



# My Musical Life

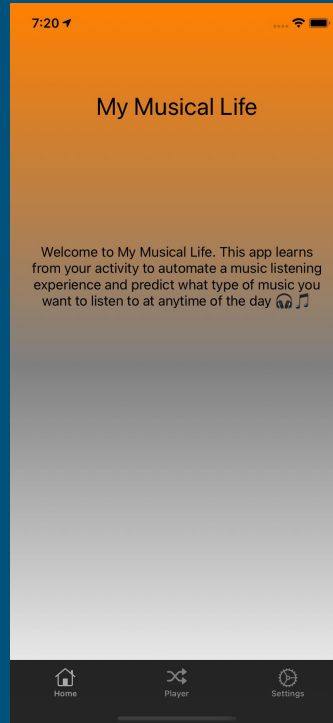
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**Team:** Chaz Clark, Christian Hernandez, Daksh Goel,  
Vatsal Bhatt, Vignesh Krishnan

**Advisor & Client:** Dr. Henry Duwe



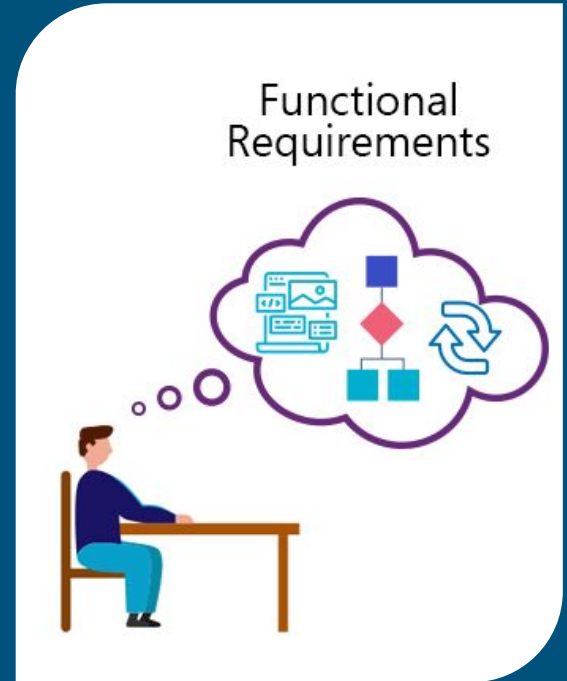
# Problem Statement



# Functional Requirements

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- User Data (from mobile device)
  - Location
  - Schedule
  - Day/Time
- Spotify Account - Premium
- Music Recommendations
- Mapping Sensor Inputs to Songs/Playlists



# Non-Functional Requirements

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- Security
  - User Data (SSL, TLS, WPA2)
    - Account logins
    - Location information
    - Calendar data
    - Music preferences
  - AWS Security
    - Database
    - Lambda authentication



# Technical Considerations

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- Application Platform
  - iOS - Apple mobile device
- Devices used for development
  - Apple's laptop devices running MacOS
- Data intensive
  - Non Personally Identifiable user data will be collected
- Data storage on cloud
  - Online cloud infrastructure - Amazon Web Services

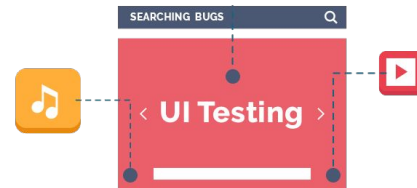


# SW/Technology Platform(s)

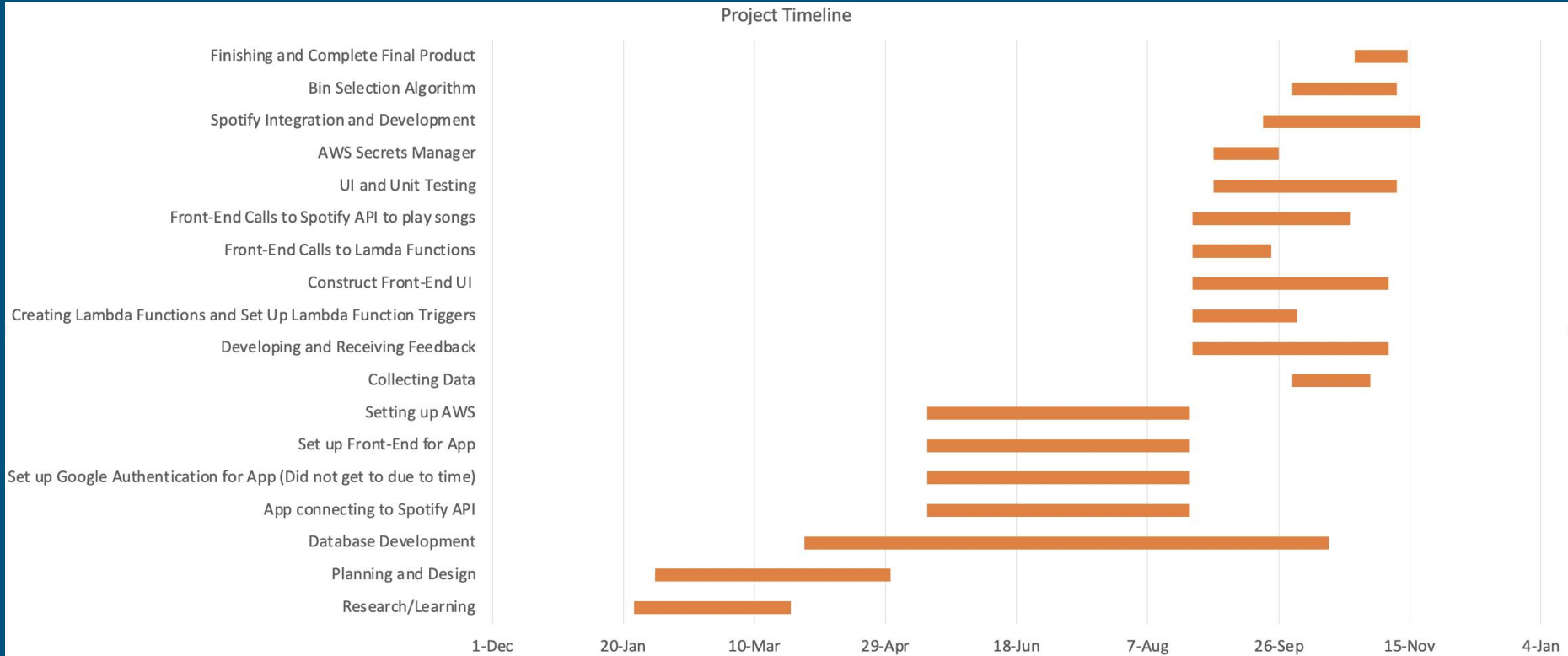
- IDE: Xcode
- Backend
  - Amazon Web Services
  - MySQL
- Programming Languages
  - Swift
  - Python
- Testing
  - UI Testing (Swift)
  - Unit Testing



Xcode



# Project Milestones & Schedule



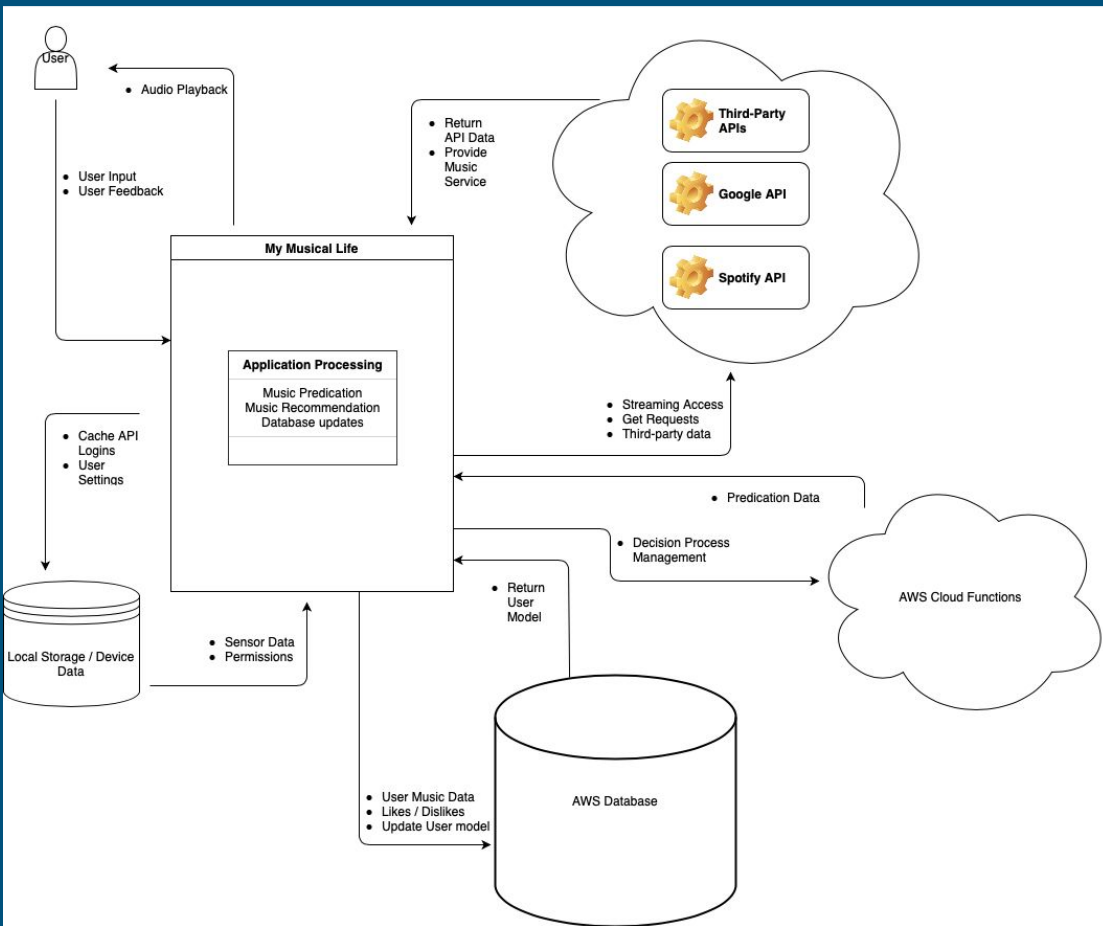


# System Design

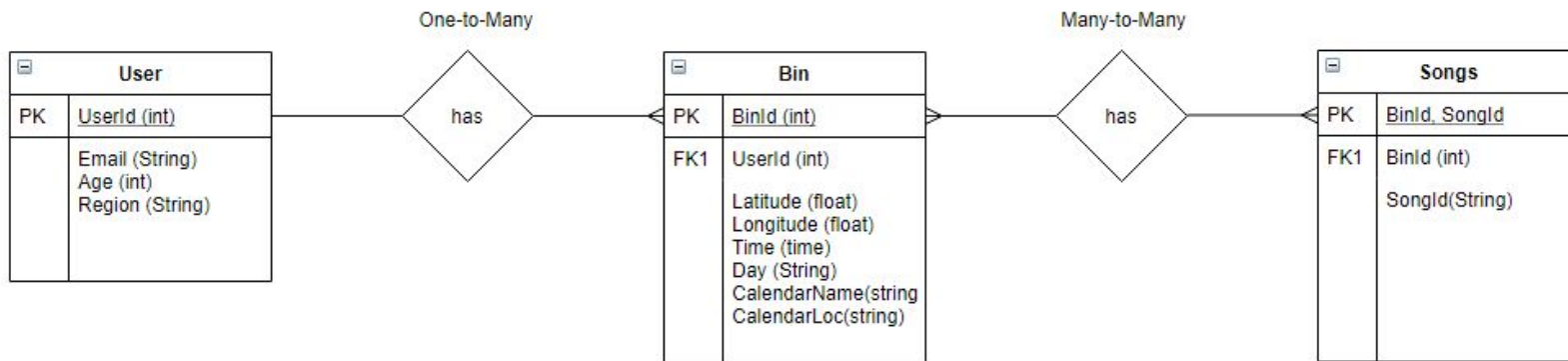
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# System Level Diagram



# Database Design



# Backend API

**Routes for Lambda REST API** Create

- ▼ /addbin  
| POST
- ▼ /addsong  
| POST
- ▼ /adduser  
| POST
- ▼ /auth  
| POST
- ▼ /getallusers  
| GET
- ▼ /getuser  
| GET
- ▼ /recommend  
| POST
- ▼ /selectbin  
| POST

Lambda > Functions

Functions (12) Last fetched 20 seconds ago Refresh Actions Create function

	Function name ▲	Description	Runtime ▼	Code size ▼	Last modified ▼
<input type="radio"/>	Authentication		Python 3.8	110.4 kB	2 months ago
<input type="radio"/>	BinSelection		Python 3.8	109.0 kB	1 hour ago
<input type="radio"/>	GetAllUsers		Python 3.8	110.6 kB	2 months ago
<input type="radio"/>	GetUser		Python 3.8	110.3 kB	2 months ago
<input type="radio"/>	InsertBin		Python 3.8	111.3 kB	last month
<input type="radio"/>	InsertSong		Python 3.8	110.3 kB	2 months ago
<input type="radio"/>	InsertUser		Python 3.8	110.3 kB	2 months ago
<input type="radio"/>	Recommend		Python 3.8	1.1 MB	yesterday

# Backend Authentication

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**Amazon API  
Gateway**

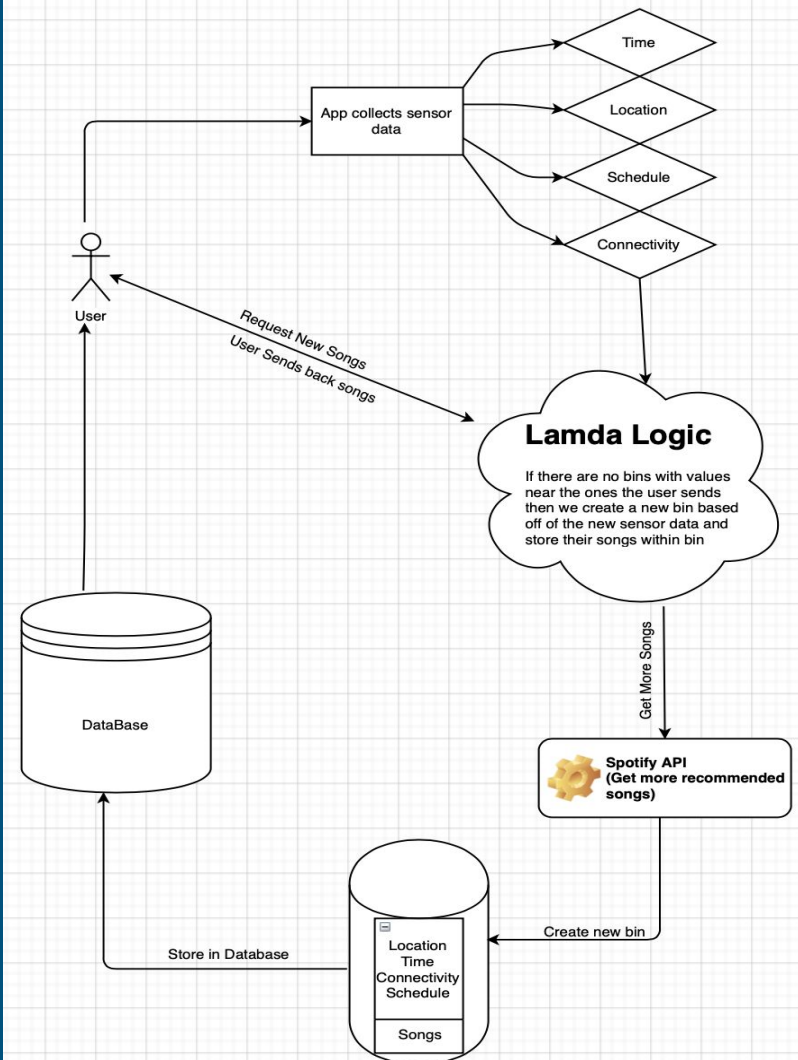


**Auth0**

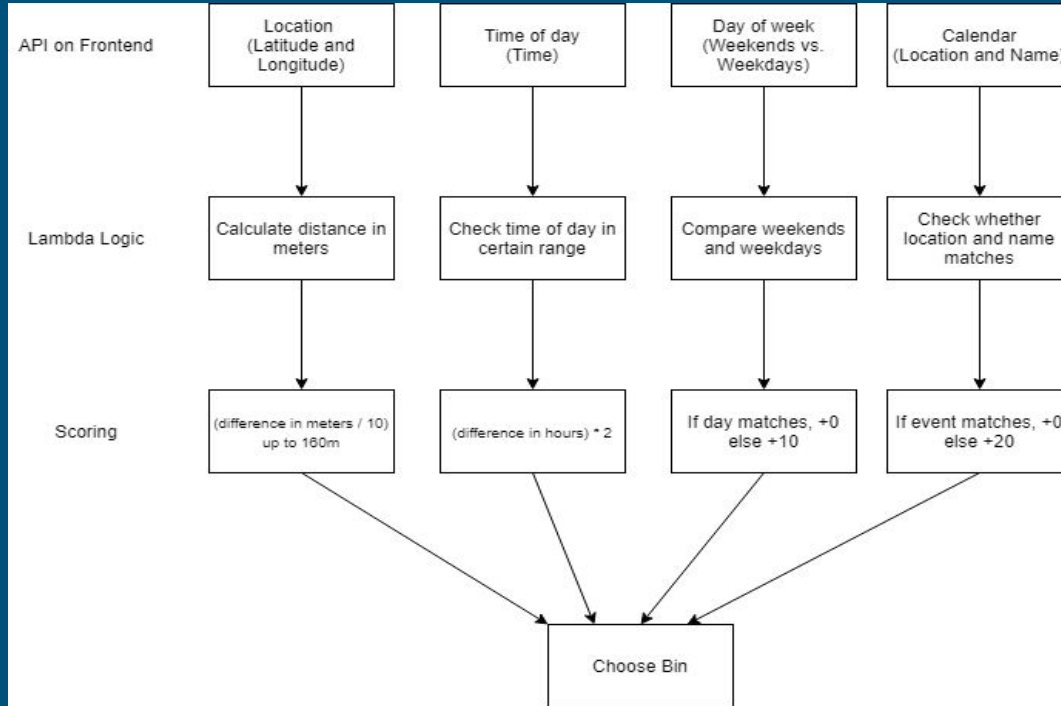
**{ REST:API }**

# Bin Creation

- Asks User for a preferred Genre
- Collects Sensor Data
- Sends to Lambda Logic
- Calls Spotify API
- Creates bin from sensor data
- Returns songs



# Bin Selection Algorithm



Note: The bin with the lowest score is selected

# Bin Selection Algorithm

	Calendar Name	Calendar Location	Day	Time	Lat, Long	
Curr	Study	Empty	Thursday	14:00	42.027663, -93.649007	
BIN A	Study	Parks Library	Tuesday	15:30	42.028006, -93.648444	
SCORING:	+0, Direct Match	+10, comparing to Empty	+0, Both are weekdays	+4, 2 hour diff	+6.2, 62 meters apart	<b>Total: 20.2</b>

Curr	Study	Empty	Thursday	14:00	42.027663, -93.649007	
BIN B	Workout	State Gym	Monday	19:00	42.024487, -93.653691	
SCORING:	+20, no match	+10, comparing to Empty	+0, Both are weekdays	+10, 5 hour diff	+16(max), > 160 meters	<b>Total: 56</b>

Curr	Study	Empty	Thursday	14:00	42.027663, -93.649007	
BIN C	Party	Home	Friday	18:30	42.021881, -93.648845	
SCORING:	+20, no match	+10, comparing to Empty	+10, Fri is weekend, Thurs is weekday	+8, 4 hour diff	+16(max), > 160 meters	<b>Total: 64</b>

# Bin Selection Algorithm

	Calendar Name	Calendar Location	Day	Time	Lat, Long	
Curr	Workout	State Gym	Tuesday	18:30	42.024511, -93.653978	
BIN A	Study	Parks Library	Tuesday	15:30	42.028006, -93.648444	
SCORING:	+20, no match	+20, no match	+0, Both are weekdays	+6, 3 hour diff	+16(max) > 160 meters	<b>Total: 62</b>

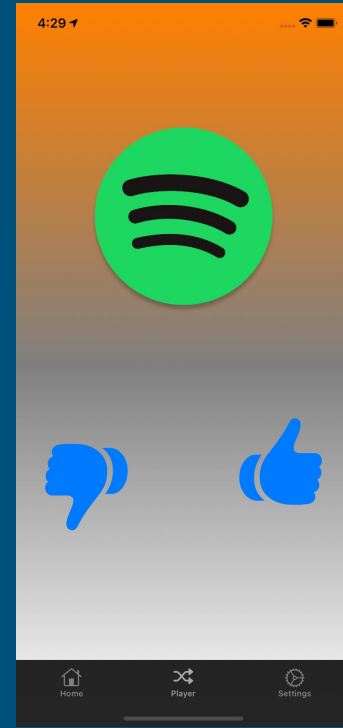
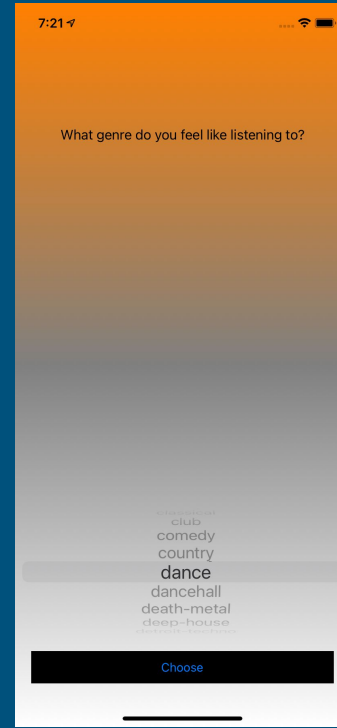
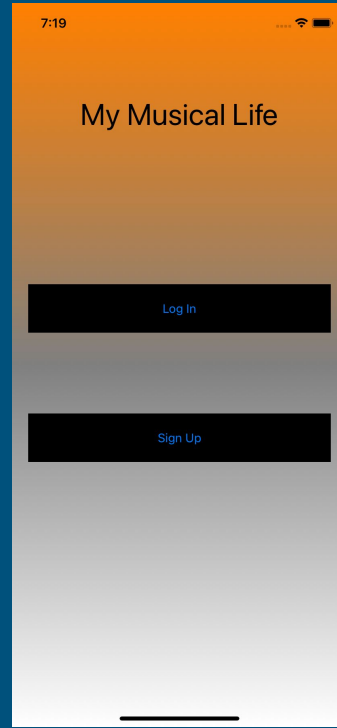
Curr	Workout	State Gym	Tuesday	18:30	42.024511, -93.653978	
BIN B	Workout	State Gym	Monday	19:00	42.024487, -93.653691	
SCORING:	+0, direct match	+0, direct match	+0, Both are weekdays	+0, 0 hour diff	+2.3, 23 meter difference	<b>Total: 2.3</b>

Curr	Workout	State Gym	Tuesday	18:30	42.024511, -93.653978	
BIN C	Party	Home	Friday	18:30	42.021881, -93.648845	
SCORING:	+20, no match	+20, no match	+10, Fri is weekend, Thurs is weekday	+0, 0 hour diff	+16(max), > 160 meters	<b>Total: 66</b>



# Front End

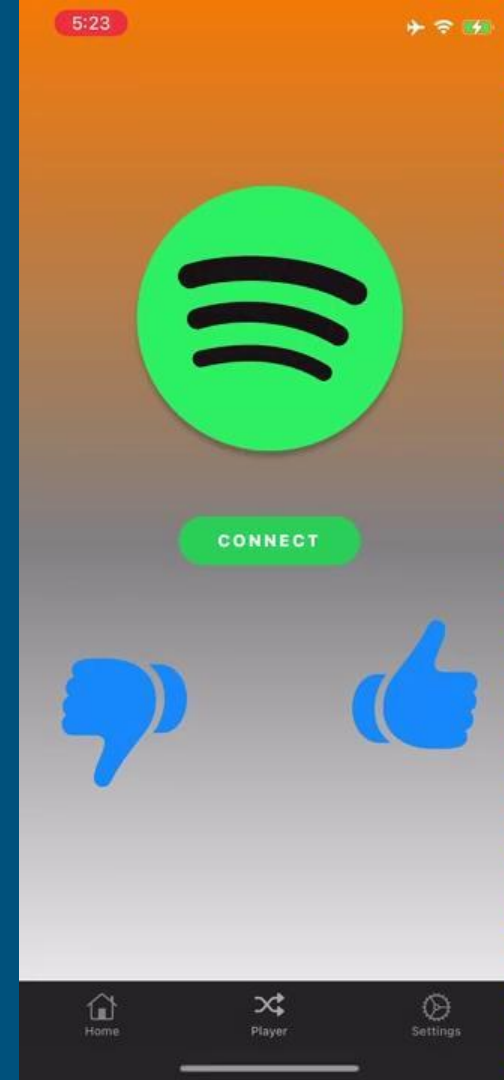
- Authenticated Log In / Sign Up
- New Bin Selection
- Spotify Player
- Feedback Mechanism



# Demo

- Login Authentication
- Gathers Sensor Data
- Finds bin with closest matching data (lowest score)
- Returns bin
- Recommend songs based off of Bin

	Binid	Userid	DayOfTheWeek	Latitude	Longitude	TimeOfDay	Calendar_Location	Calendar_Name	Genre
▶	115	93	1	-88.2622	-88.2622	17:21:00	Test	Senior Design Test	dance
	116	93	5	-90	-88.6488	20:30:00	Home	Party	pop
	117	93	2	-90	-90.6488	21:30:00	Gym	Workout	dub



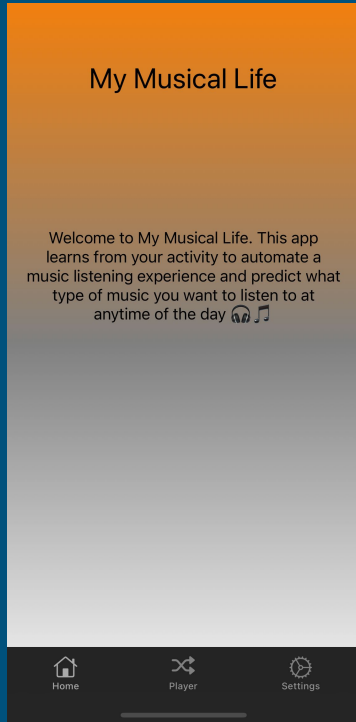
# Testing

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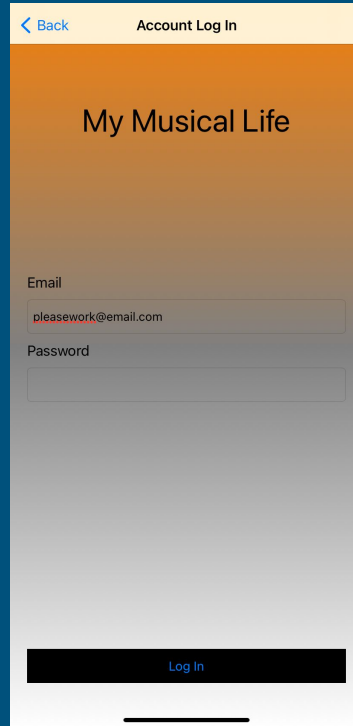
- Unit Testing
- UI Testing
- `iOSSnapshotTestCase`
- Bin Selection Algorithm Testing

# Testing con.

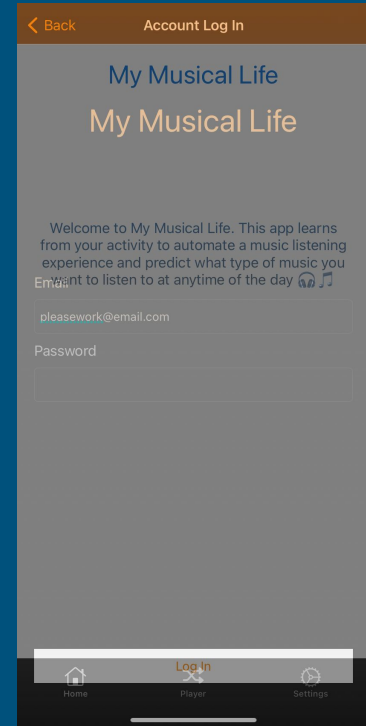
## Reference



## Failed

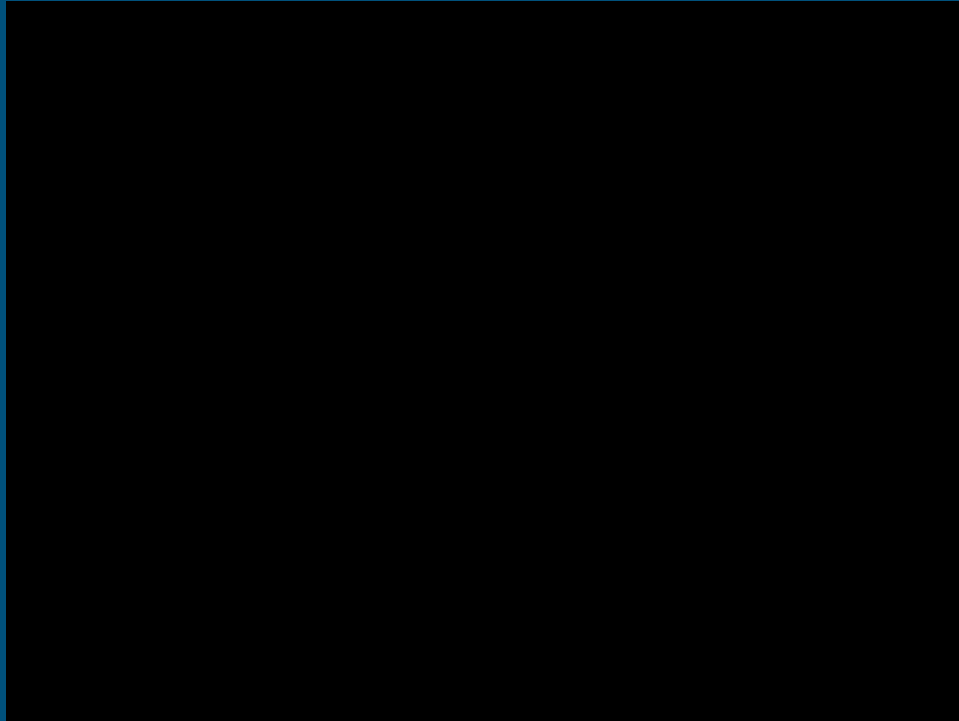


## Diff



# Testing Demo (iOSSnapshotTestCase)

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# Task Responsibilities/Contributions

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- Christian

- UI tests and unit tests
- Monitoring GitLab and Project Management
- Helped with UI and Bin Selection algorithm

- Vignesh

- Backend REST API
- REST API Authentication
- API Integration w/ Frontend

- Chaz

- Swift Network / API Development
- Bin Selection Integration
- Sensor Data Collection

- Vatsal

- Frontend Development
- Spotify API and Swift Integration
- Spotify Authentication
- AWS SecretsManager setup

- Daksh

- Lambda Functions
- Bin Selection Algorithm
- Database Design and Management

Thank You!

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# Questions?





# References

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[1] J. Crook, "Google Will Shut Down Songza App, Songza.com To Fold Into Google Play Music," TechCrunch, 02-Dec-2015. [Online]. Available: <https://techcrunch.com/2015/12/02/google-will-shut-down-songza-app-songza-com-to-fold-into-google-play-music/>. [Accessed: 24-Feb-2020].

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[5] [Dingbytes preview](<https://raw.githubusercontent.com/airpoint/Dingbytes/master/preview-mock.png>)

[6] "iOS App Testing Tutorial: Manual & Automation," *Guru99*, 24-Mar-2020. [Online]. Available: <https://www.guru99.com/getting-started-with-ios-testing.html>. [Accessed: 25-Apr-2020].

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[7] Guo, Bingkun, “iOS Security” *WUSTL*, 1-Dec-2014. [Online]. Available: [https://www.cse.wustl.edu/~jain/cse571-14/ftp/ios\\_security/index.html](https://www.cse.wustl.edu/~jain/cse571-14/ftp/ios_security/index.html). [Accessed: 25-Apr-2020].

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