**Requirements Table**

|  |  |
| --- | --- |
| **Requirement** | **Description** |
| R1: Q3, Q8 | The BusInfo system must store a timetable for each bus route which indicates when the scheduled departure times are for each of the bus stops.  It must also indicate if each journey is going forwards or backwards in the route. Timetables are fixed and do not change even if a bus is out of schedule. |
| R2: Q4, Q5, Q7 | The BusInfo system must uniquely identify each bus and bus stop. A bus route is also assigned a unique numerical identifier. |
| R3: Q1, Req Spec 3.1 | Human controllers must be able to add new buses but not remove them using the BusInfo system. |
| R4: Q2, Req Spec 3.1 | Busses must be labeled as either in or out of service. An out of service bus is one that’s not operational and cannot have a driver or route assigned. This is modified via the BusInfo system. |
| R5: Q6, Req Spec 3.1 | Drivers must be able to be added and assigned a bus and the bus to a route that they are responsible for as well as reassigning a route to a bus throughout it’s lifetime after the prior assignment has expired. This assignment is done through the BusInfo system by the HC. |
| R6: Q12, Q18, Req Spec 3.1 | BusInfo must allow for the HC to cancel a journey being done by a particular bus as well as reassign a bus to do a journey on a different route. The driver can contact the HC over the phone in the event of bus malfunction. |
| R7: Req Spec 3.1 | BusInfo must let the HC view a route’s timetable and all the running journeys on a given route as well as displaying a bus’ stats like the time and date of the last stop if the bus is doing a journey. |
| R8: Q18, Q29, Req Spec 3.2 | @bus has an interface which lets the driver indicate a journey has started, ended or is canceled. When starting, a route must be chosen. If canceled, passengers are not charged for the journey. Journeys are stored locally and sent to the central system at each stop the bus calls at.  The interface consists of a button to start the journey, one to indicate the journey is finished and one to indicate the bus is malfunctioning and the journey needs to be canceled. At the start, the driver must input the route number through a small keypad.  If a journey is canceled, passengers are informed and journey data is uploaded at the depot. Card scanning is disabled once the journey is canceled. |
| R9: Q15, Q20, Q27, Req Spec 3.2 | Passengers swipe their RFID card on the entrance reader which makes a happy beep and green light if it has enough money or red light and angry beep if not.  A card is valid if there is enough money for the maximum travel charge from the person’s starting stop to the end of the route. Debts of $1 are allowed.  If a card is not valid, drivers will deny entrance to the passenger and not allow them to board. |
| R10: Q15, Q21, Req Spec 3.2 | Passengers swipe their card on the exit reader to charge them the cost of the journey which is shown on a screen and is calculated using the bus stops at which they entered and exited.  If passenger doesn’t swipe their card at the exit reader, they are charged the maximum amount relative to the stop they got on and the last stop of the route. Busses restart the route at the last stop but passengers are asked to get off at the last stop. If they want a return journey, they must re-enter once the new journey is started. |
| R11: Q13, Q12, Q22, Q23, Req Spec 3.2 | @bus stores and dynamically updates the balance on each passengers card. The only way to travel on the bus is with a travel card, people cannot buy tickets on the bus. It also stores where they entered and exited a bus.  This data is stored locally until the next stop of the route where the data is sent to the central server. When starting a new journey, after data has been uploaded, local bus storage is deleted. |
| R12: Q25, Q30, Req Spec 3.2 | Bus stops must connect to the bus’ transponder and exchange data like the bus identifier, journey, route they are making and the current time. The passenger data is also sent through stops to the central server.  If the transponder is malfunctioning, the driver is alerted so they can get the HC to arrange a replacement bus and set the bus as being out of service. |