

# The Problem



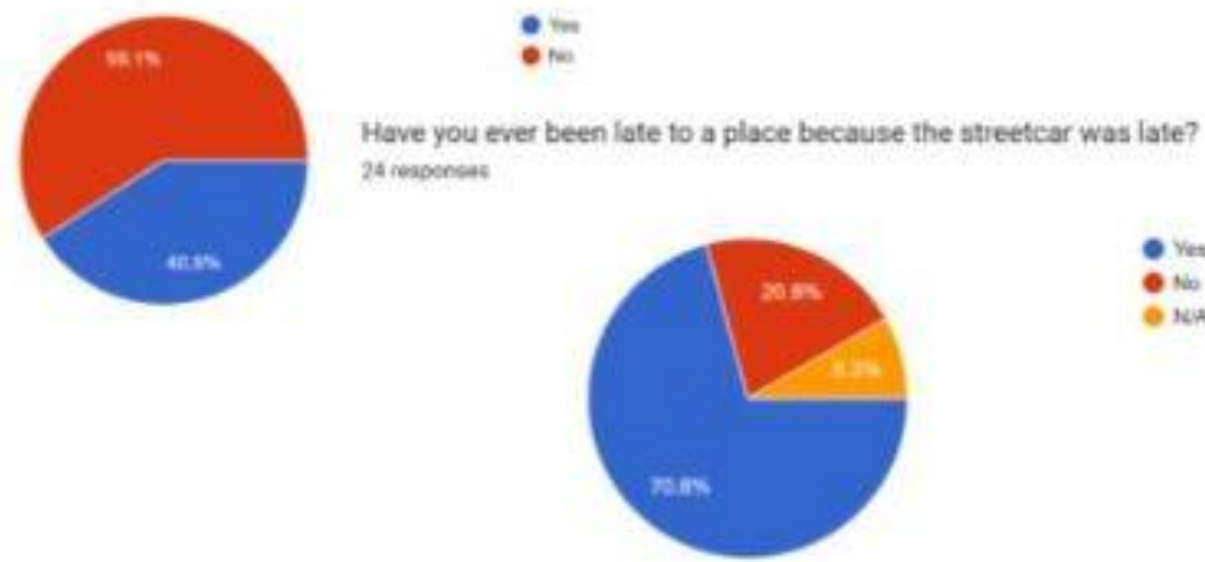
Meet Sergio

- ASU student who uses Tempe Streetcar **10+ times** per week
- Reports streetcar **delays**
- Delays causes **tardiness** to class or extended **wait times**

- 24** ASU students surveyed
- 71%** has been **late** to their destination because the **streetcar was late**
- 59%** said that the existing apps **did not** provide an **accurate** arrival time
- 86%** felt that there needs to be a **better way to track** the streetcar

If you answered yes on the previous question, do you think these apps provide an accurate time of arrival in general?

22 responses



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Mentor: Mr. John Lewis

# The Middle-Man

- Firestore Real-Time Database
- Stores and transmits **location data** to the user interfaces (UIs)
  - Enables **instant updates** to UIs
  - Reliable **cloud database** maintained by **Google**
  - Secure data transmission** using authenticated channels

# The Housing

- Custom **3D-printed case**
- Compact and lightweight**
- Access holes for **GPS antenna** and **power supply**
- Ventilation slots** to prevent **overheating**



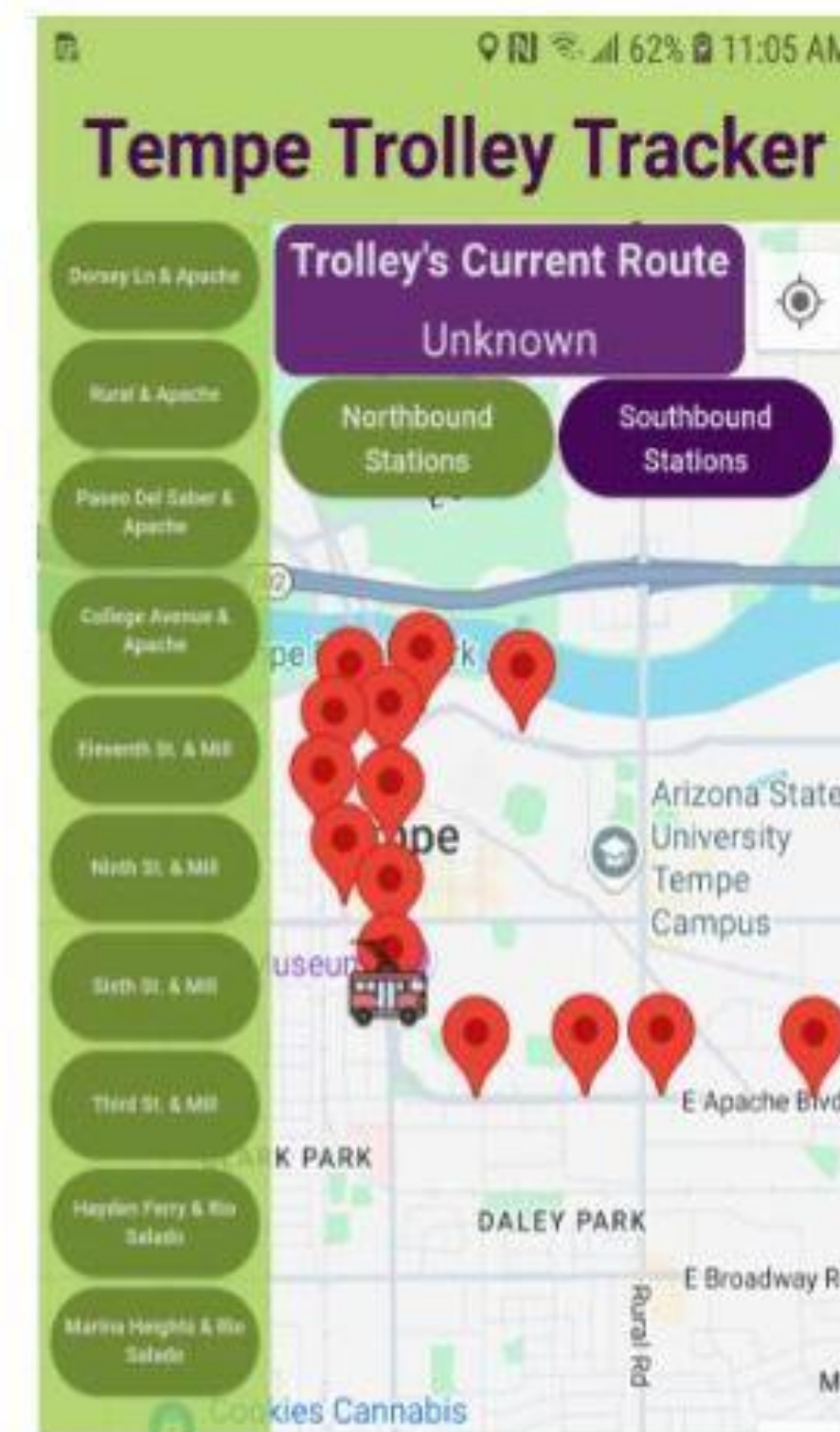
# The Approach

- Budget of **\$200**
- Timeline of **7 months**
- GPS tracking module collects **location data** from the Tempe Streetcar
- Mobile application and website **displays** Streetcar **location** and estimated arrival times (**ETAs**)
- Real-time **database** stores tracker data and **sends it to the app and website**
- Custom 3D-printed case** protects the hardware



- ## The Brains
- T-SIM7000G Microcontroller**
- Collects real-time **GPS data** from the Tempe Streetcar
  - Equipped with a **GPS antenna** for **accurate** location tracking
  - Wi-Fi compatibility** using a mobile **hotspot** for stable communication
  - All powered by a **5V DC supply**

# The Interface



- Designed for **users to view the Tempe Streetcar's real-time location**
- Displays which **route the streetcar is currently on**
- Google Maps** integration for **intuitive interface**
- QR code** included for **quick and easy access to website**

# Conclusions

- | Lessons   | Results   |
|---|---|
| <ul style="list-style-type: none"> <li>Be ready to <b>pivot</b></li> <li>Communication is <b>key</b></li> <li>Coordinating work between <b>teammates</b></li> <li>Presenting our solution to <b>Valley Metro</b></li> </ul> | <ul style="list-style-type: none"> <li>Successfully <b>tested on the streetcar</b></li> <li><b>On schedule</b> delivery</li> <li>Used <b>entire budget</b></li> </ul> |

Special thanks to Valley Metro