SYSTEM OPTION DEVELOPMENT

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A. EXECUTIVE SUMMARY

The three applications discussed in this report are a fitness tracker (Fitness Buddy), a beer brewing app (Beer Hops Brewing), and a budgeting app (Better Budgeting). They have been analyzed for various characteristics including purpose, market, possible revenue, and development strategies. The purpose of the report is not only analyzing the various applications but to determine the most feasible application based on the market size, financials, development difficulties, pros and cons.

A fitness app is a timeless tool anyone at any age can use. Staying home has become a norm which can easily lead to a decrease of self-care in the fitness department. With 1.5% annual growth rate in fitness segment revenue *(ibisworld.com)*, fitness app is a possible application to pursue.

In addition, there has been an exponential rise in alcohol sales in the US. Off-premises sales are up, and people are more interested in making their own beer. Since there are states limiting liquor stores opening, there has been an increased interest in at-home beer making. The number of craft beer consumption is growing faster than last year by 16.3%. Also, a low barrier to entry with few competitors making this application a first mover in the market with possibility of business expansion.

Due to COVID-19 many people have lost their jobs or have had a significant decrease in income forcing them to change the lifestyle they once led. In these circumstances, the best way to help make the most out of the money you have is by budgeting it. Budgeting is not only for people with a sudden decrease in income. With 5.7% annual growth, budgeting app is worthy to consider (*globalnewswire.com*)

After reviewing and testing competitor apps, several considerations have been made. The most noticeable is there are many free and successful fitness and budgeting applications. However, there are very few beer making applications leading to a limited competition and opportunity for growth. We deliberately select the Beer Hops Brewing app to proceed because of the fast-growing market, few barrier to entry, low technological challenges, and the possibility to shift from a niche market to a wholesale industry. In addition, the financial estimates indicate that Beer Hops will likely break even sooner with higher return on investment for capital investors.

Estimates	Beer Hops Brewing	Fitness Buddy	Better Budget
Initial Investment	$72,634	$74,454	$109,895
First year revenue	$78,000	$101,298	$90,450
Break-even	1 year	1 year	1.5 year
ROI	2.72	2.65	1.74

B. APPLICATION OPTIONS

1. Fitness Buddy (Fitness App)

A fitness app is a timeless tool anyone can use. Fitness is for people of all ages and this most definitely includes children as well. During the pandemic many activities have been put to a stop and many activities that are usually enjoyed by groups of people are prohibited. It is important to keep your body healthy and track your health now more than ever. Staying home has become a norm which can easily lead to a decrease of self-care in the fitness department. Working out at home is one of the best ways to stay busy during a pandemic. Not only is it fun and safe to do at home but it is also good for your health.

2. Better Budget (Budgeting App)

An app that we believe could be extremely useful is a budgeting app. These types of apps have already been popular in the past, but they are on the rise now due to Covid-19. Many people have lost their jobs or have had a significant decrease in income forcing them to change the lifestyle they once led. I believe the best way to help make the most out of the money you have is by budgeting it. Budgeting is not only for people with a suddenly decreased income though. Budgeting is for all types of incomes and classes.

A budget can grow and change with you through the rest of adult life too. As you go through life you save up for things like a first home, a vacation, medical expenses, and eventually for retirement.

3. Beer Hops Brewing App (Beer Brewing App)

The idea for the beer app is to be able to teach new brewers how to brew while having the tools that advanced brewers need. Every calculator used in our app will have a tutorial on how it is used as well as who does it apply too. We have also added a leveling system so that you can tell exactly where you are and how to farther your brewing hobby. As you get higher in your level helpful advice is given less often. We have also added all the timers you need to ensure you never miss a hop addition or a strike temperature increase. The app comes with the ingredient calculators and reminders.

The app aims to focus on how to brew beer at home. Since the virus is still spreading and outdoor drinking is not recommended, the app allows users to self-brew their own beer and adjust to meet their tastes.

C. FUNCTIONAL REQUIREMENTS

1. Application Functions

- **Fitness Buddy App**

  - Beginner to Expert workout programs with video references
  - Build your own work out and have the interval timers to go with HIIT workouts that you create
  - Logbook for food intake and calories consumption
  - Scans barcodes on food labels for easy input
  - Show your personal trends for activity
  - Considers personal info
  - Notifications to remind users to log workouts/food
  - Set target goals
  - Compare results with friends
 - Geolocation for outdoor runs/walks

- **Better Budget App**
  - Templates customization: users can pick and customize a template for your unique budget needs and spending behaviors
  - Goals setting: a function for writing down goals and what you want to use your money for and how much saving target is.
  - Calendar: to keep track of bills and set dates of when you want to meet goals.
  - Register: same as register from bank but virtual. The app lets customer to connect with their bank accounts, such as Bank of America, Chase, and other financial institutions to track your spending.

- Analytics: automated chart showing how much money you have spent in each category and how much money you have left in each category.

- Beer Hops Brewing App

- Progress saving: all recipes, work-in-progress are sync to profile across platforms.
- Reminder: work with mobile, text message, or compatible with smart devices such as Apple Home Pod, Google Home, Amazon Echo
- Ingredient customization: app provides recipes and users can customize to meet their taste. User can expect what is the outcome through Preview Mode
- Subscribed users have access to advanced instruction videos made to help users brew their beers.
- Market: app connects users and suppliers to ship necessary ingredients and users can experiment brewing at home. There will be a wishlist and purchase recommendation.
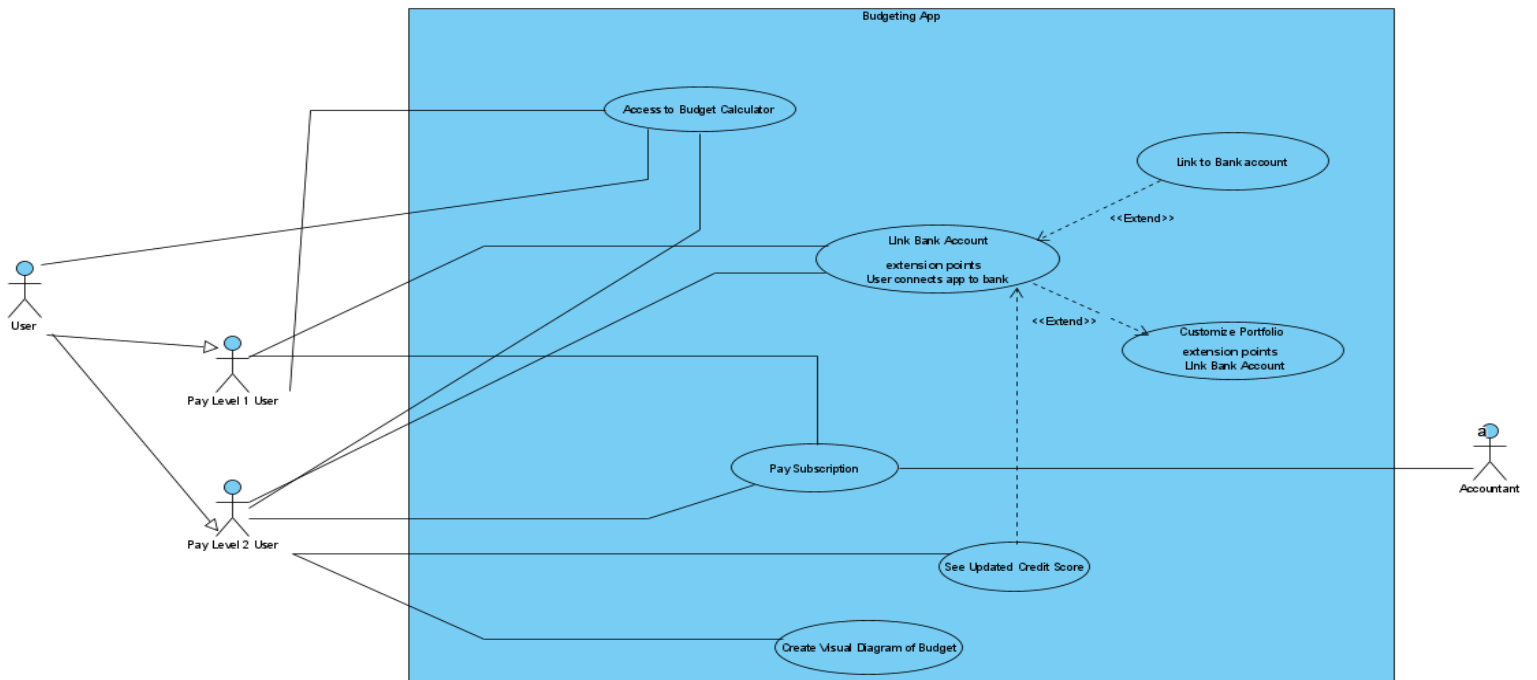
2. Use Case Diagram

- Fitness Buddy App
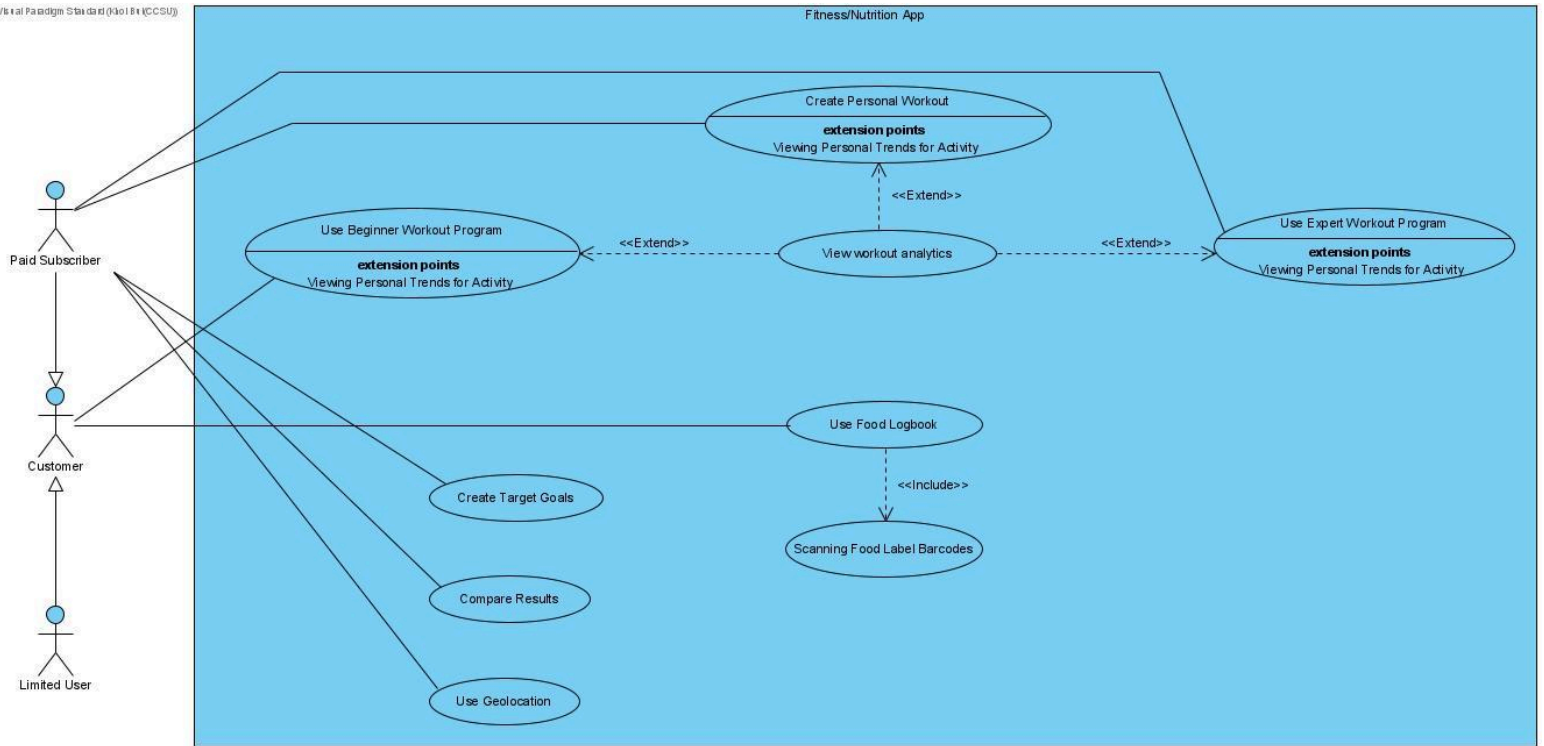
- Better Budget App

- Beer Hops Brewing App
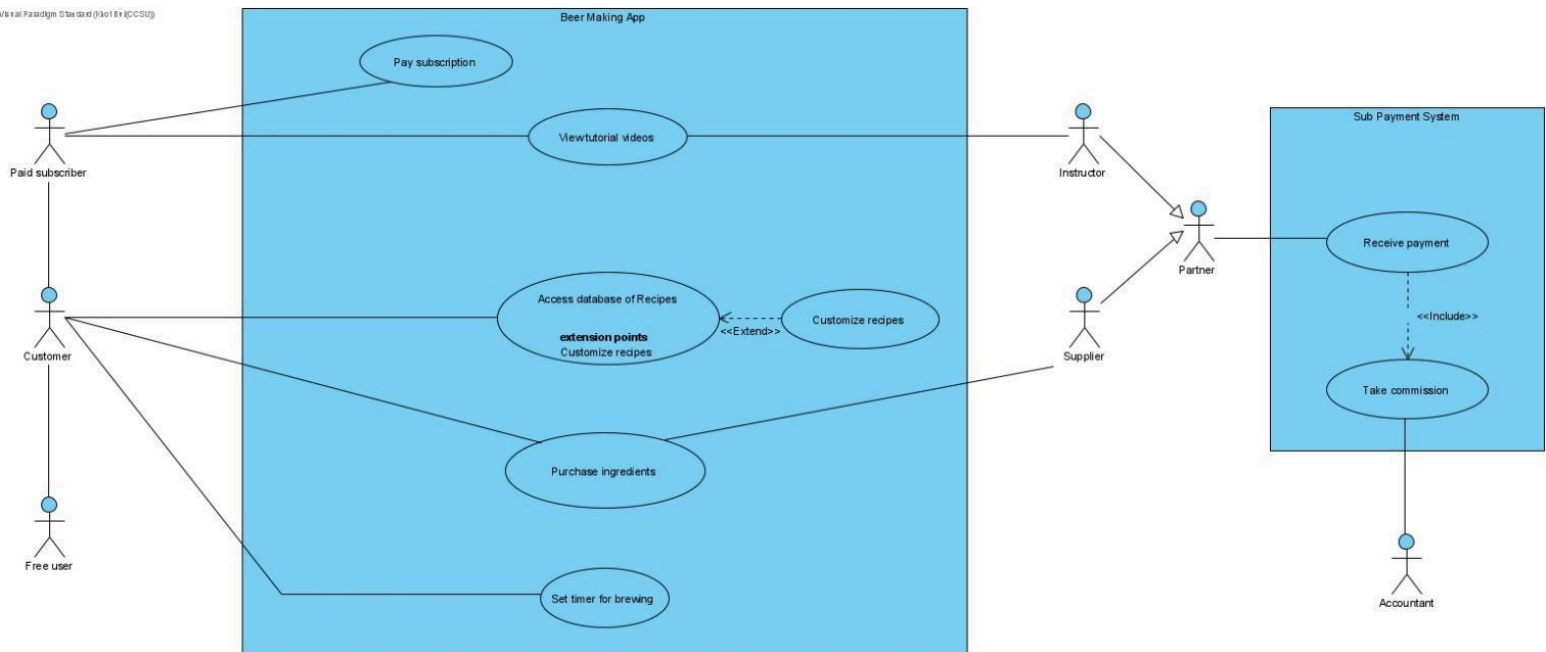
D. MARKET & COMPETITOR ANALYSIS

1. Market Size

a. Fitness Buddy App

Launching country	Worldwide
Population	7.8 bn (worldwide) - 328.2 million (US) (*worlddometers.info*)
User characteristics (persona)	Age : any age Location : anywhere Language : English Job : any Income : any Buying behavior: any Interest / lifestyle : lose weight, stay healthy
Estimate market size	Market potential : 87.4 million people "We forecast the number of US smartphone users using health and fitness apps will increase by 27.2% this year, from 68.7 million in 2019 to 87.4 million." (*emarketer.com*)

Search interest score (Google Trend)	There is a constant interest in fitness search result around 50. Since the pandemic, the score is slightly lower than 50/100
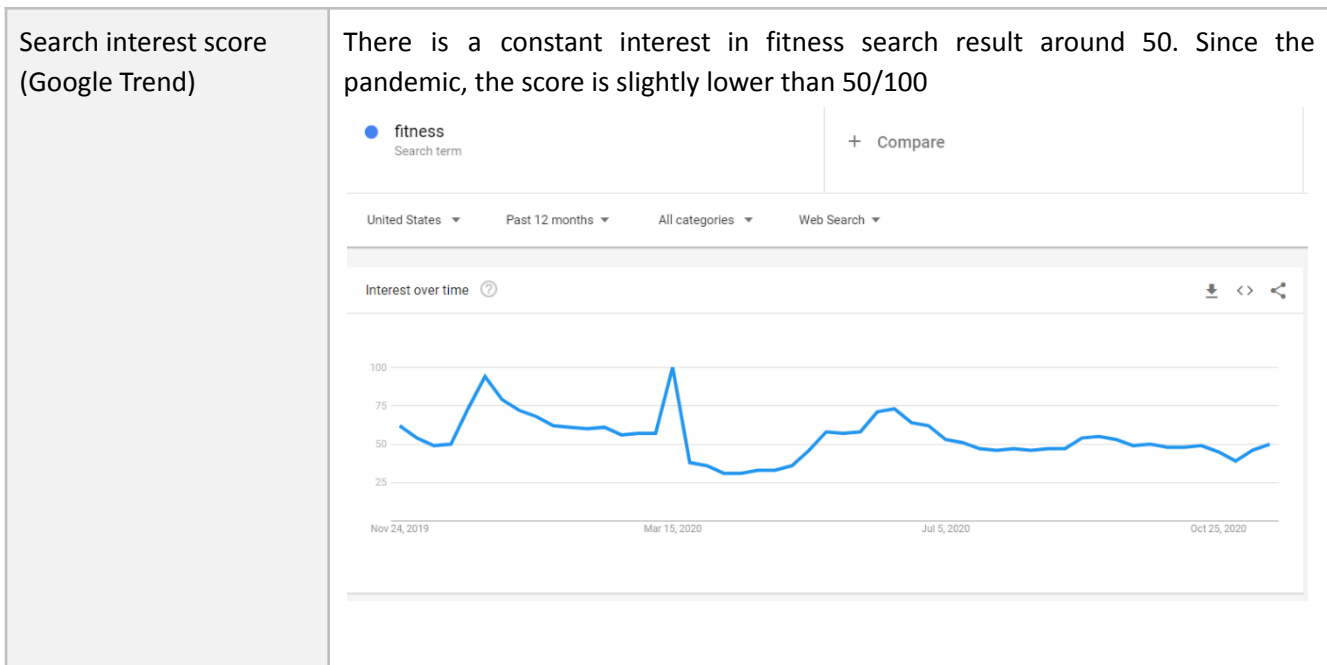
b. Better Budget App

Launching country	Worldwide
Population	7.8 bn (worldwide) - 328.2 million (US) (*worlddometers.info*)
User characteristics (persona)	Age : 4+ Location : anywhere Language : English Job : any Income : any Buying behavior: all types Interest / lifestyle : manage budget
Estimate market size	Market potential : 480 million "Standalone budgeting and investing apps are less common; they can be found on just 18% and 17% of smartphones" (*bankrate.com*)
Search interest score (Google Trend)	There is a high constant interest in budget management. Based on the keyword search, the interest score is around 75/100

budget
Search term

+ Compare

United States ▼   Past 12 months ▼   All categories ▼   Web Search ▼

Interest over time ⑦

100
75
50
25

Nov 24, 2019   Mar 15, 2020   Jul 5, 2020   Oct 25, 2020
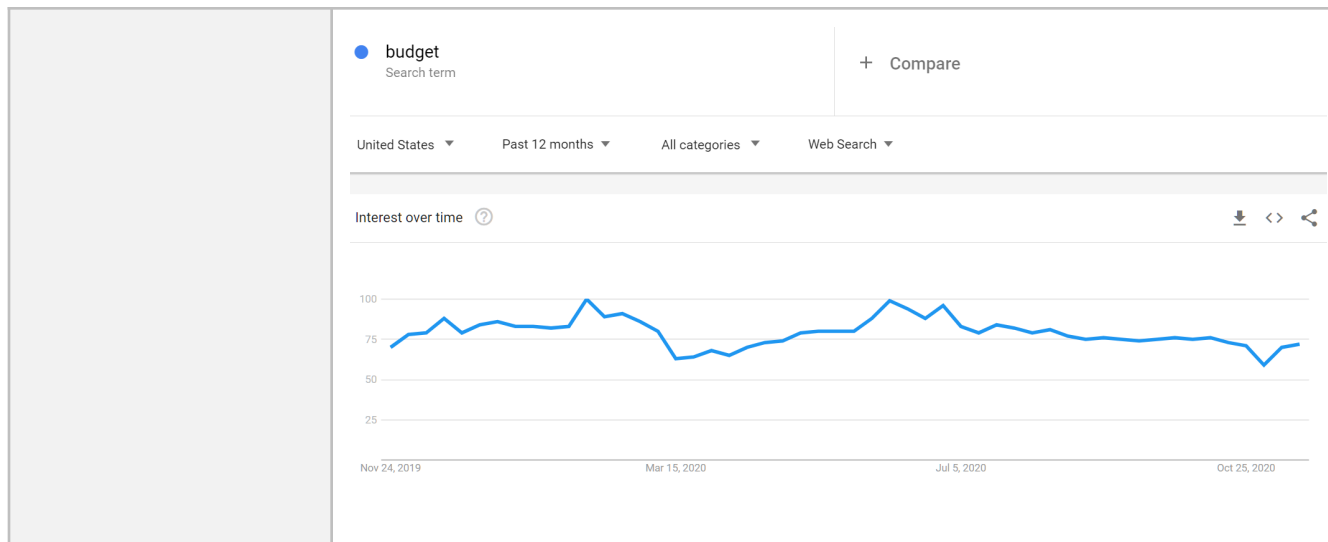
c. Beer Hops Brewing App

Launching country	US
Population	328.2 million (US) (*worlddometers.info*)
User characteristics (persona)	Age : +21 Location : anywhere Language : English Job : any Income : any Buying behavior: all types Interest / lifestyle : beer, brewing beer, craft beer
Estimate market size	Market potential : 1.1 million users "There are currently 1.1 million people in the United States who homebrew their own beer" (*brewersassociation.org*).
Search interest score (Google Trend)	There is a high constant interest in beer consumption. Based on the keyword search, the interest score is around 75/100

beer
Search term

+ Compare

United States ▼   Past 12 months ▼   All categories ▼   Web Search ▼

Interest over time ?

100
75
50
25

Nov 24, 2019   Mar 15, 2020   Jul 5, 2020   Oct 25, 2020
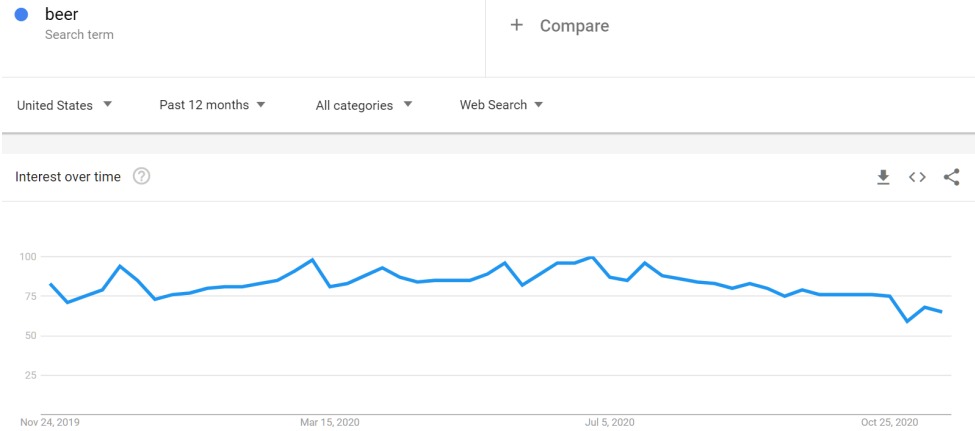
2. Market Comparison

a. Fitness Buddy App

	Fitness Buddy App	Fitness Bod	30 Day Fitness
Market Store	Google Play and App Store	Google Play	Google Play
Feature	-Track food consumption -Scan food items to calculate calories intake -Geolocation measurement -Sync across devices	-Track food -Log exercise	Record and analyze daily activities
Gross download (sensortower.com)		90k / month	300k / month
Revenue model	Free	Subscription: $9.99	Free
Rating		4.4/5	4.0/5
Strength	- Celebrate success by sharing progress, photos, and nutrition reports	- Easy and practical - Tracks food and calories using barcode scanner of recipe importer - Log water intake	-Free exercise Programs -Intuitive chart -Helpful diet tips

	- Sync progress across platform - Remind daily goals	Share progress	
Weakness	- Limited functions at rollout - Lack of health device connection	Fitbit issues	No weight and calories intake management
Market observation	Although the market for fitness is still growing steadily at the rate of 4.5% and is currently estimated at $32billion *(wellnesscreatives.com)*, making a distinctive app is somewhat challenging due to the fact that many health device manufacturers create app to promote their devices. There are free in-house apps such as Samsung Health, Apple Health, making this market is extremely competitive.		

b. Better Budget App

	Better Budget App	**Mint: Budged and Financial Tracker**	**Acorns**
Market Store		Google Play and App Store	Google Play and App Store
Feature	-Credit Score Check -Visually Customize portfolio -Connect Bank Account	-Track bills and account balances -refinance mortgage -get free credit score	-Rounds every purchase you make to the nearest dollar and invests that into the stock market.
Gross download *(sensortower.com)*	N/A	100k/month (1.2m / year)	200k/month (2.4m / year)

Revenue model	Level 1 (free): Access to budget calculator Level 2 ($10 a month): Connect bank accounts. Visually customize portfolio Level 3 ($15 a month): See your updated credit score. Create visual diagram of budget	-Receives revenue through referrals made to financial institutions	-Monthly Subscription Fee -Management fee for accounts over $5,000
Rating		4.5/5	4.7/5
Strength	-Ease of Use -Free Budget Calculator -Uncomplicated Visuals	-Free -Easy to use -Free credit score monitoring -Good amount of Security Features	-Automatically invests spare change -Great investment option for kids
Weakness	-No investment options -Does not support multiple currencies -No free credit score monitoring -Hard to negotiate with banks to connect to their accounts data	-Too detailed for some -Inability to plan ahead -Does not support multiple currencies	-Limited Investment Selection -No budget options -pricing structure can add up for smaller amounts
Market observation	Unlike other apps, the budget app will provide very uncomplicated visuals to the user so that they can easily see where the spending are going. They will have the option to manipulate this information in terms of bar graphs, pie charts, etc. Overall, what this app will have that other apps on the market will not is extreme user friendliness. The budget app will help users who are having difficulty tracking their spending habits. Based on this information, the user can adjust their spending habits to improve their financial status. According to *bankrate.com*, on their phones 55% of Americans have at least one full-service banking app, 40% have at least one peer-to-peer payments app, 17% have at least one standalone budgeting app, and 17% have at least one stand-alone		

	investing app. Although the market is growing, but it is difficult to motivate customers to leave their app with established bank accounts account.

c. Beer Hops Brewing App

	Beer Hops Brewing app	Beer Smith	Brew Father
Market Store		Google Play and Apple Store	Google Play and Apple Store
Feature	- Sync between platforms - Step by step instructions for different level user -Customize instruction based on user experience - 1 on 1 support (subscribed account) - Connect with vendor to refer sales -Unit converter and calculators	- Local recipe - Calculator - Timer - Work with advanced users	- Recipe on cloud - Sync brewing progress on web and mobile - Scale recipe, equipment, alter color, original gravity or bitterness - Save profiles or ingredients from an existing recipe
Gross download (sensortower.com)		10k / month (120k / year)	15k / month (180k / year)
Revenue model	- Free basic recipe - Subscription for advanced recipe and instructional videos - Commission on selling ingredients	- Free basic recipe - Subscription for advanced recipe	- Free basic recipe - Subscription for advanced recipe
Rating		4.6	4.2/5
Strength	- Connect with vendor to supply ingredients		

	- Sending SMS message to inform order confirmation and reminder - Market place for ordering ingredients		
Weakness	- Low market awareness: customers usually find ingredients themselves	- Basic function - No sync between platforms - App crash	- No interactive ingredient checklist - No shopping list or inventory - No ingredient supplier - Calculator problem with decimal separator
Market Observation	-Craft production grew the most by 6%, up to 29.3% and account for more than $11.6 billion in US market *(brewerassociation.org)* - Most of the app does not have saving progress and syncing with user account. Our app allows progress synchronization on web and app versions. - Reminder schedule will work on Google Home / Amazon echo / Apple Home Pod, text message and email. - App will allow customization for flavor, bitterness, color and show preview of the final product - Subscribed users will be able to access advanced video and tips how to make the beer crispier or optimize ingredients - First Mover: users can order the ingredients right on the app. Most apps only offer calculation, formula without answering the concern where to get the right ingredients. 10% sales commission will contribute to the revenue. - Progress can be shared and monitored by other people, which promote the use of beer app to new users. - Our platform also works as a bridge between part-time brewing instructor and users. 30% payment will be kept as commission for the app. Users will have 1 on 1 video instruction how to make their special beer.		

E. DECISION ANALYSIS

1. Financial Analysis

a. Revenue

Yearly Estimate	Beer Hops Brewing	Fitness Buddy	Better Budget
a. Estimate download rate / year (average of the 2 competitor apps gross downloads – section D2)	150,000 = (120k + 180k)/2	195,000 = (90,000 + 300,000)/2	150,000 = (100k + 200k)/2
b. Estimate conversion rate "5.2% of users spend money on in-app purchases" (*appsflyer.com*)	5.2% (7,800 paid users)	5.2% (10,140 paid users)	5.2% (7,800 paid users)
c. Spending / customer	$ 10	$ 9.99	$10 - First pay level $15 - Second pay level 66% - First Pay level 33% - Second Pay level
d. Annual Revenue = c x b	$ 78,000 = 7800 x $10	$ 101,298.6 = 10,140 x $9.99	$ 90,090 = (7800 x $10 x 66%) + (7800 x $15 x 33%)

b. Cost

● Beer Hops Brewing App

Complexity Level	Medium
Max Development time (cleverroad.com)	2000 hrs
Main Source of hiring	Asia

Projected Development Costs	Total (Hrs x Rate)	Hours	Rate
Personnel			
Business Analysis (Asia)	$ 3,240.00	90	$36.00
UI/UX Design (Asia)	$ 3,050.00	100	$30.50
Development (lead / senior, Asia)	$ 14,175.00	350	$40.50
QA Testing (senior, Asia)	$ 3,500.00	100	$35.00
Project Management (US)	$ 48,300.00	350	$138.00
Total Personnel Cost	$ 72,265.00		

Cloud per month	
Virtual Hardware	$ 219.00
Software	$ 150.00
Total Cloud	$ 369.00
Total Projected Development Cost	$ 72,634.00

Projected Annual Operating Costs	(20% development cost)
Personnnel	$ 4,183.00
Analysis	$ 648.00
Programmer & QA	$ 3,535.00
Cloud per month	$ 369.00
Total Projected Operating Costs	$ 8,611.00

- Fitness Buddy App

Complexity Level	Medium
Max Development time (cleverroad.com)	2000 hrs
Main Source of hiring	Asia

Projected Development Costs	Total (Hrs x Rate)	Hours	Rate
Personnel			
Business Analysis (Asia)	$ 3,600.00	100	$36.00
UI/UX Design (Asia)	$ 4,575.00	150	$30.50
Development (lead / senior, Asia)	$ 16,200.00	400	$40.50
QA Testing (senior, Asia)	$ 10,500.00	300	$35.00
Project Management (US)	$ 55,200.00	400	$138.00
Total Personnel Cost	$ **90,075.00**		

Cloud per month	
Virtual Hardware	$ 400.00
Software	$ 150.00
Total Cloud	$ **550.00**
Total Projected Development Cost	$ **90,625.00**

Projected Annual Operating Costs	(20% development cost)
Personnnel	$ 6,060.00
Analysis	$ 720.00
Programmer & QA	$ 5,340.00
Cloud per month	$ 550.00
Total Projected Operating Costs	$ **12,660.00**

- Better Budget App

Complexity Level	High
Max Development time (cleverroad.com)	2500+ hr
Main Source of hiring	Asia

Projected Development Costs		Total (Hrs x Rate)	Hours	Rate
Personnel				
Business Analysis	(Asia)	$ 3,600.00	100	$36.00
UI/UX Design	(Asia)	$ 7,625.00	250	$30.50
Development	(lead / senior, Asia)	$ 20,250.00	500	$40.50
QA Testing	(senior, Asia)	$ 8,750.00	250	$35.00
Project Management (US)		$ 69,000.00	500	$138.00
Total Personnel Cost		$ 109,225.00		

Cloud per month	
Virtual Hardware	$ 320.00
Software	$ 350.00
Total Cloud	$ 670.00
Total Projected Development Cost	$ 109,895.00

| Projected Annual Operating Costs	(20% development cost)
Personnnel	$ 6,520.00
Analysis	$ 720.00
Programmer	$ 5,800.00
Cloud per month	$ 670.00
Total Projected Operating Costs	$ 14,560.00

c. Feasibility Analysis
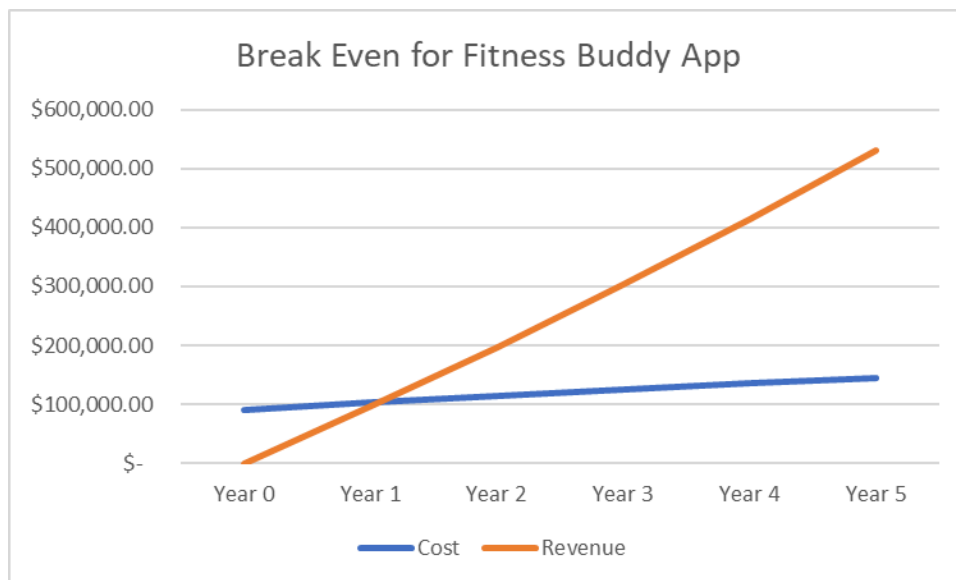
Assumptions:

- Discount rate: 5%
- Revenue growth: 10%

- ● Beer Hops Brewing App

	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
Net economic benefit (10% increase / annual)		$ 78,000.00	$ 85,800.00	$ 94,380.00	$ 103,818.00	$ 114,199.80
Discount rate (5%)	1.000	0.952	0.907	0.864	0.823	0.784
PV of benefits	$ -	$ 74,256.00	$ 77,820.60	$ 81,544.32	$ 85,442.21	$ 89,532.64
NPV of all benefits	$ -	$ 74,256.00	$ 152,076.60	$ 233,620.92	$ 319,063.13	$ 408,595.78
One-time cost	$ 72,634.00					
Recurring cost		$ 8,611.00	$ 8,611.00	$ 8,611.00	$ 8,611.00	$ 8,611.00
Discount rate (5%)	1.000	0.952	0.907	0.864	0.823	0.784
PV of recurring cost	$ -	$ 8,197.67	$ 7,810.18	$ 7,439.90	$ 7,086.85	$ 6,751.02
NPV of all costs	$ 72,634.00	$ 80,831.67	$ 88,641.85	$ 96,081.75	$ 103,168.61	$ 109,919.63

Overall NPV	$ 298,676.15
Overall ROI (Overall NPV / NPV of all costs)	2.72

Break even for Beer Hops Brewing App
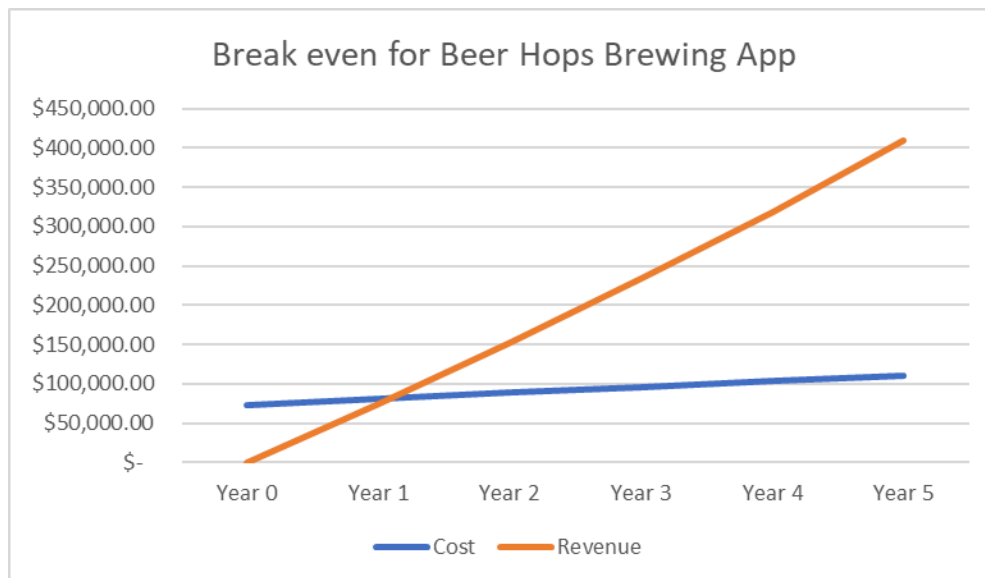
- Fitness Buddy App

	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
Net economic benefit (10% increase / annual)		$ 101,298.00	$ 111,427.80	$ 122,570.58	$ 134,827.64	$ 148,310.40
Discount rate (5%)	1.000	0.952	0.907	0.864	0.823	0.784
PV of benefits	$ -	$ 96,435.70	$ 101,065.01	$ 105,900.98	$ 110,963.15	$ 116,275.36
NPV of all benefits	$ -	$ 96,435.70	$ 197,500.71	$ 303,401.69	$ 414,364.84	$ 530,640.19
One-time cost	$ 90,625.00					
Recurring cost		$ 12,660.00	$ 12,660.00	$ 12,660.00	$ 12,660.00	$ 12,660.00
Discount rate (5%)	1.000	0.952	0.907	0.864	0.823	0.784
PV of recurring cost	$ -	$ 12,052.32	$ 11,482.62	$ 10,938.24	$ 10,419.18	$ 9,925.44
NPV of all costs	$ 90,625.00	$ 102,677.32	$ 114,159.94	$ 125,098.18	$ 135,517.36	$ 145,442.80

Overall NPV		$ 385,197.39
Overall ROI (Overall NPV / NPV of all costs)		2.65

Break Even for Fitness Buddy App

- Better Budget App

	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
Net economic benefit (10% increase / annual)		$ 90,450.00	$ 99,495.00	$ 109,444.50	$ 120,388.95	$ 132,427.85
Discount rate (5%)	1.000	0.952	0.907	0.864	0.823	0.784
PV of benefits	$ -	$ 86,108.40	$ 90,241.97	$ 94,560.05	$ 99,080.11	$ 103,823.43
NPV of all benefits	$ -	$ 86,108.40	$ 176,350.37	$ 270,910.41	$ 369,990.52	$ 473,813.95
One-time cost	$ 109,895.00					
Recurring cost		$ 14,560.00	$ 14,560.00	$ 14,560.00	$ 14,560.00	$ 14,560.00
Discount rate (5%)	1.000	0.952	0.907	0.864	0.823	0.784
PV of recurring cost	$ -	$ 13,861.12	$ 13,205.92	$ 12,579.84	$ 11,982.88	$ 11,415.04
NPV of all costs	$ 109,895.00	$ 123,756.12	$ 136,962.04	$ 149,541.88	$ 161,524.76	$ 172,939.80

Overall NPV	$ 300,874.15
Overall ROI (Overall NPV / NPV of all costs)	1.74

Break Even for Better Budget App
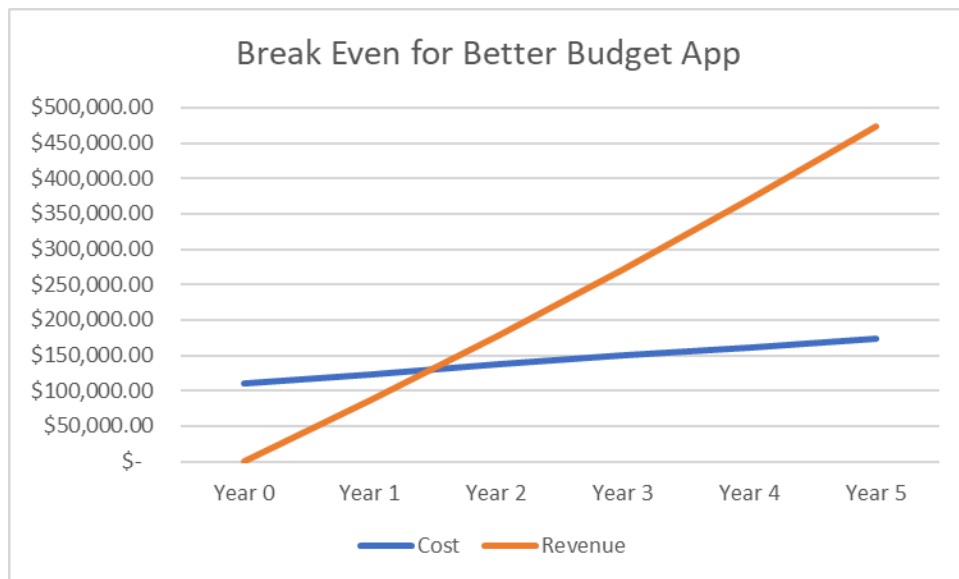
2. Weighted-approach technique analysis

Criteria	Weight	Beer Hops Brewing App		Fitness Buddy App		Better Budget App	
1: lowest-5: highest		Rating	Score	Rating	Score	Rating	Score
Financials	50%	4	2	2	1	3	1.5
Technology Learning	20%	3	0.6	3	0.6	3	0.6
Ease of development	20%	5	1	3	0.6	1	0.2
Market growth	10%	1	0.1	3	0.3	2	0.2
TOTAL	100%	13	3.7	12	2.5	10	2.5

F. SELECTION AND JUSTIFICATION

1. Beer Hops Brewing App is the solution

From the market observation and competitor analysis, Beer Hops Brewing is the selected application to develop. The app helps solve several problems, both long-term and short-term:

- **Demand**: in the pandemic, bars and pubs are not open. Liquor stores access are also limited. The situation will likely last for at least an additional year while off-premises alcohol sales are up. The demand for craft beer is rising for consumption by 16.3% *(VinePair.com).*

- **First mover**: for most users, the largest obstacle is to find the right ingredients and brewing tools to make their desired beers. Most apps do not offer such supply, which can hinder users' interest to find every different ingredient. Our beer app acts as a bridge to connect suppliers and buyers and keep the sales commission.

- **Market creator**: we eventually aim to be a one-stop supplier in brewing industry. Besides ingredients, we can supply brewing tools not only for individual customers but also for bar owners, who need a wholesaler to diversity their menu and expand their brewing capacity.

- **Customer experience**: most applications do not offer detail instruction for beginners, leaving a huge barrier to ones who are interested in brewing. Our platform offers 1 on 1 instructional videos for subscribed users who are interested in making beer. Likewise, instructors also support professional craft beer brewers to diversify their menu and experiment new tastes.

2. The future of the craft beer industry

"Craft beer was already becoming an increasingly competitive space prior to the pandemic, with record numbers of producers and competition from hard seltzers and canned cocktails" (brewerassociation.org). As of June 30th, 8,217 active craft breweries in the U.S., up from 7,480 during a comparable time frame last year.

The number of brewery permits submitted to the Tobacco Tax and Trade Bureau also grow by 219 breweries between quarter 2 and 3 (VinePair.com). Therefore, there is a significant shift from on-premises beer consumption to craft beer brewing and our application will seize this opportunity to grow.

3. Product differentiation strategy

With the initial aim to serve individual segment, the Beer app focuses on Differentiation Focus strategy, where we offer distinctive solution for individual users.

We envision that if the model is successful, we can expand our warehouse to supply ingredients and brewing tools directly to customers who demand such special ingredients. Thereby, our business model will be shifting from focus to Differentiation.

Since the market is small, we diversify the sources of income to fund our business:

- Subscription
- Sales commission
- Tutorial video commission for instructors
- Advertising
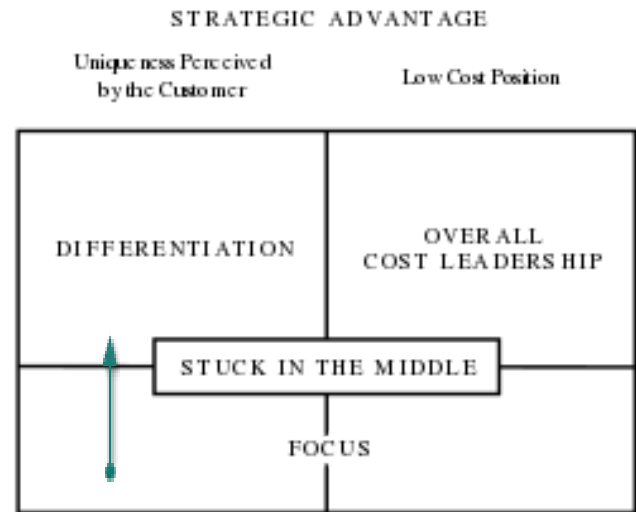
4. Technological learning and challenges

- **Technology difficulty**: The Beer Hops Brewing app has the lowest technological challenges among 3 apps. Most of requirements exist in the app development industry, such as online market, video depository, Bluetooth connection.

- **Development period**: the demand shift is occurring from on-premises to off-premises consumption and it may not last more than 1 more year. Therefore, selecting an app with simple design and requirements are crucial to assure rapid development and on time roll out.

- **Technology learning**: there will be continuous learning for CT Consulting Group since we envision to expand business from retailer to wholesaler. The feature roll-out schedule will be in the below order

Phase	Tasks	Timeline
Phase 1	- Ingredient and recipe database - Online market for ingredient - Video tutorial for subscribed users	4 months
Phase 2	- Online market for brewing tool	2 months
Phase 3	- Launch app in other countries' market	6 months

- **Application environment**: Beer Hops Brewing App will connect with IoT devices allowing users to precisely control the brewing process. The app will synchronize and save progress across platforms, connect with smart home speakers to remind the brewing progress, with smart thermometers to monitor brewing temperature, connect with warehouse system for shipment and ingredient suppliers.


5. SWOT analysis for Beer Hops Brewing App

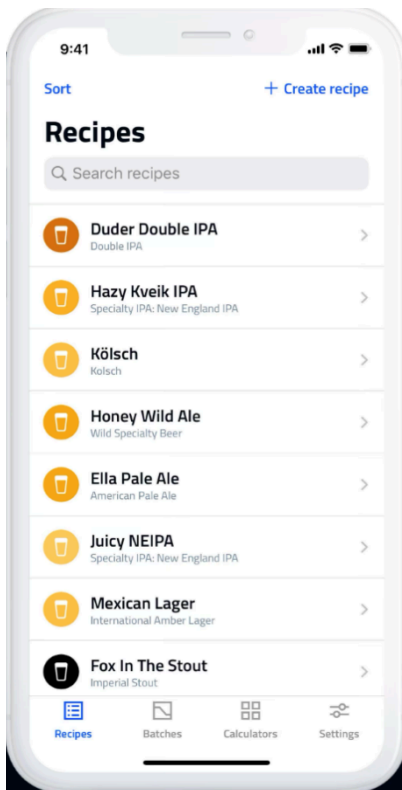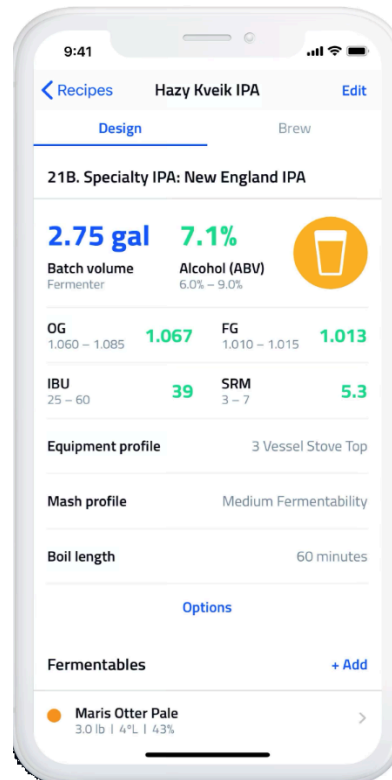| Strength	Weakness
- Integrate with home device to remind users about brewing timeline - Synchronize progress across devices - Share brewing status with other users	- Slow to pick up demand - Small market size - Most users are not aware of self-brewing. - Bottled beer still has a high market share
Opportunity	**Threat**
- Be the first mover and market creator for ingredients and brewing tool supply - First to offer 1 on 1 instructional video to attract new users - Low app development challenge	- Ability to find ingredient suppliers - Ability to find brewing instructor - There are free brewing app offering basic functions

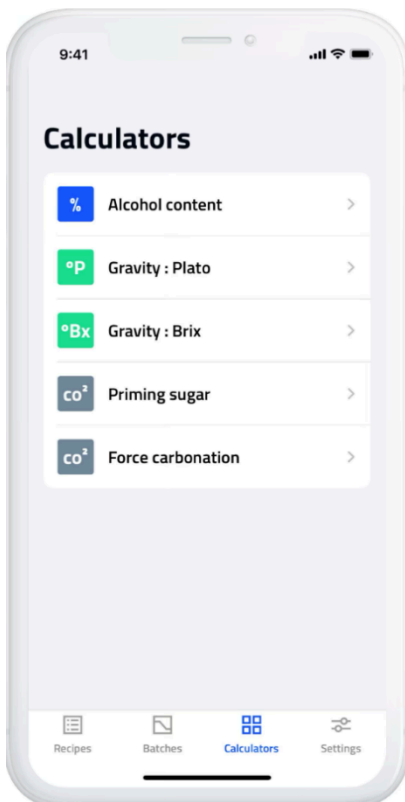## G. DIALOGUE SEQUENCE & WIREFRAME
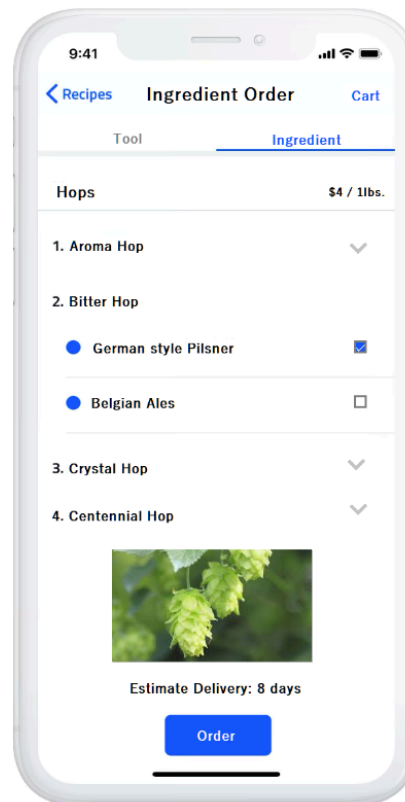
1. Diagram
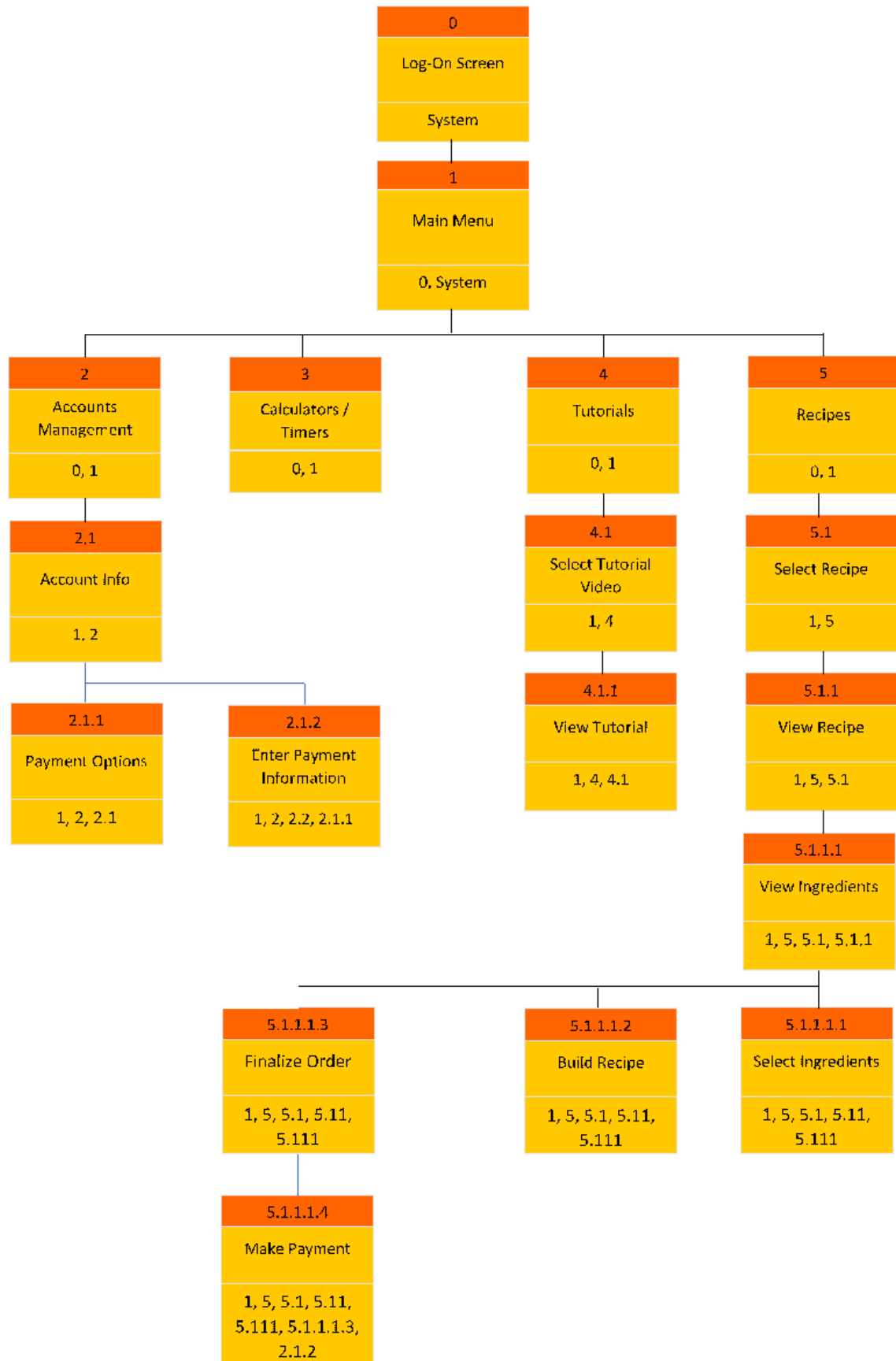
2. App Wireframe

Recipes screen

Ingredient screen

Calculator screen

Ingredient Order screen

H. CLASS DIAGRAM

Visual Paradigm Standard (Kkol Bit (CCSU))

Dry Malt Extract
-Amount

Liquid Malt Extract
-Amount

Grain
-Weight
-Type

Sugar
-Amount

0..* consisting of

0..* consisting of

0..* consisting of

0..* consisting of

0..*

0..*

0..*

0..*

Fermentables
-Original gravity : int
-°L : int

1..*

Order

Order
-Orderid : int
-Quantity : int

Yeast
-attenuation : int
-Lowest_temperature : int
-Highest_Temperature : int
-PPM : int
-Liquid : boolean

1..* Order 0..*

Customer
-CustomerID
-Customer_First_Name : char
-Customer_Last_Name : char
-Subscriber : boolean
-Address : char

0..*

Brew

0..*

1..*

Beer
-ABV : int
-cost : double
-Beer Type : char

0..*

Order

Hops
-Alpha acids : int

1..*

Hop_Extract
-Type

Leaf
-Type

Pellet
-Brand

0..* Contained in

0..* Contained in 0..*

0..*

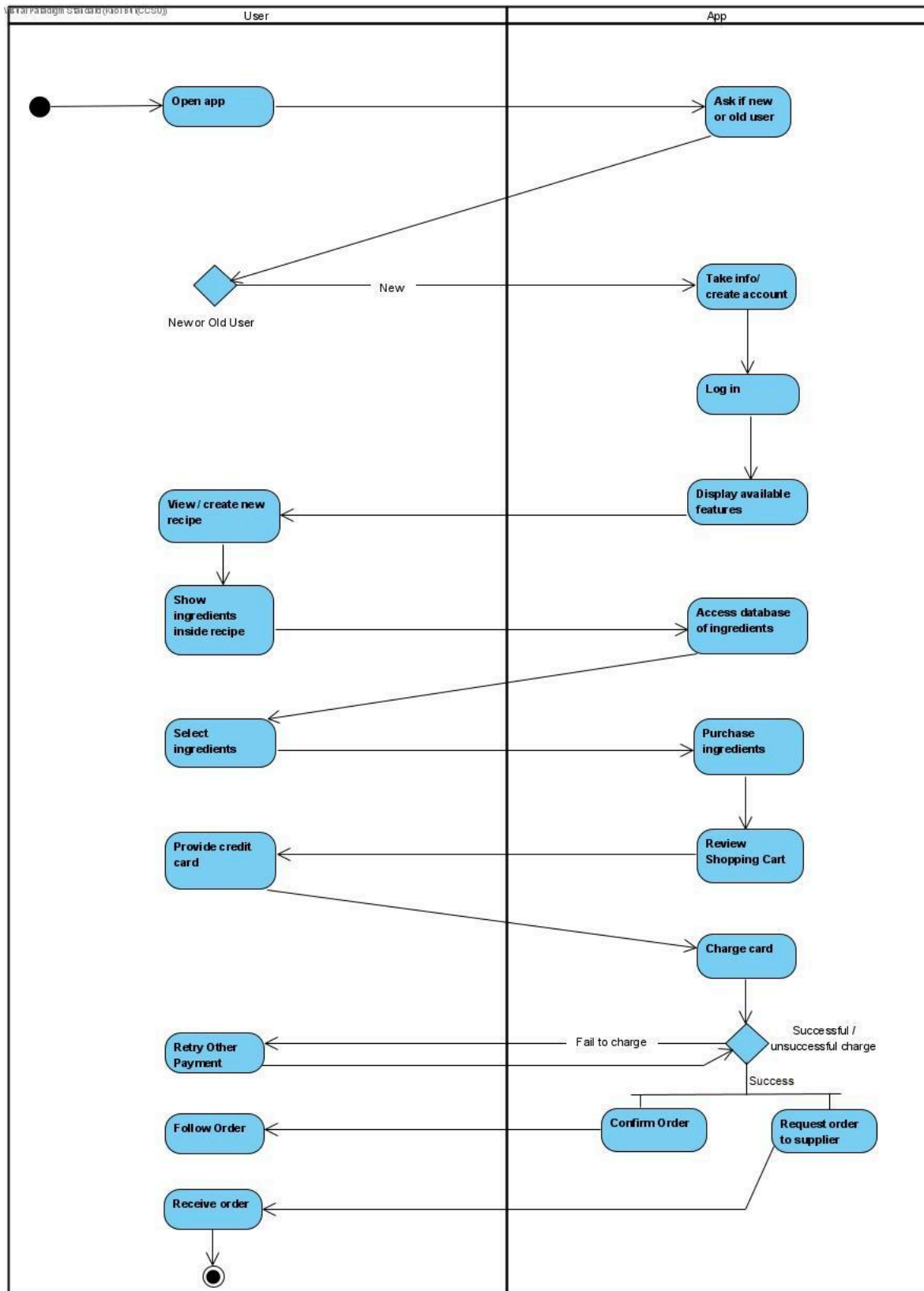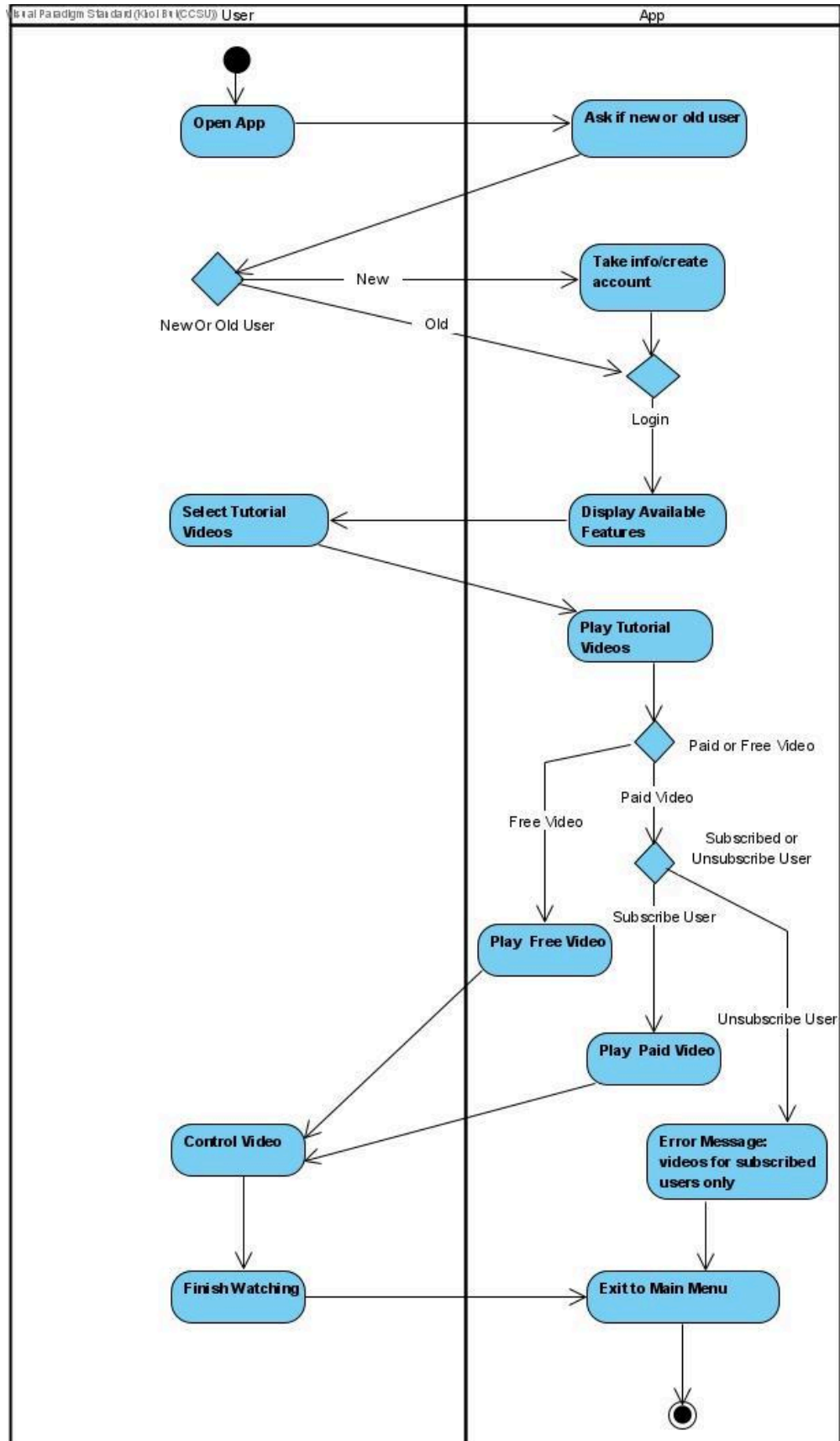0..* Contained in 0..*

I. ACTIVITY DIAGRAM

1. Ingredient Ordering Diagram

2. Playing instructional videos for subscribe / unsubscribe users

J. APPENDIX

BEER JUDGE CERTIFICATION PROGRAM
2015 STYLE GUIDELINES

Beer Style Guidelines

Copyright © 2015, BJCP, Inc.

2015_Guidelines_Beer
.pdf
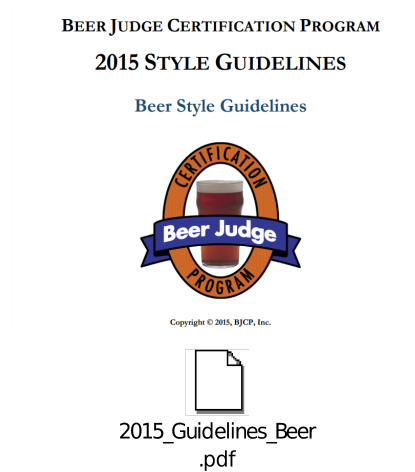
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