The Oyster Card Problem

You are required to model the following fare card system which is a limited version of London's Oyster card system. At the end of the test, you should be able to demonstrate a user loading a card with £30, and taking the following trips, and then viewing the balance.

1. Tube Holborn to Earl's Court
2. 328 bus from Earl's Court to Chelsea
3. Tube from Earl's court to Hammersmith

Operation

- When the user passes through the inward barrier at the station, their oyster card is charged the maximum fare.
- When they pass out of the barrier at the exit station, the fare is calculated and the maximum fare transaction removed and replaced with the real transaction (in this way, if the user doesn't swipe out, they are charged the maximum fare).
- All bus journeys are charged at the same price.
- The system should favour the customer where more than one fare is possible for a given journey. E.g. Holburn to Earl's Court is charged at £2.50.

Assume stations zones are as follows:

Station	Zone(s)
Holborn	1
Aldgate	1
Earl's Court	1, 2
Hammersmith	2
Arsenal	2
Wimbledon	3

Assume fares are as follows:

Journey	Fare	Example
Anywhere in Zone 1	£2.50	From Holborn to Aldgate
Any one zone outside zone 1	£2.00	From Arsenal to Hammersmith
Any two zones including zone 1	£3.00	From Hammersmith to Holborn
Any two zones excluding zone 1	£2.25	From Arsenal to Wimbledon
More than two zones (3+)	£3.20	From Wimbledon to Aldgate
Any bus journey	£1.80	Earl's Court to Chelsea

Other Considerations

- Any bus journey costs a flat rate of £1.80 regardless of the journey stations.
- The maximum possible fare is therefore £3.20

Assessment Criteria

Points you will be assessed on:

- Following the Operational requirements
- A working solution which meets the requirements.
- Testing methods and coverage.
- Design, Approach, and Elegance of Solution.