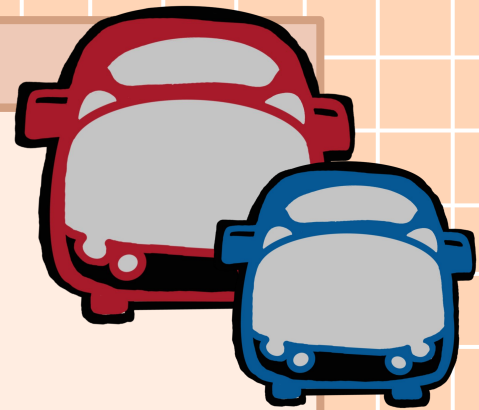


# BUSTING BUS BUNCHING



21st century solutions for bus bunching





## The Problems with Bus Bunching



- **Overcrowding**
- **Long Wait Times and Delays**
- **Poor Overall Level of Service**





## Identifying Solutions



1. Live geolocation mobile app
2. Removal of static timetables and fixed schedules
3. Reduction of on-street parking to quickly deploy new bus lanes
4. Better signage for passenger embarking and disembarking



## Mobile App



- Utilize existing MTA Infrastructure (GPS/Geolocation) to create a dynamic map
- RFID contingency for uptime and operational continuity
- Borough dispatch relays instructions based on incoming data
- Sensors under seats to provide live seat count data



# Calculating Distance

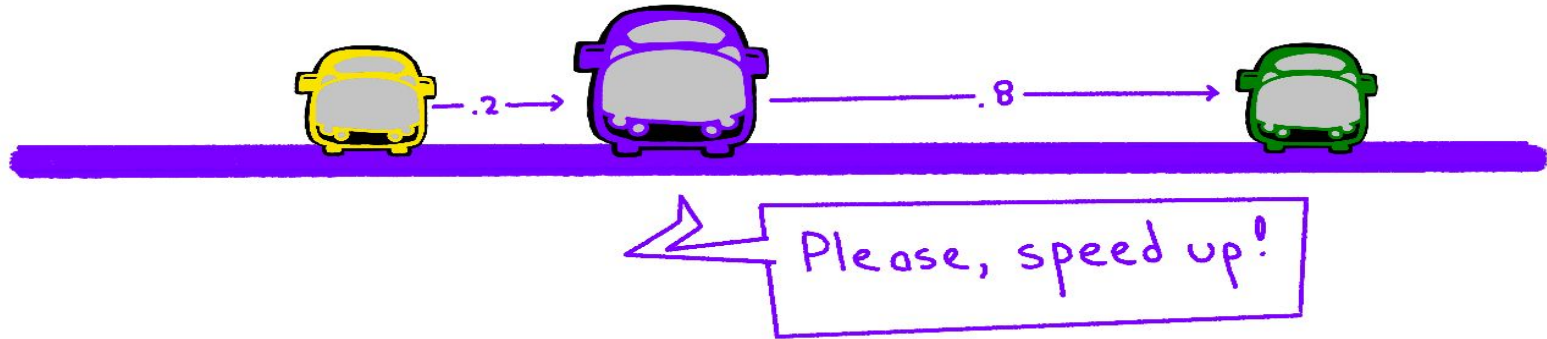


```
Start Page x PolymorphismExample.java x BusBunching.java x DriversInstructions.java x
Source History
47 System.out.println("Log in");
48 System.out.print("Please, enter your username: ");
49 username1 = scnr.nextLine();
50 System.out.print("Please, enter your password: ");
51 password1 = scnr.nextLine();
52
53 if (username.equals(username1) && password.equals(password1)) {
54     System.out.println("You have successfully logged in!");
55 }
56 else {
57     System.out.println("Login failed!");
58 }
59 }
60 }
61 public class BusBunching {
62
63     public static void main(String[] args) {
64         LoginForDrivers d1 = new LoginForDrivers();
65
66         d1.driversRegistration();
67         System.out.println("_____");
68         d1.Login();
69         System.out.println("_____");
70         DriversInstructions case1 = new DriversInstructions(8.6, 13);
71
72         case1.distancesBtwBusses();
73
74     }
75 }
76
77
78
```

busbunching.BusBunching > main >

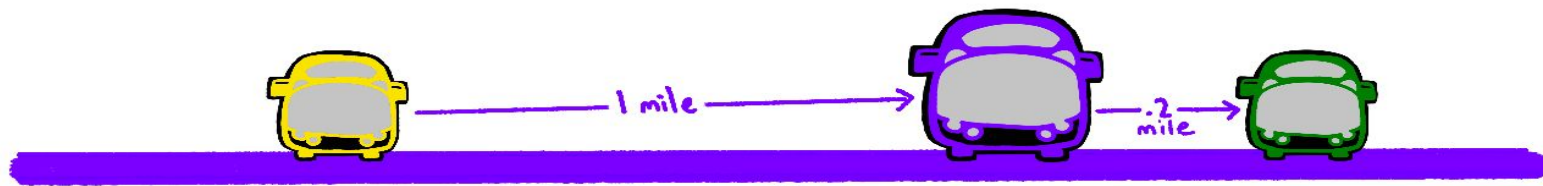


## Managing Distance





# Managing Distance



Please wait  
2 MIN at the  
next stop!



# Mobile App



DRIVER  
VIEW



OPERATOR  
VIEW

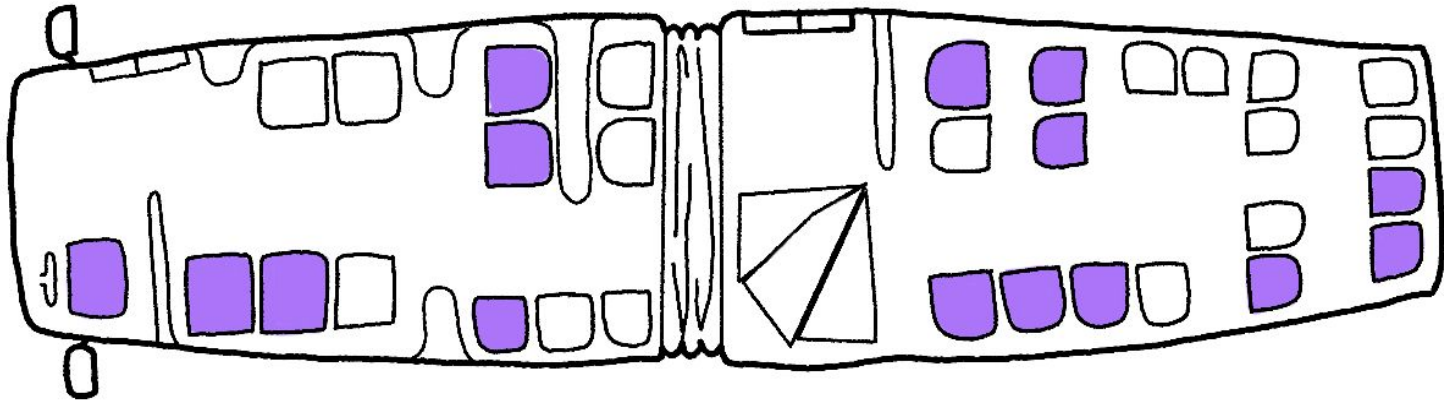
Click links to interact with mock designs







## Real-Time Seating Info



■ Occupied

□ Seat available



## Removal of Static Timetables



- Removing fixed static scheduling
- 20th Century artifact
- Going “With the Flow” of traffic
- Adapting to 21st Century passenger behaviour

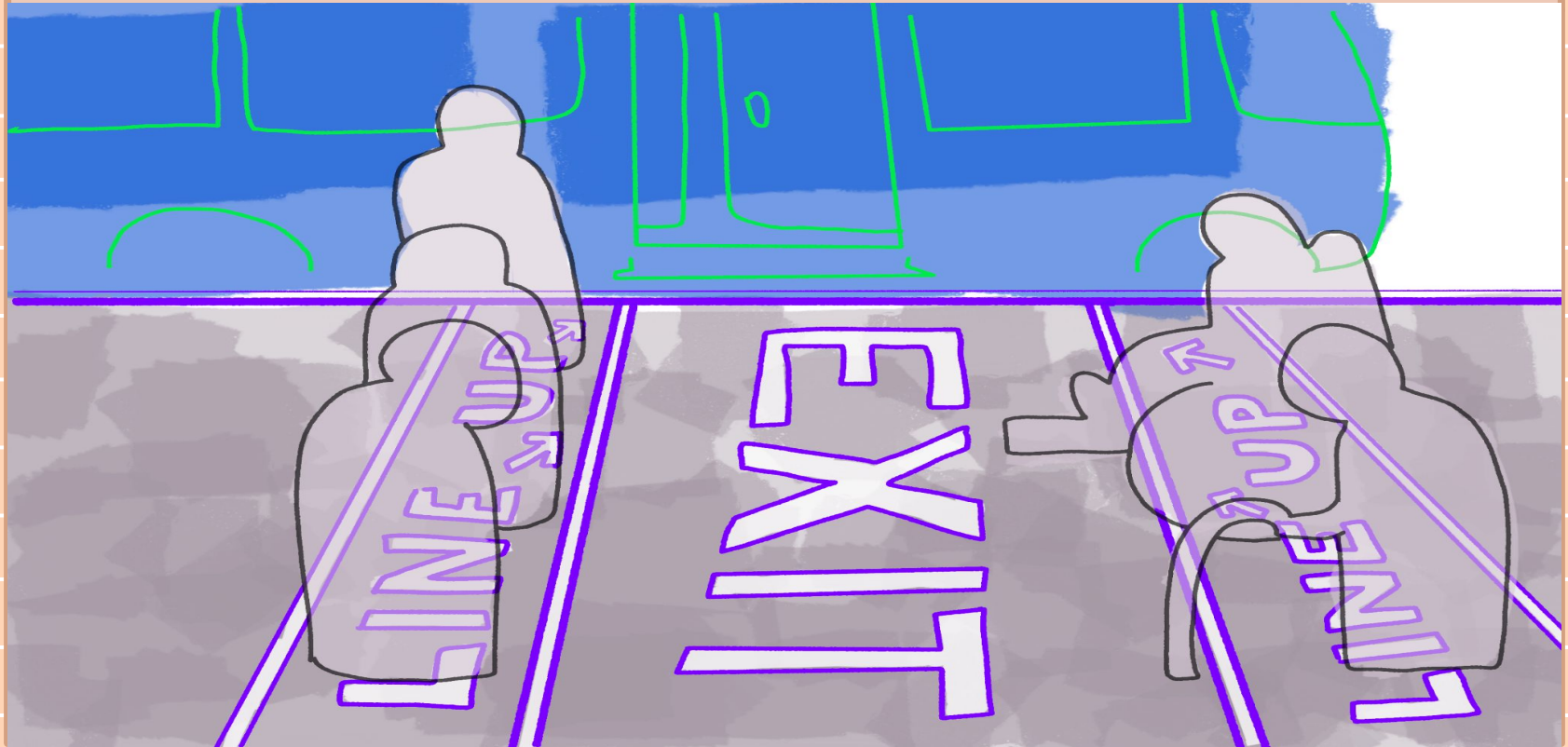


## Reduction of On-Street Parking





## Improved Signage





## Concluding Thoughts

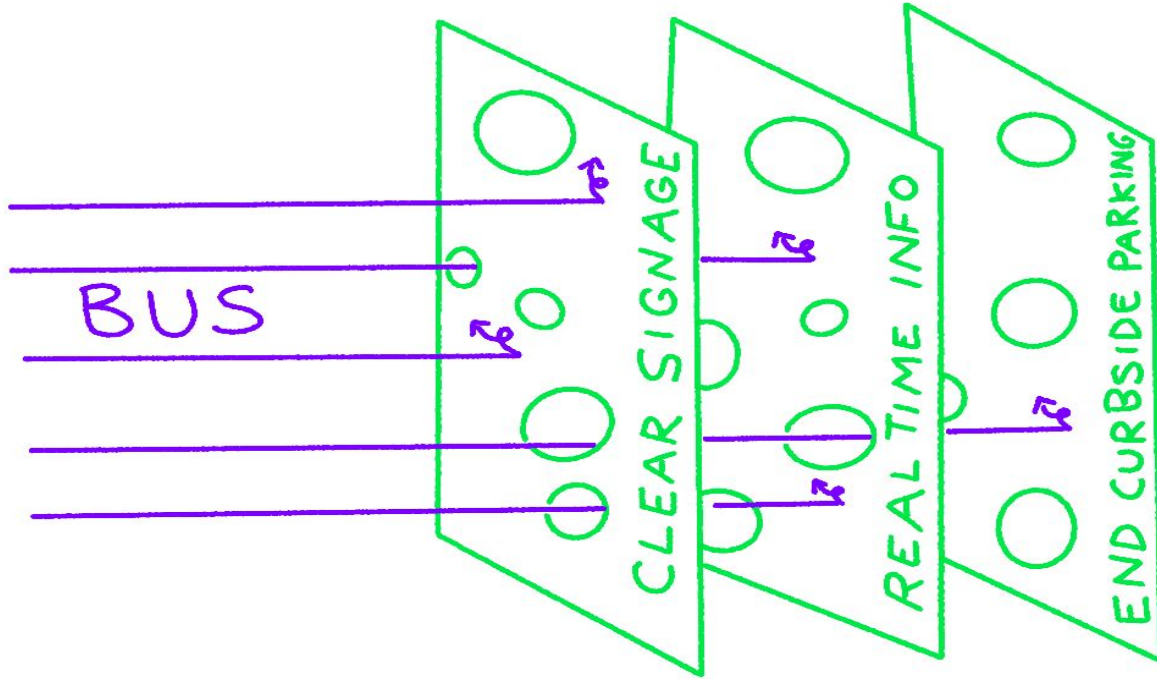


- Individually these solutions are okay, but exceptionally strong together
- Contingencies and fail-safes for continuity
- “Swiss Cheese Model”





# “Swiss Cheese” Model



BUNCHING



## Works Cited



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- Martinez, Daniel. Can Buses Run More Efficiently Without A Schedule? Metro Wants To Test It Out / LAist
- NYC Open Data
- Traffic Light Optimization with low penetration rate vehicle trajectory data / Nature Communication Mag



# THANK YOU!

## Team 38

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  - Angela Cruz
- 