overwhelmed and uncertain about improving my eating habits

			impact my health		
PS-2	a university nutritionist or health coordinator	identify and address nutritional gaps among students	I struggle to get real-time, actionabl e data from student food habits	data from cafeterias, surveys, and health records isn't integrated	frustrated and limited in delivering timely interventions

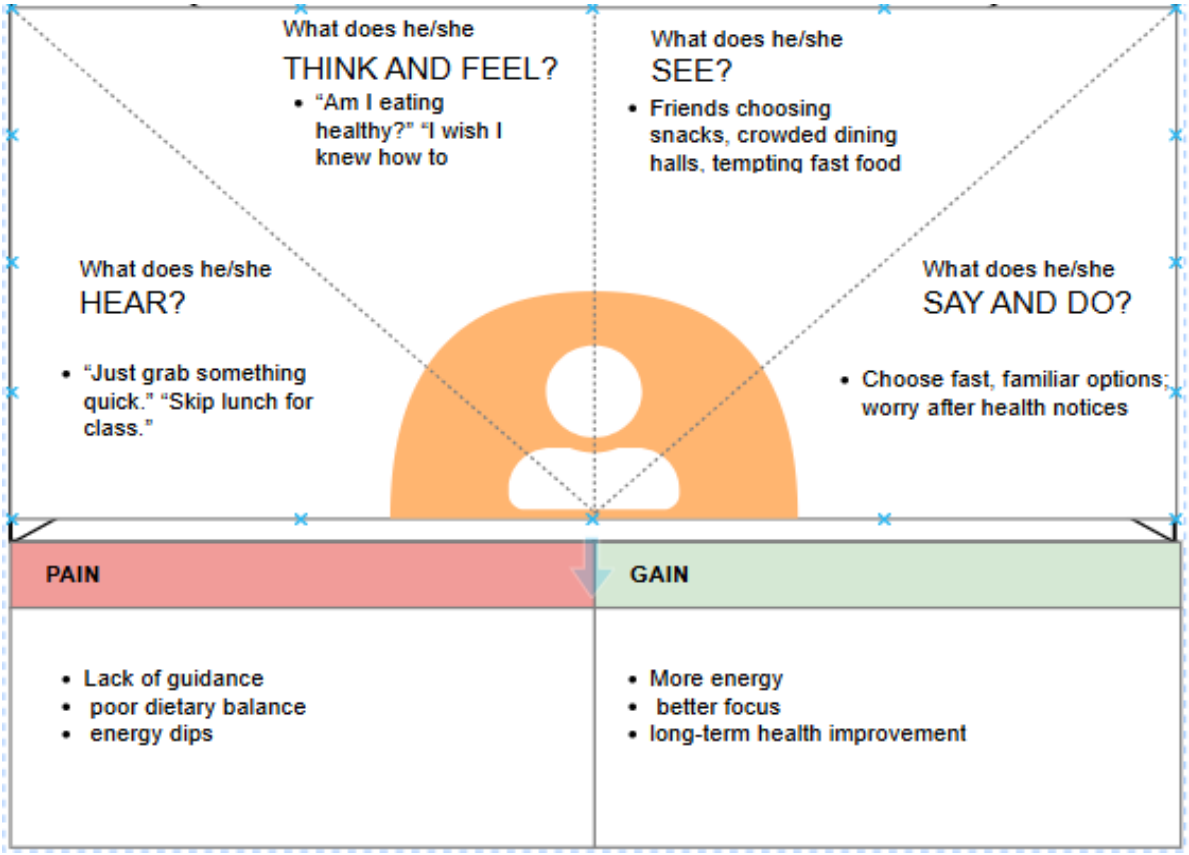
2.2 Empathy Map Canvas

An empathy map is a simple, easy-to-digest visual that captures knowledge about a user's behaviours and attitudes.

It is a useful tool to helps teams better understand their users.

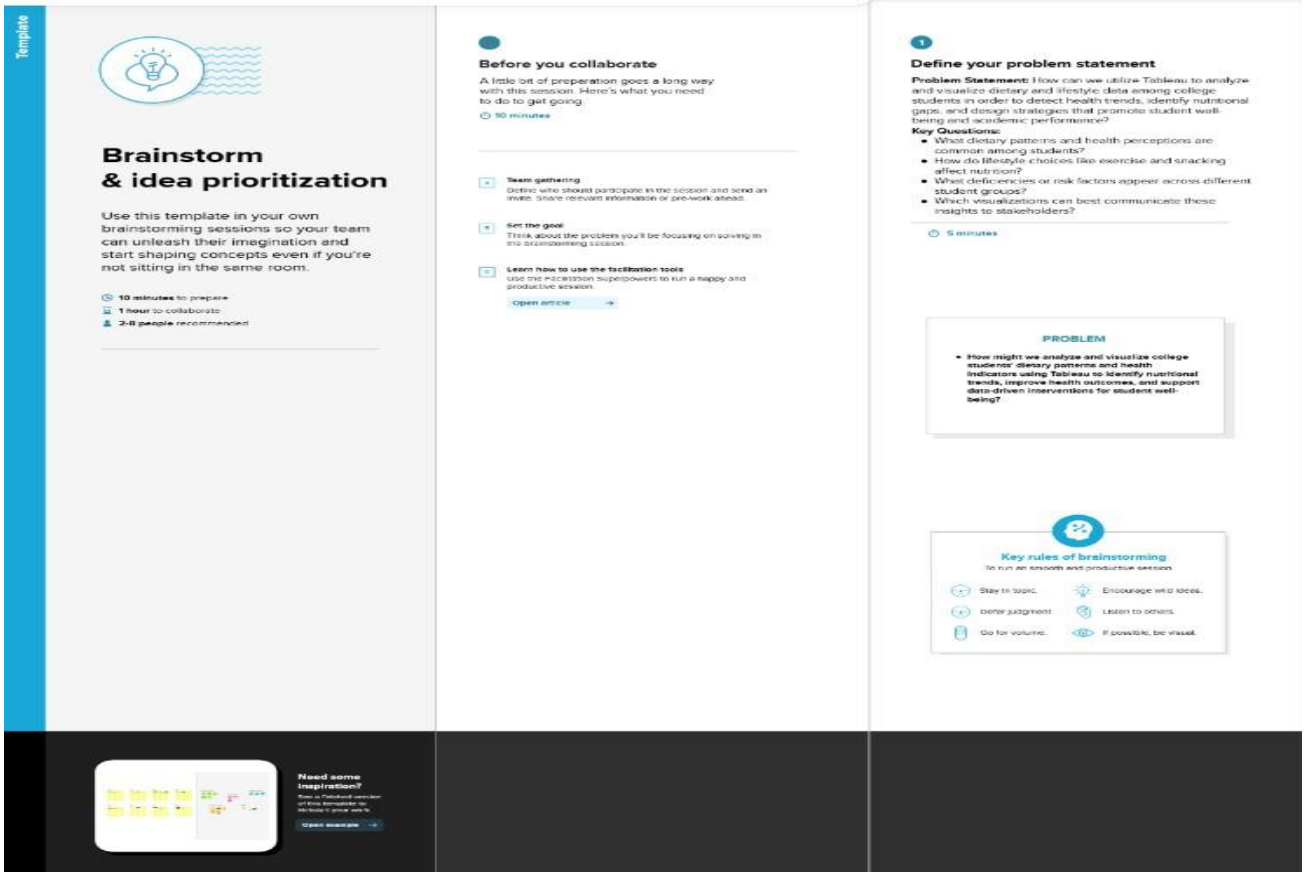
Creating an effective solution requires understanding the true problem and the person who is experiencing it. The exercise of creating the map helps participants consider things from the user's perspective along with his or her goals and challenges.

Example:

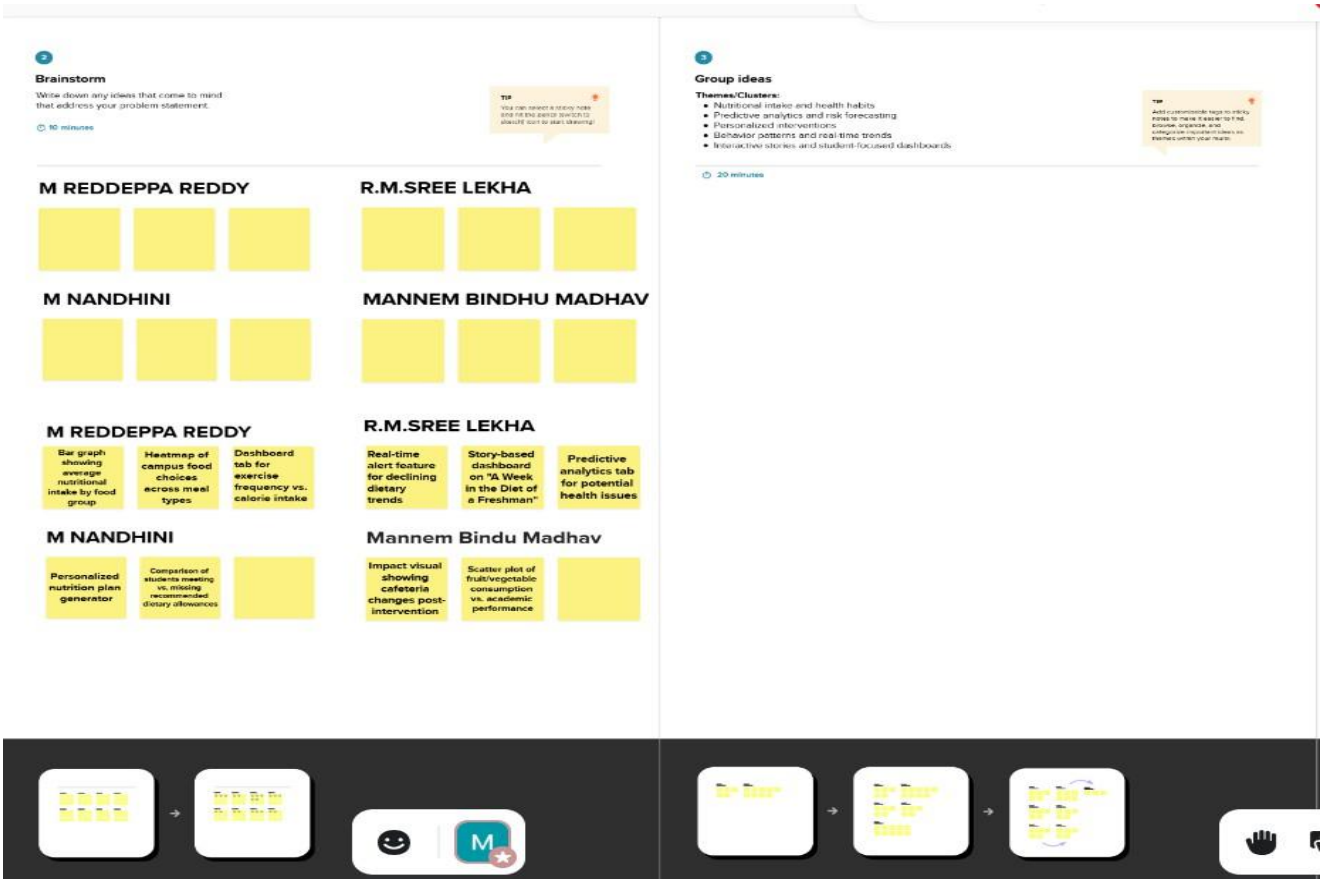


2.3 Brainstorming

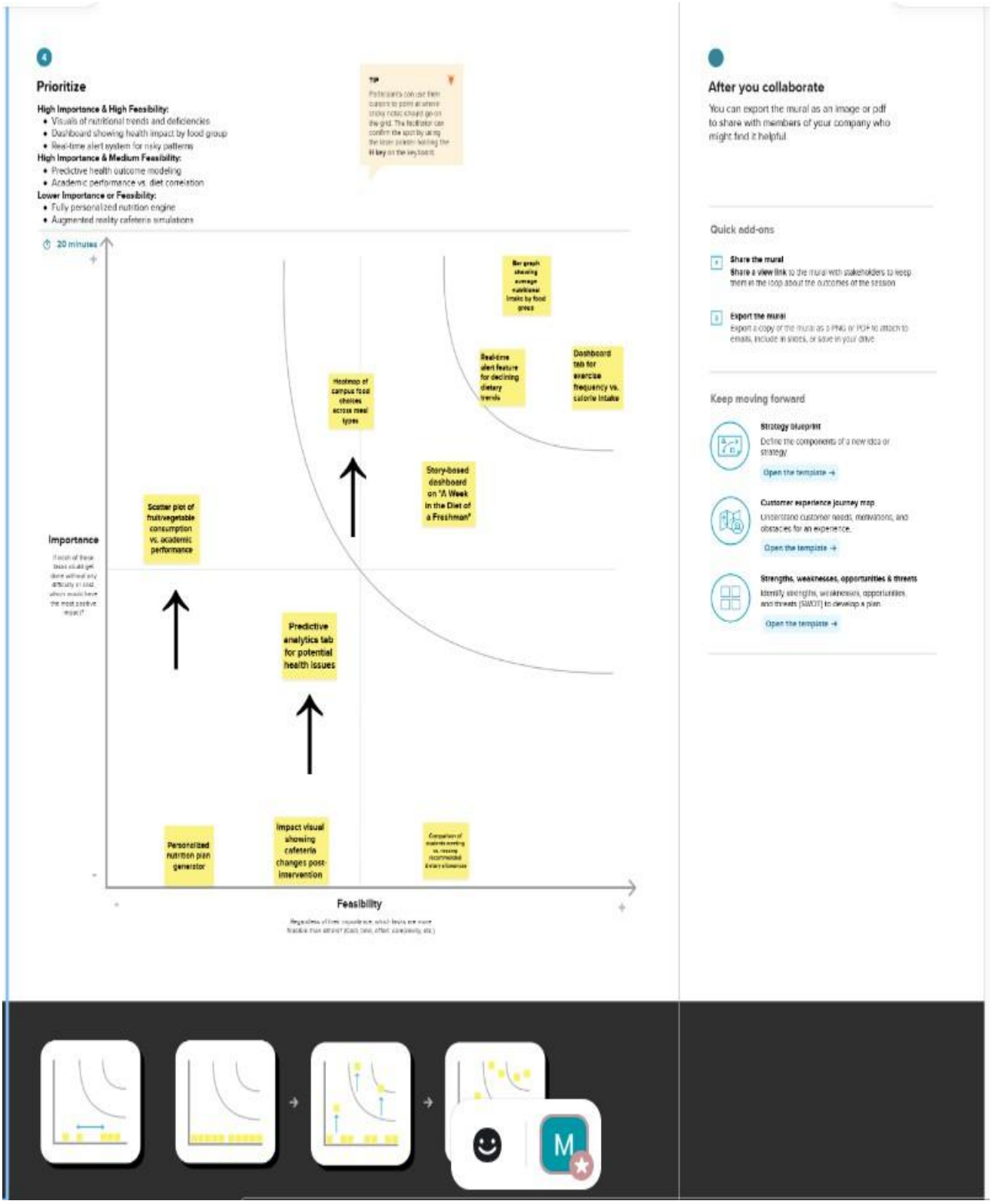
Step-1: Team Gathering, Collaboration and Select the Problem Statement



Step-2: Brainstorm, Idea Listing and Grouping



Step-3: Idea Prioritization



3. REQUIREMENT ANALYSIS

3.1 Customer Journey map

Stage	Steps (What Happens)	Interactions (What They Use / See / Do)	Goals & Motivations (Help Me...)	Positive Moments	Negative Moments	Opportunities
Entice	Recognize need for nutritional awareness among students	Conversations with students, faculty, admin; academic wellness reports	...understand how food choices affect health and academic performance	Stakeholder enthusiasm for improving student life	Limited existing data or fragmented insights	Build data-driven awareness of emotional eating, comfort food patterns, and diet perception
Enter	Collect food behavior data (CSV) via surveys or institutional datasets	CSV files (food_coded.csv), forms, or backend intake forms	...collect detailed data on food, exercise, emotions, preferences	Successful ingestion into pandas / SQL pipeline	Missing values, non-uniform categories	Automate preprocessing with Python & SQL filters; normalize categories (e.g., food types, mood triggers)
	Clean, filter, and preprocess data using pandas + SQL	Jupyter Notebook, SQL Workbench, pandas	...trust the data structure and clean variables before visualization	Clear structure, recoded categories, ready for analysis	Time-consuming cleaning, subjective survey inputs	Document assumptions, use value labels, and track cleaning scripts in version control
Engage	Design Tableau dashboards to visualize calorie trends, comfort	Tableau Desktop, Public Gallery, SQL-	...quickly grasp complex patterns via interactive dashboards	Seeing correlations (e.g., between "comfort	Hard to convey qualitative factors visually	Use text clustering, emotional keywords, or pre-scored behavioral tags to reveal latent patterns

	food, emotion triggers, GPA, exercise frequency	filtered data sources		food" and "sadness")		
Exit	Deploy web app to platforms like Render via GitHub workflows	GitHub (repo hosting), Render (deployment), custom domains	...host and share the solution with wider academic/heal th communities	Real-time access to a centralized dashboard	Network hiccups or version errors	Add CI/CD setup for auto-deploy, README docs for ease of use, and uptime monitoring

3.2 Solution Requirement

Functional Requirements:

Following are the functional requirements of the proposed solution.

FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	User Registration	Registration through Form Registration through Gmail Registration through LinkedIN
FR-2	User Confirmation	Confirmation via Email Confirmation via OTP
FR-3	Data Exploration & Filtering	- Filter by Gender, Diet Status, Vitamin Intake, Comfort Food Reason
FR-4	Dashboard Interactivity	- View dynamic charts (e.g., Calories vs. Exercise) - Drill-down by GPA or Cuisine - Tooltip insights on hover

FR-5	Scenario-Based Storytelling	Nutrition Alert Triggers - Predictive Insights for Intervention - Persona-based narrative views
FR-6	User Feedback & Export Options	Download PDF or Image of Dashboard - Submit feedback form or survey

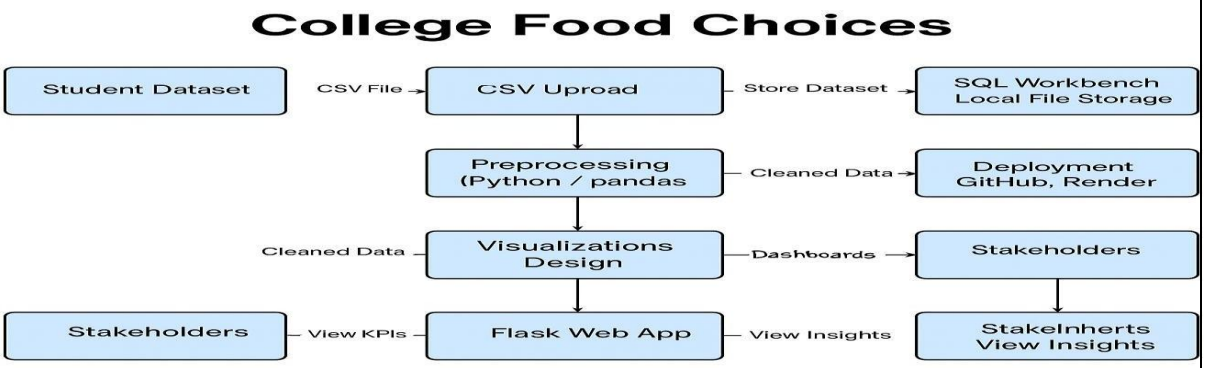
Non-functional Requirements:

Following are the non-functional requirements of the proposed solution.

FR No.	Non-Functional Requirement	Description
NFR-1	**Usability**	The dashboard should have an intuitive and clean user interface, ensuring ease of navigation and interaction for both students and administrators.
NFR-2	**Security**	User data must be protected through access control and secure storage practices, especially if personal health metrics are included.
NFR-3	**Reliability**	The solution should consistently deliver accurate and updated insights without crashes or data discrepancies.
NFR-4	**Performance**	Dashboards should load within 2–3 seconds with minimal latency, even when filters and multiple visualizations are applied.
NFR-5	**Availability**	The dashboard should be accessible 24/7 via campus network or public link with minimal downtime.
NFR-6	**Scalability**	The system should support growing datasets and user expansion (e.g., across departments or universities) without performance degradation.

3.3 Data Flow Diagram

A Data Flow Diagram (DFD) is a traditional visual representation of the information flows within a system. A neat and clear DFD can depict the right amount of the system requirement graphically. It shows how data enters and leaves the system, what changes the information, and where data is stored.



3.4 Technology Stack

The Deliverable shall include the architectural diagram as below and the information as per the table1 & table 2

Example: Order processing during pandemics for offline mode

Here's your custom **Technology Stack** for the *College Food Choices* project, presented in a clear and structured table format:

Component	Tool / Technology	Purpose
Data Source Layer	food_coded.csv	Raw dataset containing students' dietary behaviors, preferences, and lifestyle indicators
Data Storage	SQL Workbench / CSV File	Centralized storage for cleaned and filtered datasets
Data Processing	Python (pandas, NumPy)	Cleaning, filtering, recoding variables, and transforming data for analysis

Data Filtering	SQL Queries	Custom filters based on GPA, calorie intake, gender, diet status, etc.
Statistical Modeling	R Programming (optional)	Advanced statistical analysis (e.g., ANOVA, regression)
Visualization Engine	Tableau Desktop / Tableau Public	Create interactive dashboards to visualize trends and behavioral patterns
Web Framework	Flask	Serve visualizations via a lightweight Python web app
Embedding Tool	Tableau IFrame Integration	Embed dashboards into the Flask application
Version Control	GitHub	Code repository, versioning, and collaboration

Component	**Tool / Technology**	**Purpose**
Deployment Platform	Render	Host the Flask + Tableau web application for external access
Frontend Interface	HTML / Bootstrap (optional)	Present dashboards in a responsive and clean user interface
Documentation	Markdown / Jupyter Notebooks	Track data flow, methodology, and decisions

4. PROJECT DESIGN

4.1 Problem Solution Fit

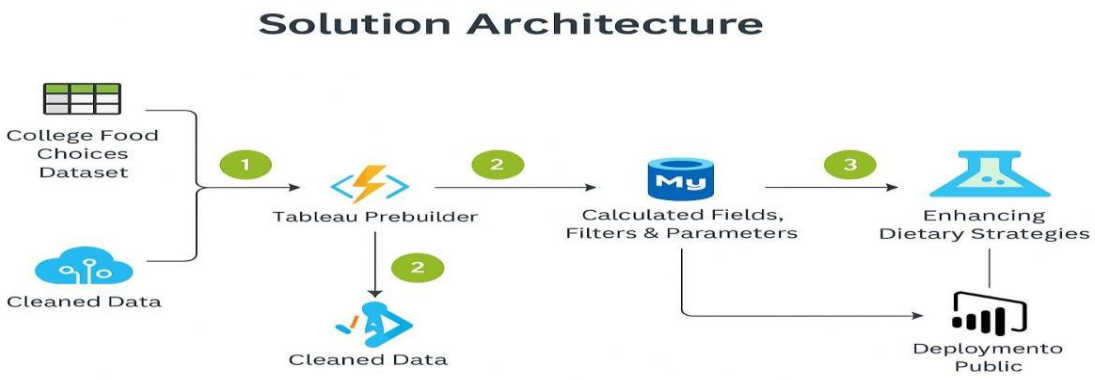
4.2 Proposed Solution

Project team shall fill the following information in the proposed solution template.

S.No.	Parameter	Description
1.	Problem Statement (Problem to be solved)	Lack of real-time, integrated insights into college students' dietary habits and health outcomes, making it difficult to promote

		informed nutrition and wellness decisions across campuses.
2.	Idea / Solution description	A Tableau-based interactive dashboard that visualizes diverse lifestyle and nutrition data (e.g., calories, comfort food patterns, cooking frequency, GPA, exercise, vitamin intake), enabling stakeholders to monitor student health trends, personalize interventions, and improve dietary strategies.
3.	Novelty / Uniqueness	Combines academic performance, emotional factors, lifestyle behavior, and nutrition in a single visualization platform, with predictive analytics, scenario modeling, and user personas derived from real survey data.
4.	Social Impact / Customer Satisfaction	Improves student health awareness and empowers campus wellness teams to act early. Fosters behavioral change and well-being through accessible, relatable visual stories and real-time insights.
5.	Business Model (Revenue Model)	Can be offered as a subscription model to universities for ongoing analytics and well-being tracking. Additional tiers could include personalized dashboards for individual students or nutritionist integration.
6.	Scalability of the Solution	The model can scale to different campuses and be customized for various educational settings. Additional datasets (e.g., wearable

4.3 Solution Architecture



5. PROJECT PLANNING & SCHEDULING

5.1 Project Planning

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint-1	Data Collection	USN-2	As a user, I can load data into the processing environment	1	High	ALL
Sprint-2	Data Preprocessing	USN-3	As a user, I can handle missing values in the dataset	3	Medium	ALL
Sprint-2	Data Preprocessing	USN-4	As a user, I can encode or map categorical variables appropriately	2	Medium	ALL
Sprint-3	Making Graphs/Visualizations	USN-5	As a user, I can build the initial model based on processed data	5	High	ALL
SPRINT - 4	Dashboard & STORIES	USN - 6	Dark ui with eye feasted color palette	6	HIGH	ALL
SPRINT - 5	Report & documentation	USN - 7	The step by step guide documentation	7	MEDIUM	ALL

Project Tracker, Velocity & Burndown Chart: (4 Marks)

Sprint	Total Story Points	Duration	Sprint Start Date	Sprint End Date (Planned)	Story Points Completed (as on Planned End Date)	Sprint Release Date (Actual)
Sprint-1	20	1 Day	21 June 2025	21 June 2025	20	21 June 2025
Sprint-2	20	1 Day	22 June 2025	22 June 2025	20	22 June 2025
Sprint-3	20	1 Day	23 June 2025	23 June 2025	20	23 June 2025
Sprint-4	20	1 Day	24 June 2025	24 June 2025	20	24 June 2025
Sprint-5	20	1 Day	25 June 2025	25 June 2025	20	25 June 2025

6. FUNCTIONAL AND PERFORMANCE TESTING

6.1 Performance Testing

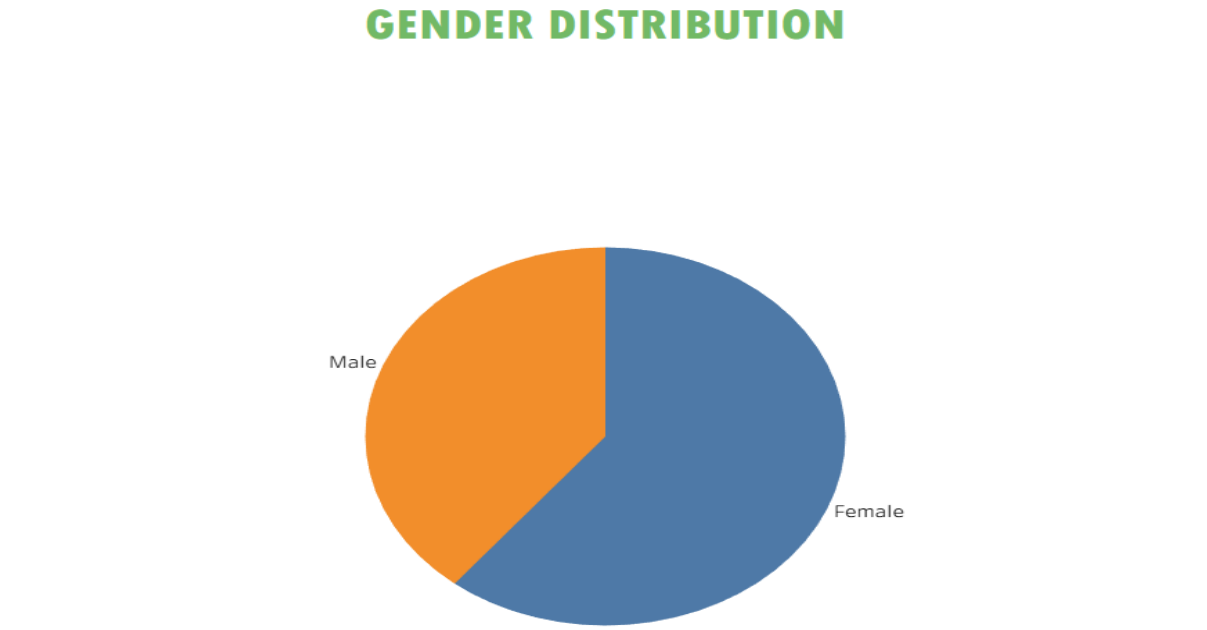
Project team shall fill the following information in model performance testing template.

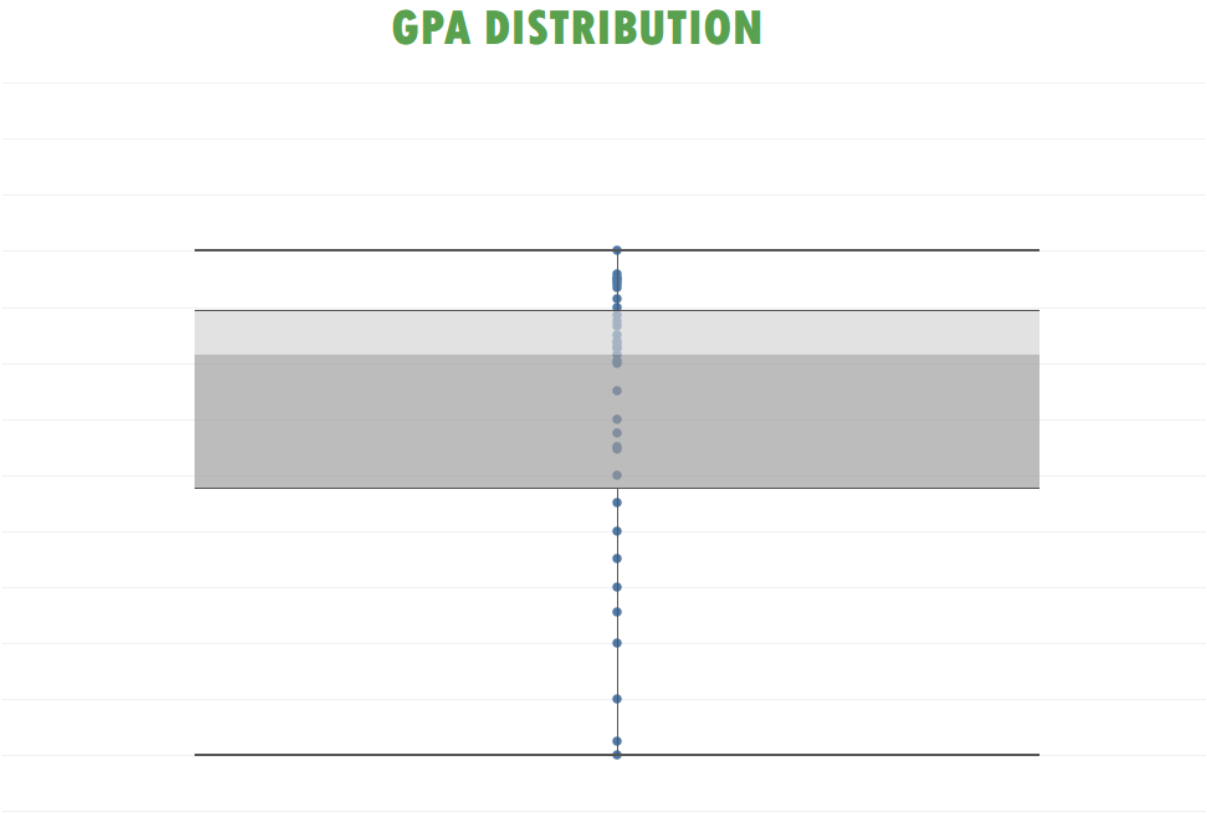
S.No.	Parameter	Screenshot / Values
1.	Data Rendered	food_coded.csv with 100+ variables including GPA, exercise, dietary habits, preferences, etc.
2.	Data Preprocessing	- Null value handling for columns like calories_day, weight - Encoded categorical fields (e.g., diet_current, gender, exercise) - Created standardized fields for calorie intake and health ratings
3.	Utilization of Filters	Filters added for: - Gender - Diet Status - Exercise Frequency - Cuisine Preferences - Self-perceived weight status

4.	Calculation fields Used	**Calcution fields** Calorie Consumption ComfortFoodReasons_Label FavComfortfoods SportsParticipation MEAL PAY RANGE Weight (bin) Breakfast (copy) COUNT_1 **Numeric to string conversion** Gender(count) Marital Status(count) Parentscook(count) Vitamins(count)
5.	Dashboard design	**Visualizations-23** 1. GPA Distribution 2. Gender Distribution 3. Breakfast distribution 4. Calorie Consumption per day 5. Fav Comfort Foods 6. Comfort Food Reasons 7. Cooking Frequency per week 8. Cuisine Preferences 9. Diet Status 10. Exercise Frequency 11. EmployeeStatus 12. HealthyFeeling 13. LifeRewardingRating 14. Marital Status 15. Nutritional Check 16. ParentalCookingHabits 17. MealPaymentHabits 18. WeightSelfPerception 19. SportsParticipation 20. VitaminIntake 21. WeightDistribution 22. Eatingout 23. Coffee Consumption **Dashboards-4** 1. Dietary Habits and Preferences 2. Parental Influence and Eating Out 3. Lifestyle Overview **4.** Health and Nutrition
6	Story Design	**Story Design-1** A college food choices story board

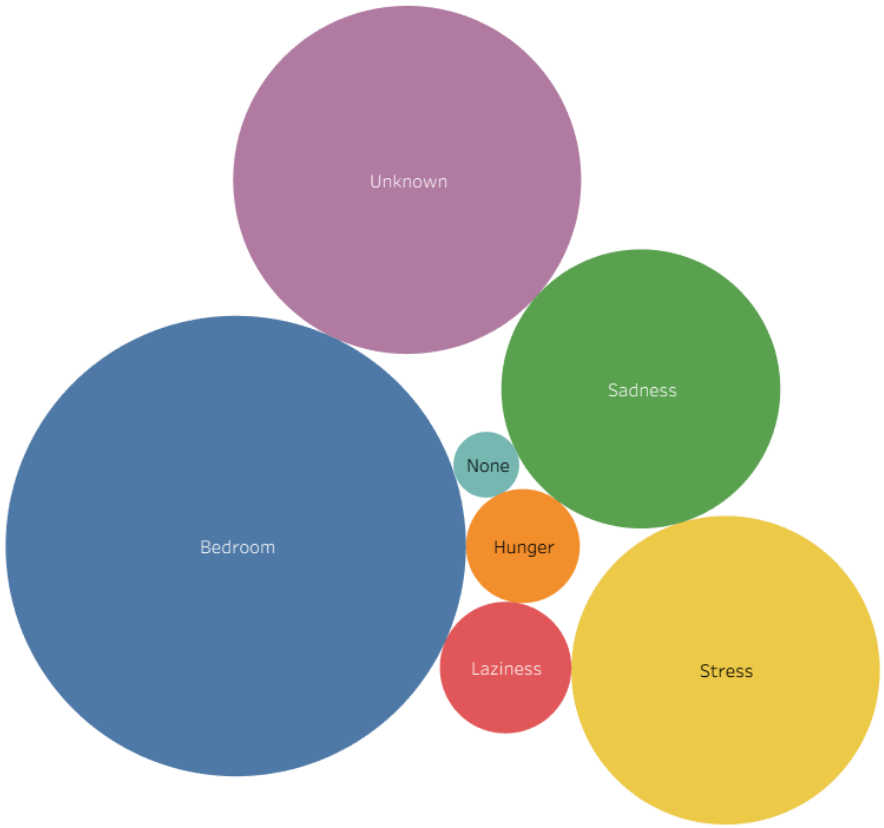
7. RESULTS

7.1 Output Screenshots

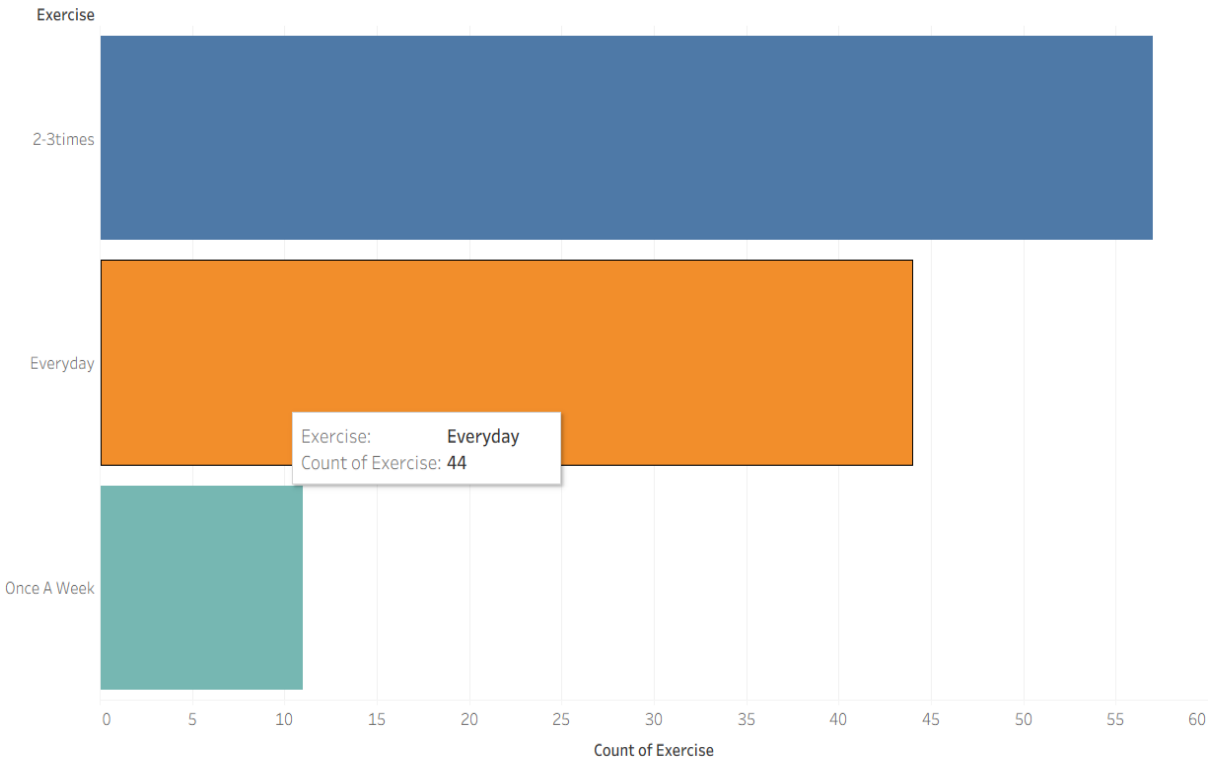




Comfort_food_reasons

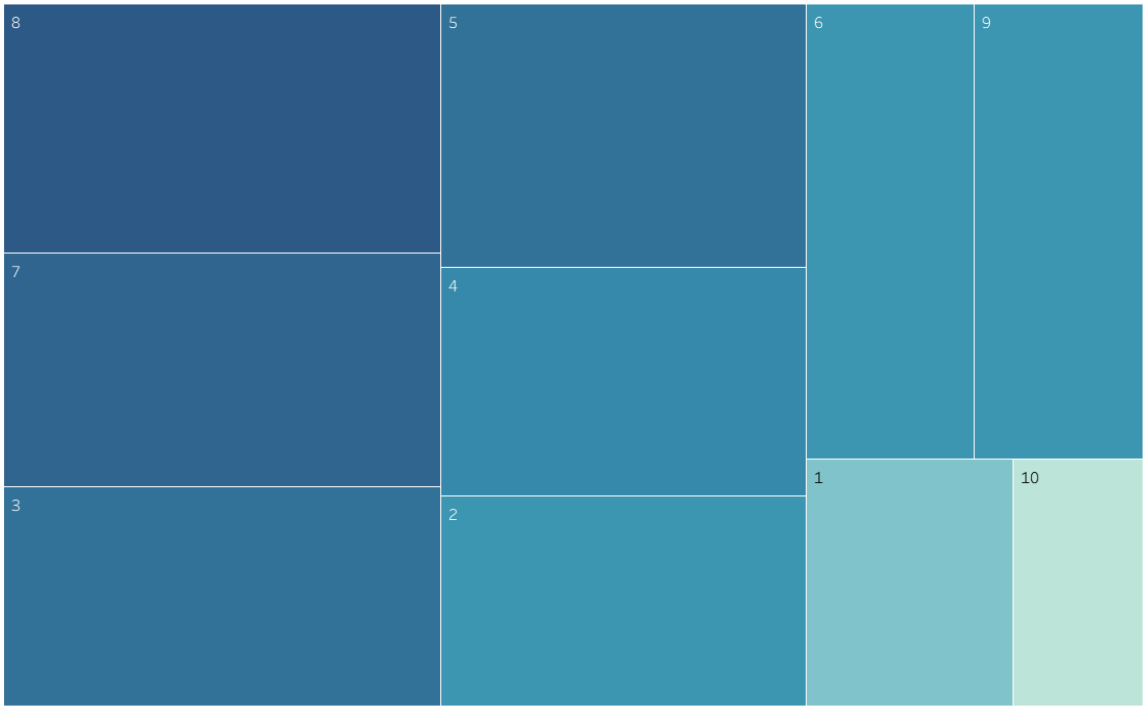


1.Exercise Frequency

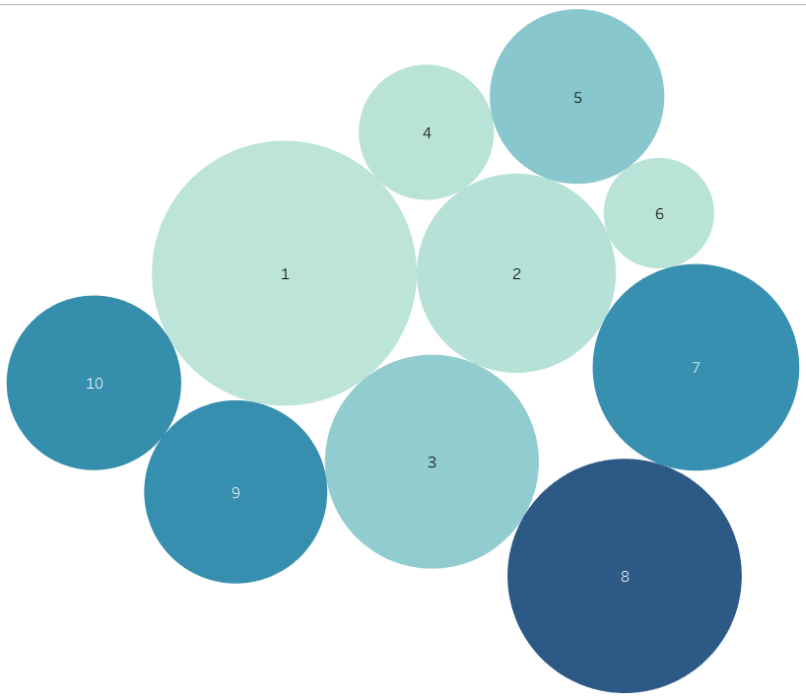


Employement Frequency

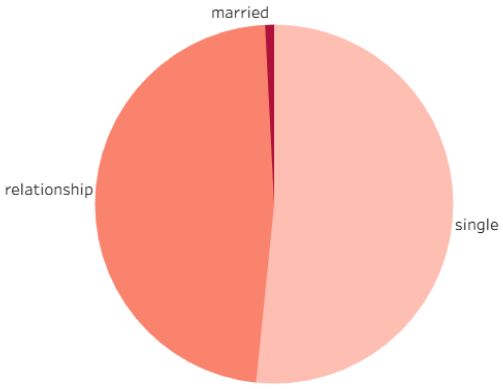
2.Healthy Feeling

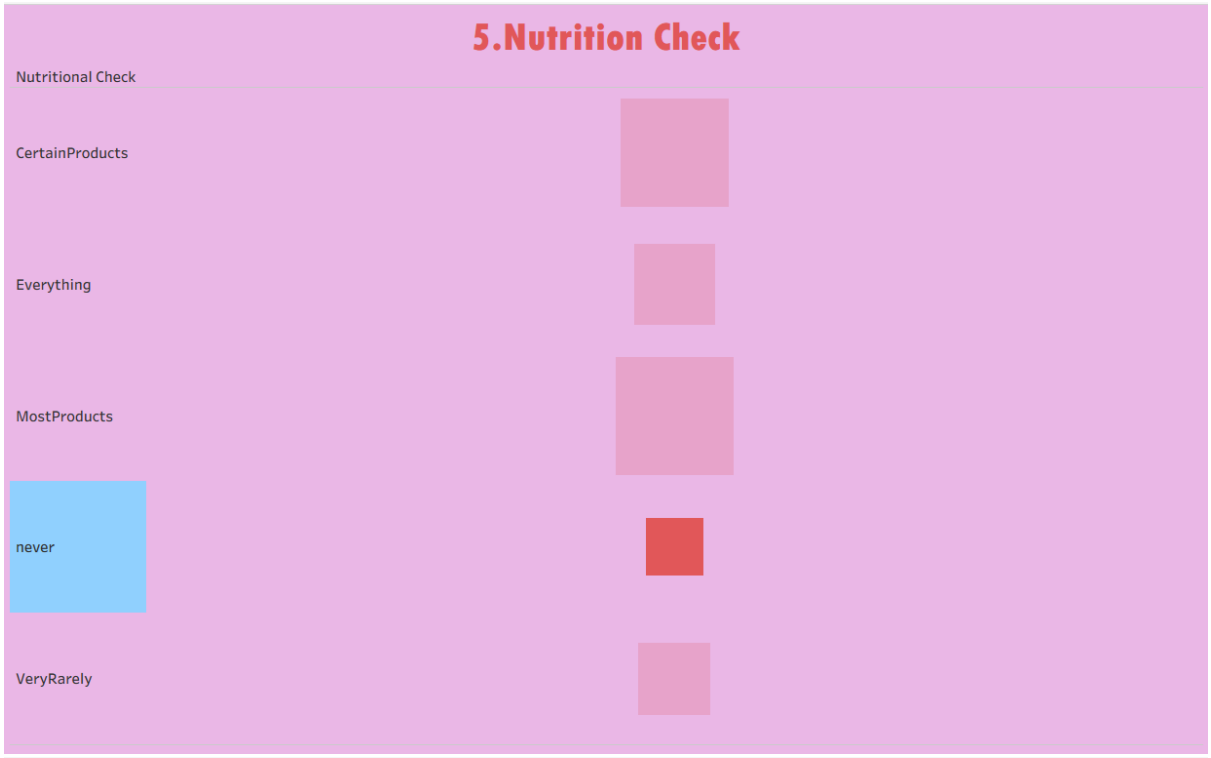


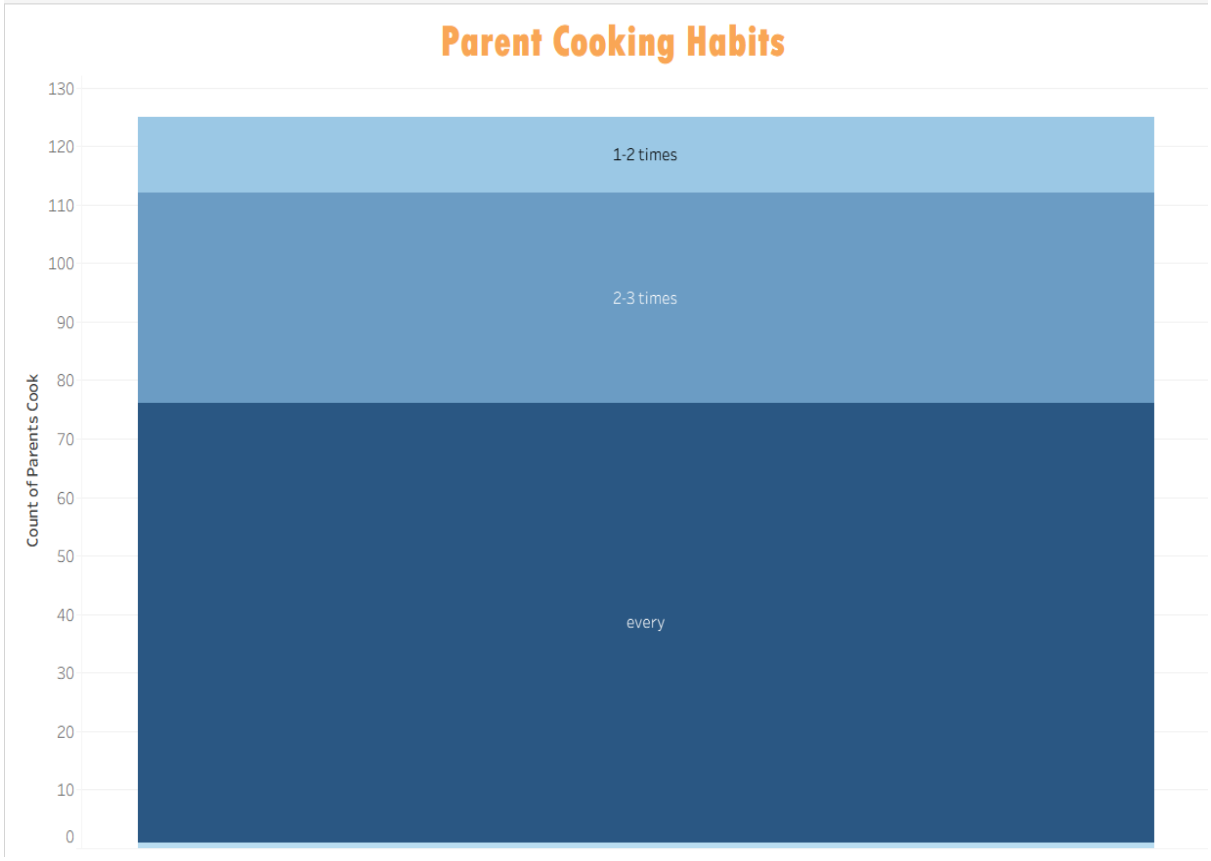
Life Rewarding



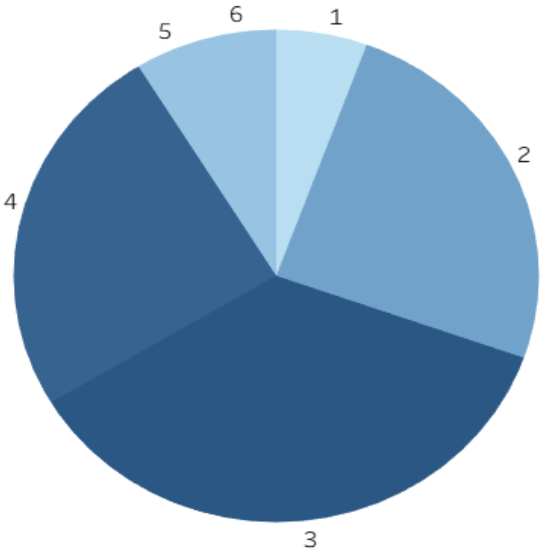
Marital Status



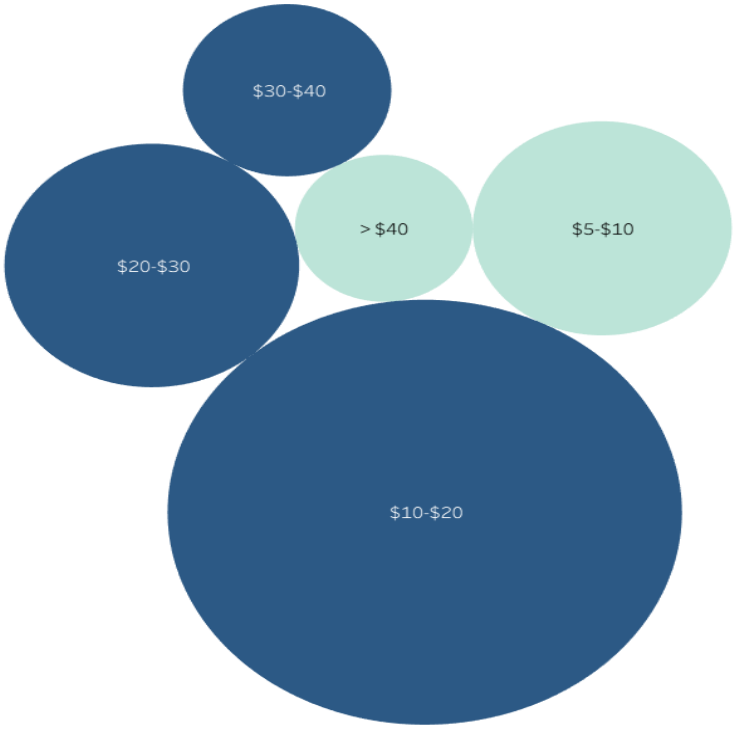

5.Nutrition Check
Nutritional Check
CertainProducts
Everything
MostProducts
never
VeryRarely


Parent Cooking Habits
Count of Parents Cook
130
120
110
100
90
80
70
60
50
40
30
20
10
0
1-2 times
2-3 times
every

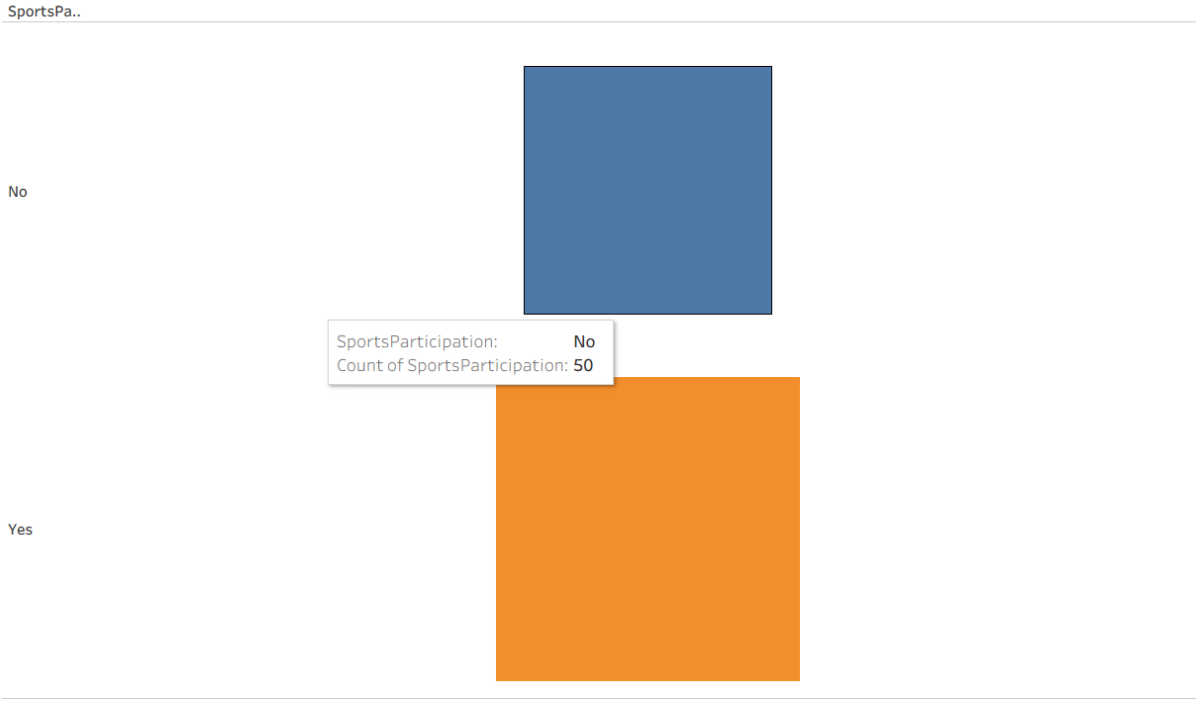
Weight Self Perceptron

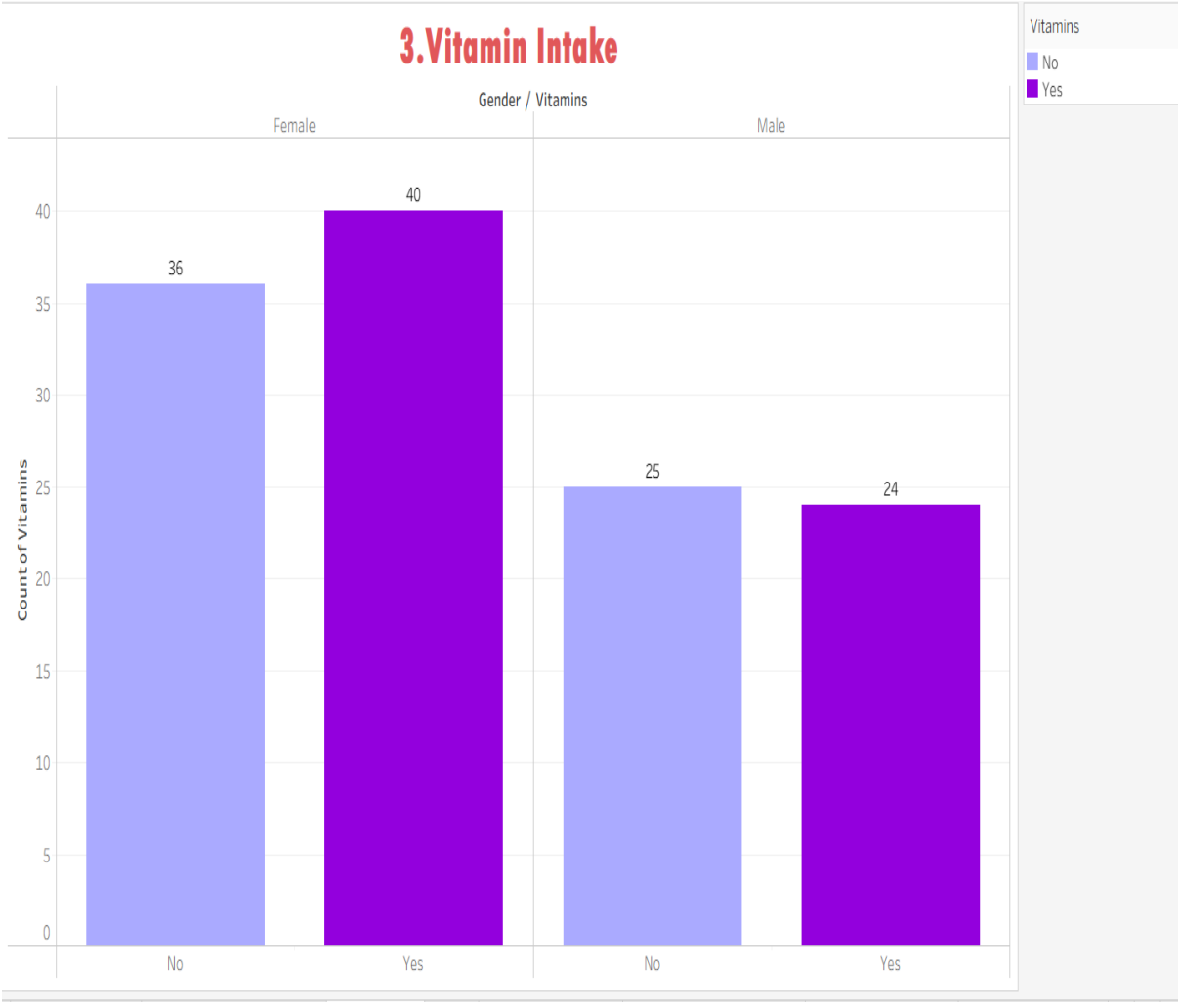


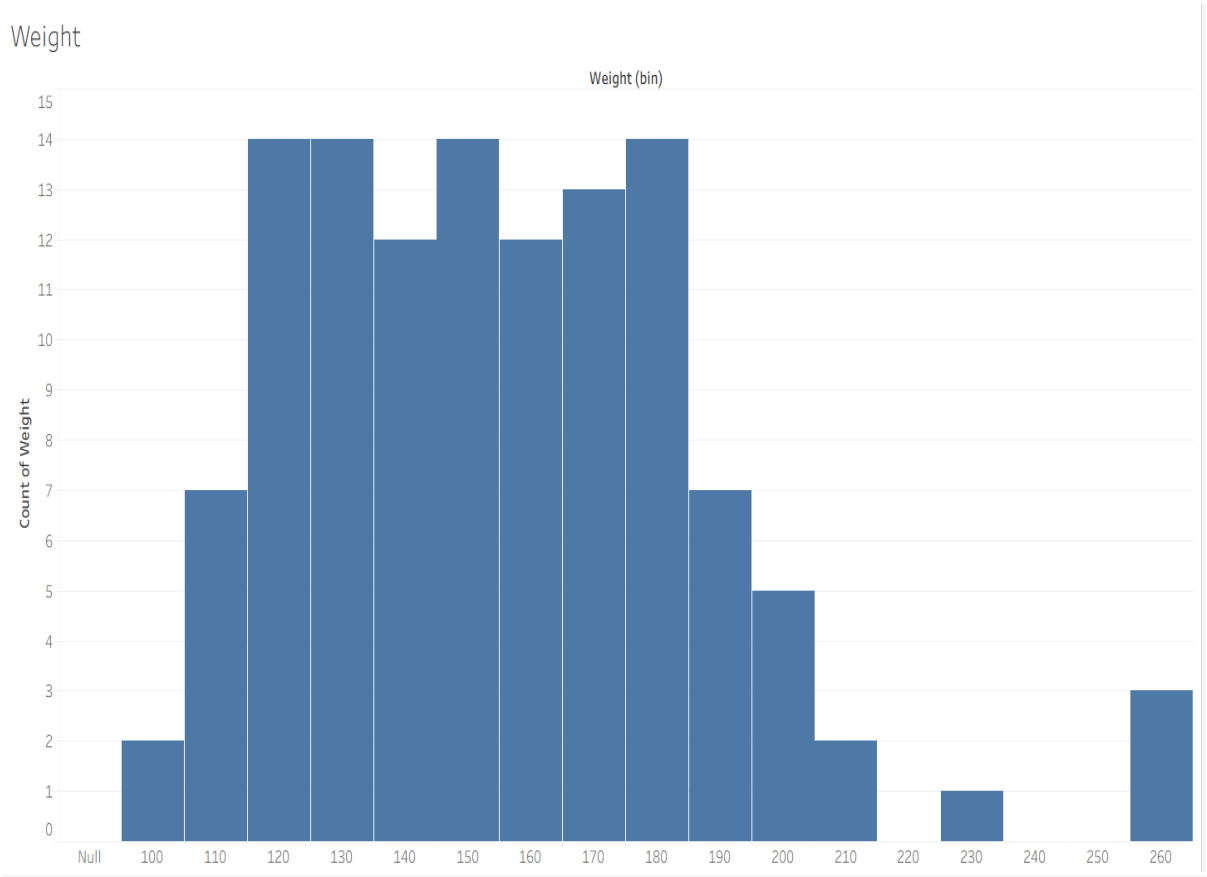
Meal Payment Habits

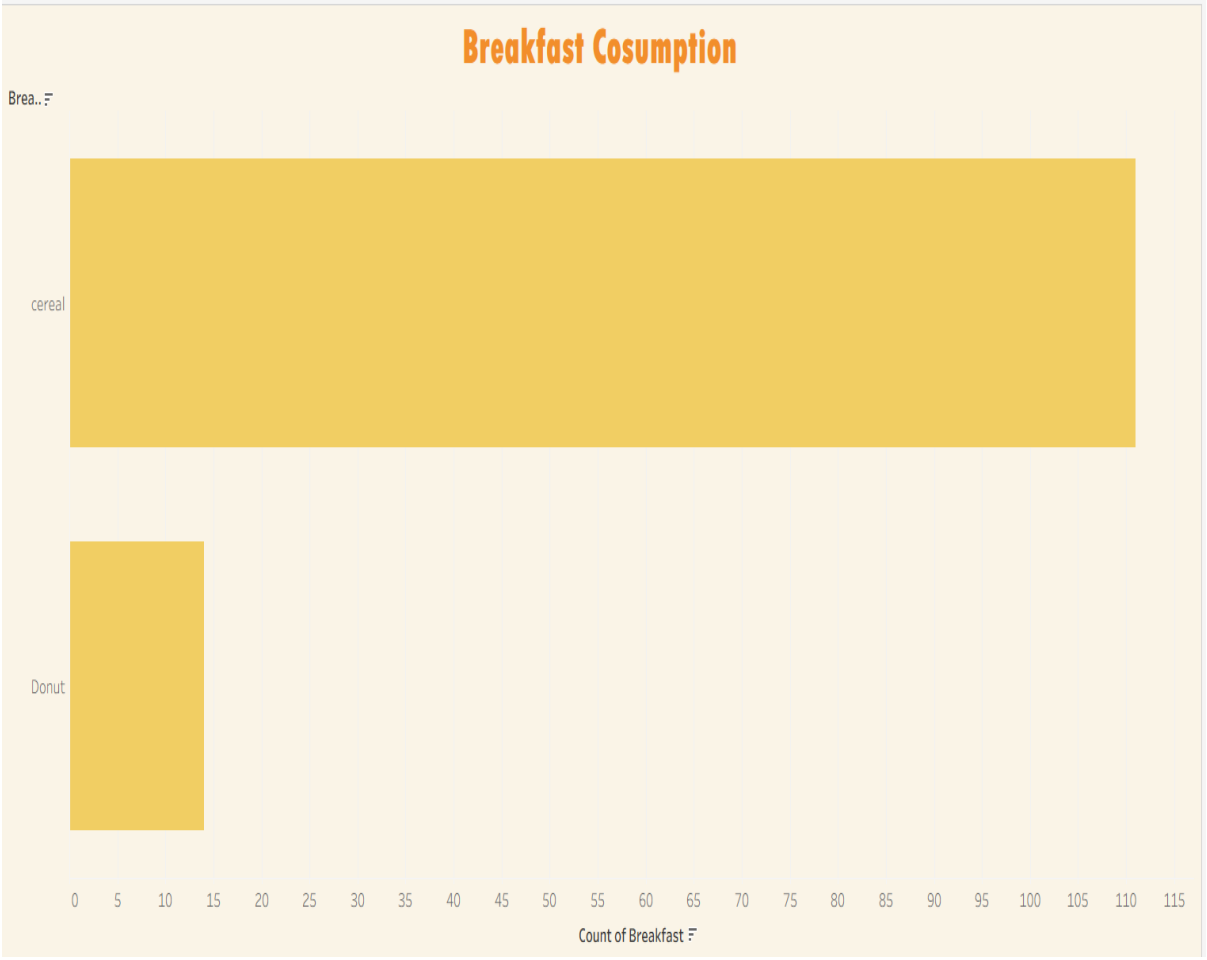


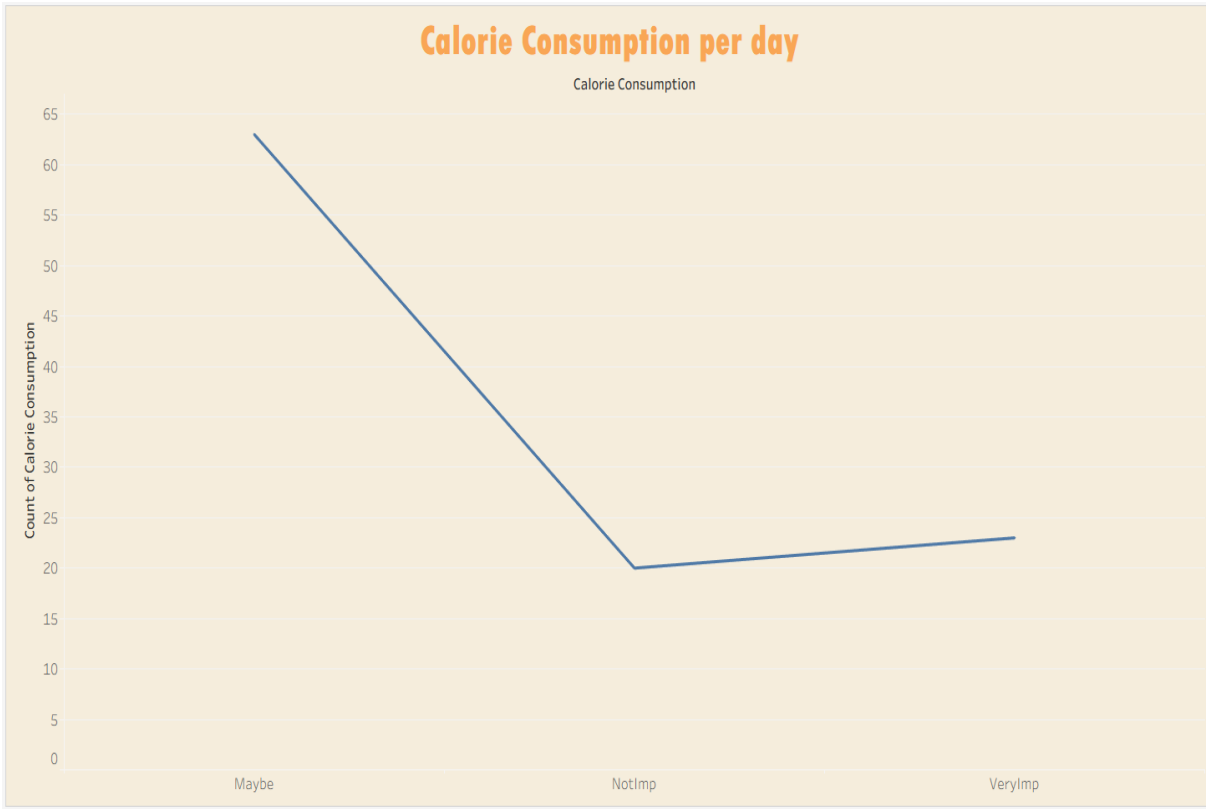
Sports Participation

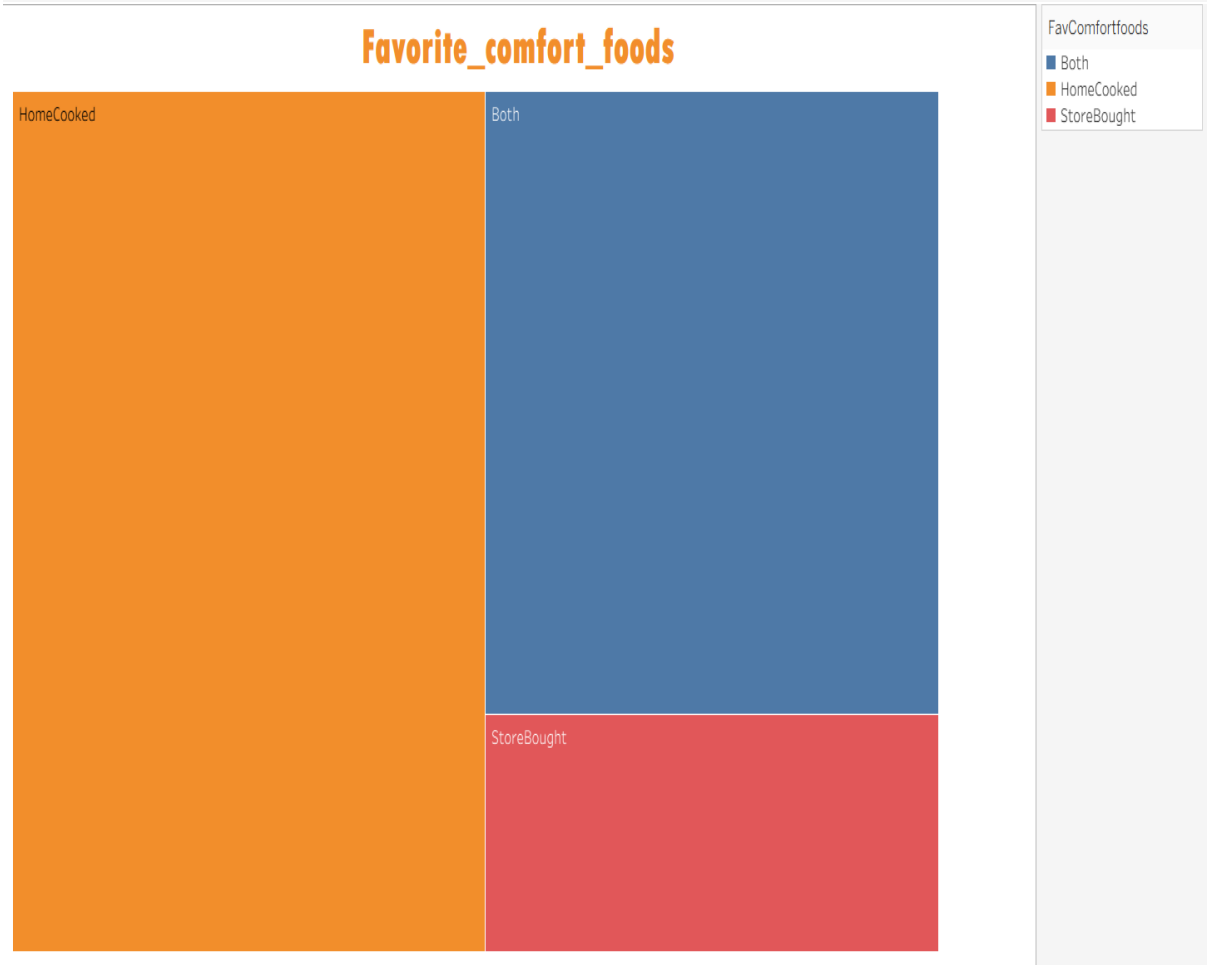


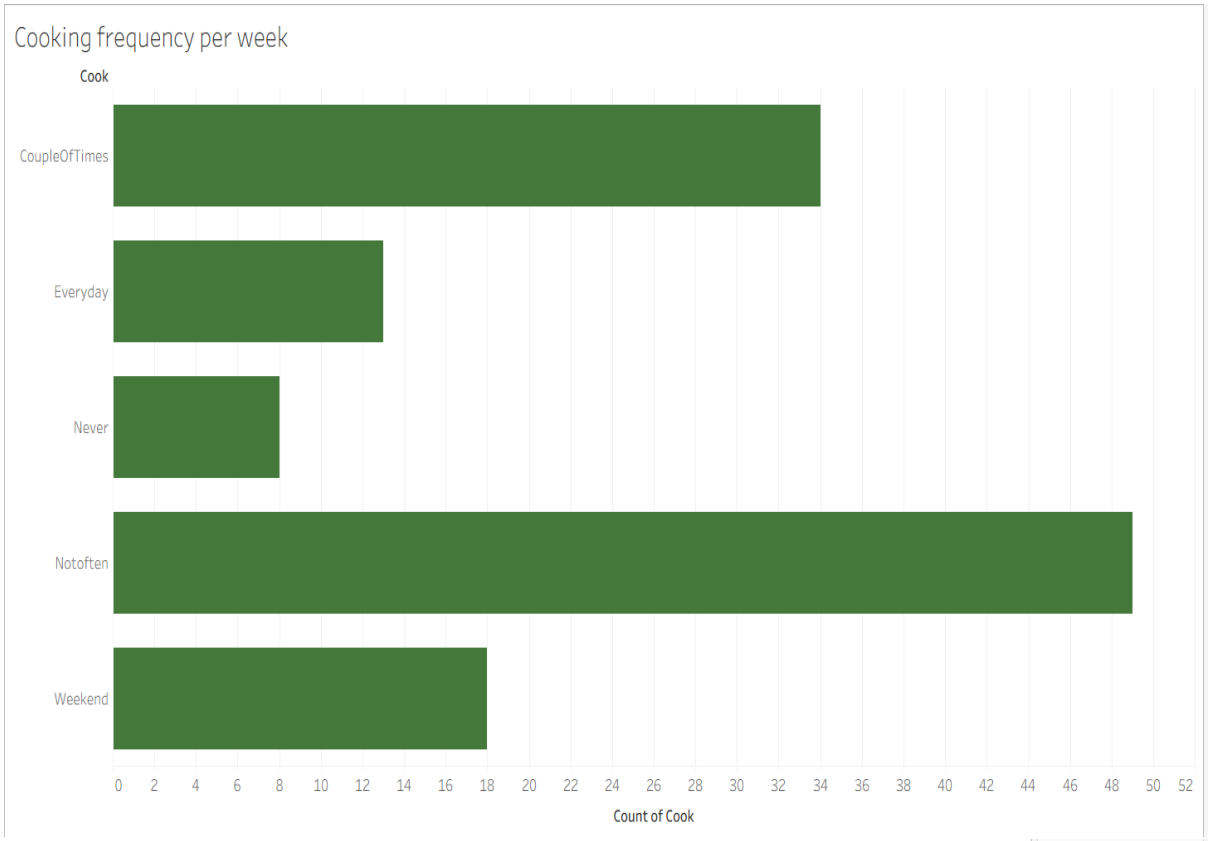


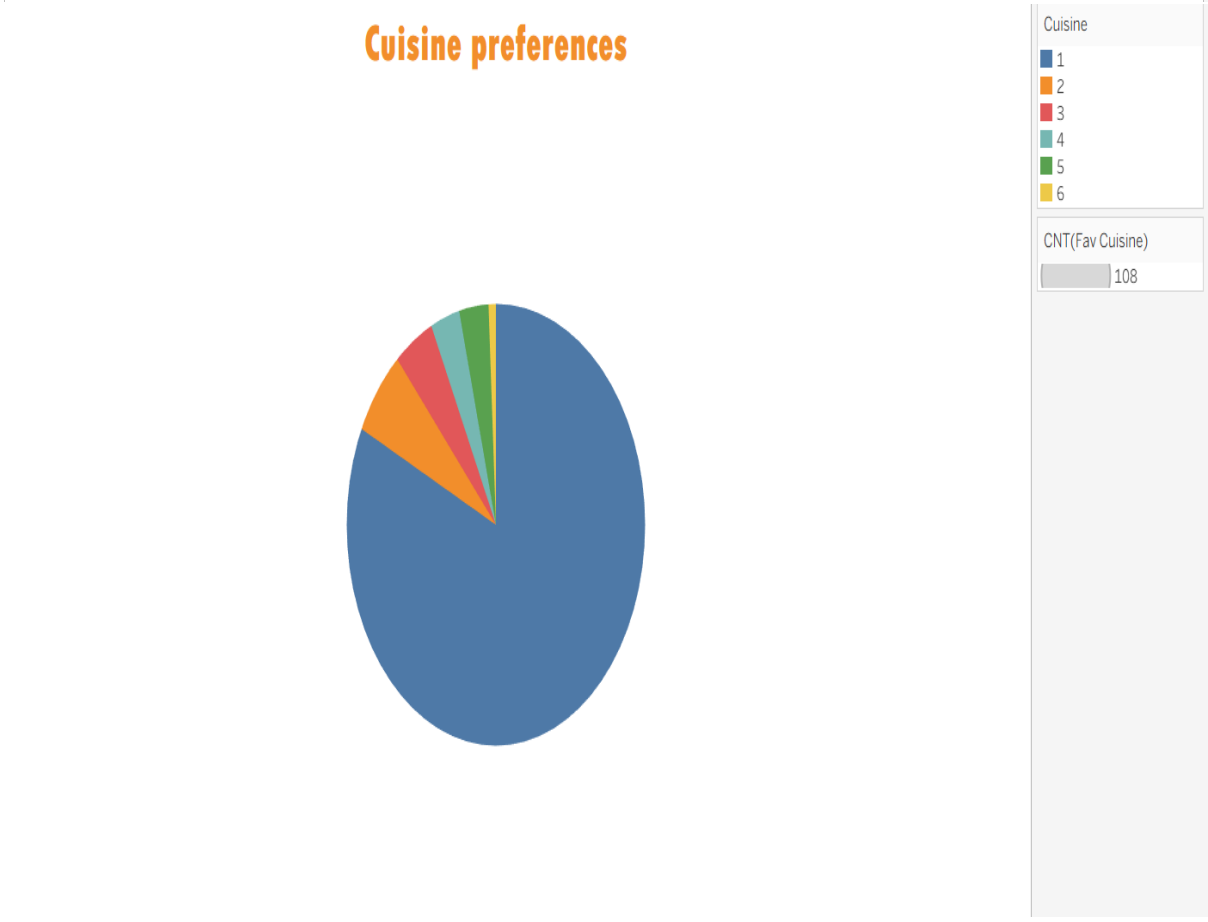

Weight
Weight (bin)
Count of Weight
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1
0
Null
100
110
120
130
140
150
160
170
180
190
200
210
220
230
240
250
260


Breakfast Cosumption
Brea..
cereal
Donut
0
5
10
15
20
25
30
35
40
45
50
55
60
65
70
75
80
85
90
95
100
105
110
115
Count of Breakfast


Calorie Consumption per day
Calorie Consumption
Count of Calorie Consumption
65
60
55
50
45
40
35
30
25
20
15
10
5
0
Maybe
NotImp
VeryImp

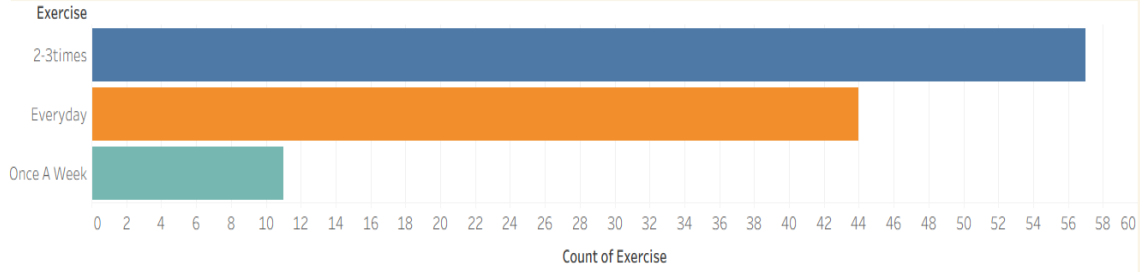

Favorite_comfort_foods
HomeCooked
Both
StoreBought
FavComfortfoods
Both
HomeCooked
StoreBought


Cooking frequency per week
Cook
CoupleOfTimes
Everyday
Never
Notoften
Weekend
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50 52
Count of Cook

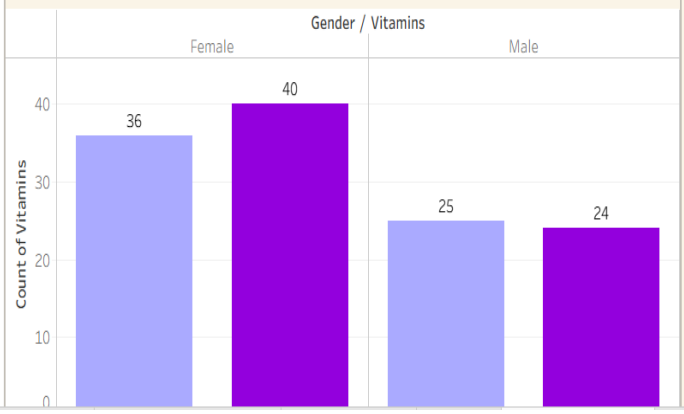

Cuisine preferences
Cuisine
1
2
3
4
5
6
CNT(Fav Cuisine)
108

HEALTH AND NUTRITION

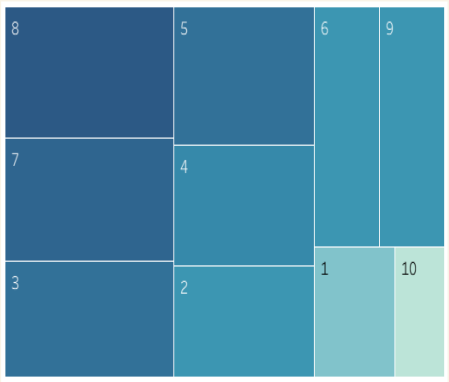
1.Exercise Frequency



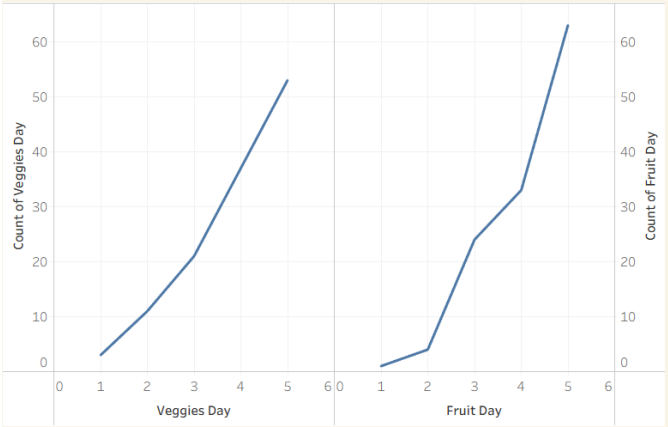
3.Vitamin Intake



2.Healthy Feeling



4.Veggieandfruit_Consumption

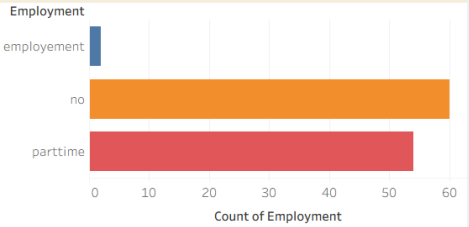


5.Nutrition Check

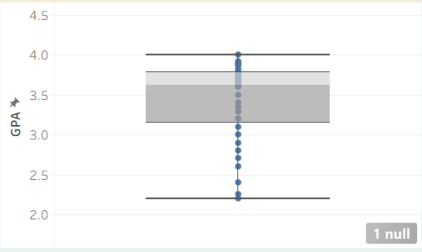
Lifestyle Overview

GENDER DISTRIBUTION

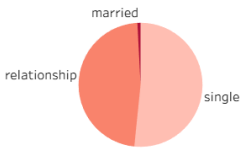
Employement Frequency



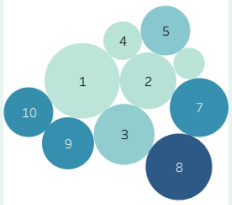
GPA DISTRIBUTION



Marital Status



Life Rewarding

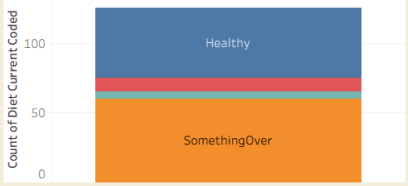


Daitary Habits And Preferences

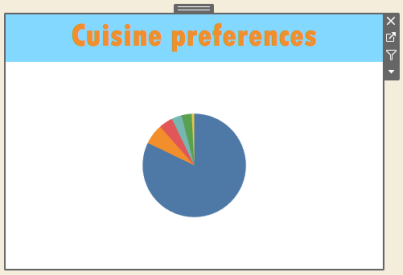
Calorie Consumption per day

Comfort_food_reasons

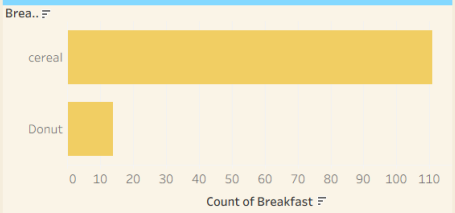
Diet Status



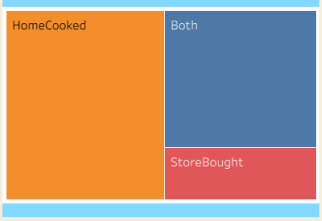
Cuisine preferences

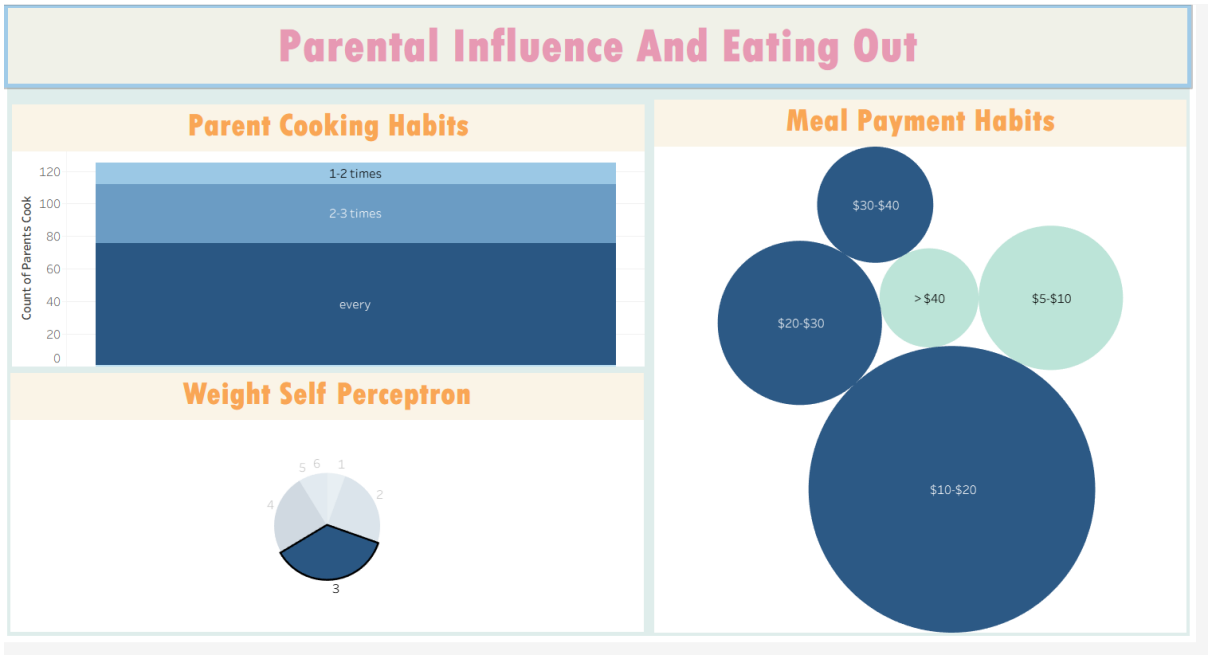


Breakfast Cosumption

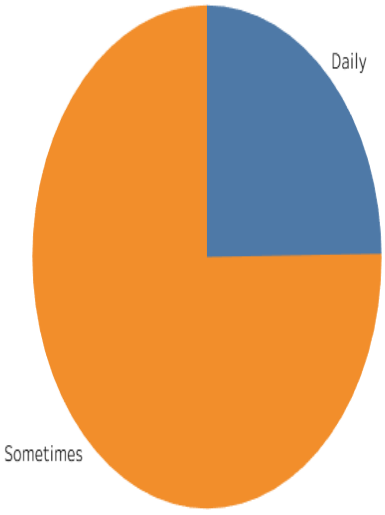


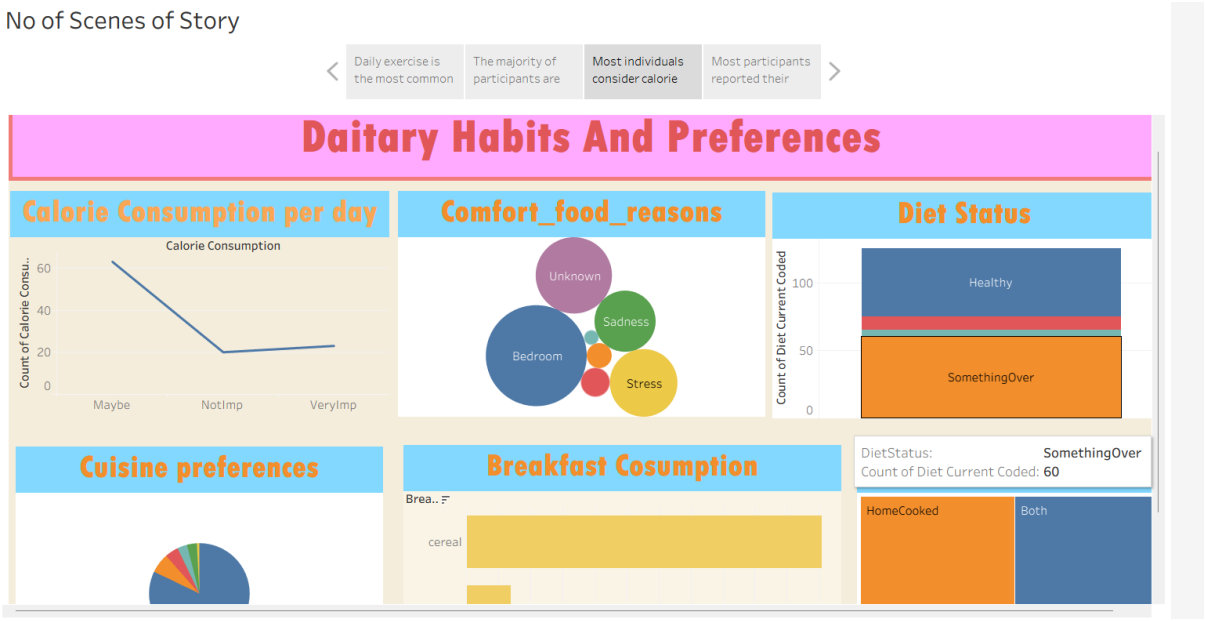
Favorite_comfort_foods

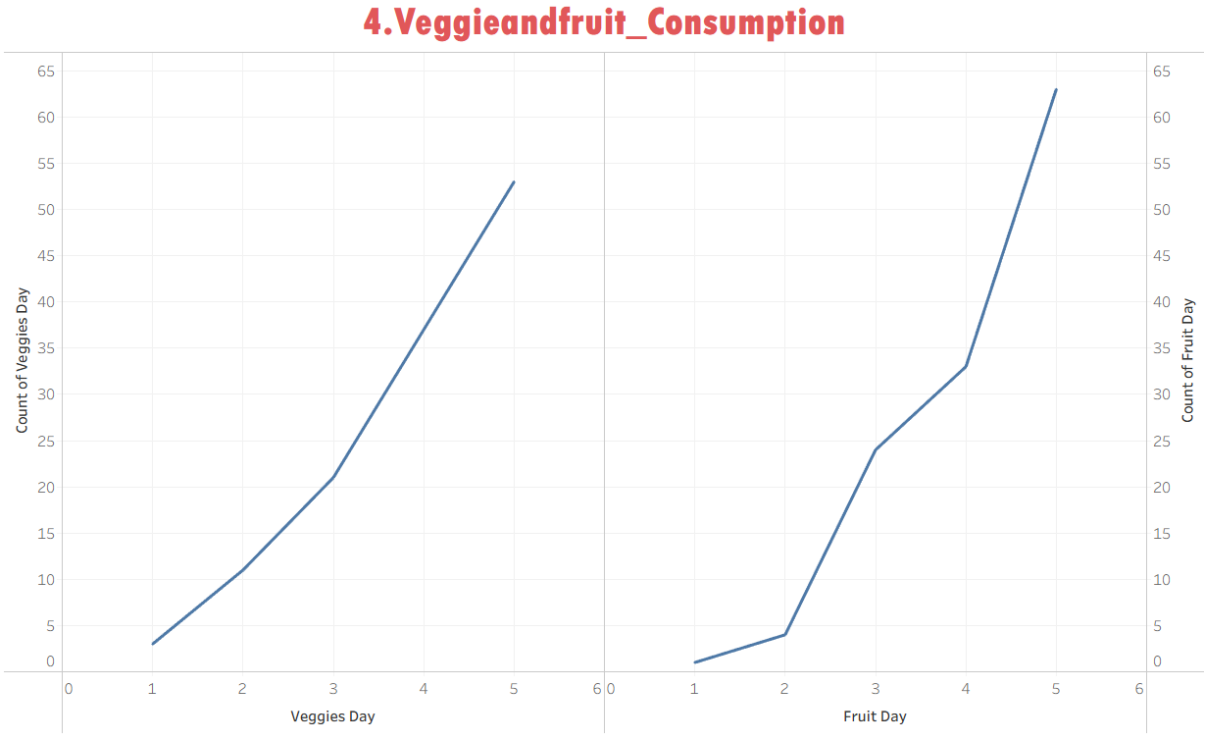




Coffee Consumption







8. ADVANTAGES & DISADVANTAGES

Advantages

- **Multidimensional Insights**: Combines dietary, emotional, lifestyle, and academic data to offer a holistic understanding of student wellness.
- **Interactive Visualization**: Tableau dashboards provide an engaging way to explore data patterns and trends.
- **Web Accessibility**: The Flask-based web app makes the dashboards publicly accessible across devices and platforms.

- **Scalable & Modular Design**: The system can easily be extended with predictive models, new data sources, or broader campus integration.
- **Actionable Analytics**: Empowers stakeholders to make data-backed decisions that improve student health, behavior, and campus policy.
- **Educational Value**: Supports students, researchers, and administrators in understanding behavior change through evidence.
- **Open Source Workflow**: Python, SQL, and GitHub tools keep the project lightweight, reproducible, and collaborative.
- **Cultural Awareness**: Visuals like comfort food triggers and cuisine preferences allow for culturally inclusive recommendations

Disadvantages

- **Self-Reported Data Limitations**: Survey responses may be biased, inconsistent, or lacking in accuracy.
- **No Real-Time Data Capture**: The system is currently batch-based and doesn't support live data feeds or updates.
- **Requires Technical Expertise**: Setup, customization, and maintenance require familiarity with Tableau, Python, Flask, and SQL.
- **Hosting Constraints**: Deployment on platforms like Render may encounter performance issues under heavier traffic or dataset size.
- **Privacy Concerns**: Health and behavior-related insights must be handled carefully to protect student confidentiality and consent.
- **Scalability Considerations**: Expanding the solution to multiple institutions may involve reworking data schemas or dashboard logic.

9. CONCLUSION

The *College Food Choices* project offers a powerful, data-driven lens into the eating behaviors and wellness perceptions of college students. By synthesizing food choices, emotional influences, and lifestyle patterns into engaging Tableau dashboards, it transforms raw data into actionable knowledge.

This initiative doesn't just visualize trends—it drives impact. From sparking personalized health conversations to enabling evidence-based policy decisions, the project equips institutions with the tools needed to promote holistic student well-being. Through intuitive access and deep analytical capabilities, it bridges the gap between data science and real-world behavioral change.

10. FUTURE SCOPE

Predictive Modeling: Introduce machine learning models to forecast students at risk of poor nutrition or emotional eating patterns.

Real-Time Monitoring: Expand architecture to support continuous data collection through mobile apps or campus wellness platforms.

Personalized Wellness Dashboards: Offer tailored dashboards for students that reflect their personal data and health goals.

Institutional Benchmarking: Compare wellness metrics across different departments or campuses to inform systemic interventions.

Data Privacy Enhancements: Implement anonymization protocols and user consent modules to ensure ethical usage.

Wider Deployment: Extend the platform's reach to other educational institutions, NGOs, or public health bodies for large-scale impact.

11. APPENDIX

Dataset Link

https://www.kaggle.com/datasets/borapajo/food-choices?select=food_coded.csv

GitHub & Project Demo Link

reddeppareddy-27/A-College-Food-Choices-Intiative-CaseStudy