Verification Score Card(First Pass)

| System Requirements | Vehicle Reqs | Score Rubric | Score |
|---|---|---|---|
| Average Time to Recharge Vehicle | <=40min | -3% for each more min | 10 |
| Load | >=2 Trash Bag | 50% for each bag | 10 |
| Stopping Precision | <=6inch | 0%/100% | 10 |
| Average Time for Vehicles to travel to T-cans | <=15min | -5% for each more min | 10 |
| Price for each vehicle | <=$500 | -10% for each more $100 | 10 |
| The average usage time for each vehicle after recharge | >=4h | -10% for each less 10 min | 10 |
| The service life period of each vehicle | >=5years | - 25% for each less year | 10 |
| Number of People to Maintain | <=3people | -20% for each more person | 10 |

Prototype Requirements Correlation

| Vehicle ReqsCorrelation ----> User Needs | Req 1 | Req 2 | Req 3 | Req 4 | Req 5 | Req 6 | Req 7 | Req 8 | Weight |
|---|---|---|---|---|---|---|---|---|---|
| Clean | 1 | 3 | 9 | 3 | | | | | 5 |
| Cheap | | 1 | | | 9 | | 1 | 3 | 3 |
| Convenient | 3 | 3 | 1 | | | | | 9 | 4 |
| Frequent | 9 | 3 | | 9 | | 9 | | | 5 |
| Reliable | 3 | | 3 | 3 | | 3 | 3 | | 4 |
| Long-Term | | | | | | | 9 | | 2 |
| Safe | | | | | | 1 | 3 | | 5 |
| Importance | 74 | 55 | 61 | 72 | 27 | 62 | 48 | 45 | 444 |

Determine Scaled Points

| | Unscaled | Scaled | Rounded | Points(100) |
|---|---|---|---|---|
| **Requirement 1** | 10 | 16.7% | 17.0% | 17 |
| **Requirement 2** | 10 | 12.4% | 12.0% | 12 |
| **Requirement 3** | 10 | 13.7% | 14.0% | 14 |
| **Requirement 4** | 10 | 16.2% | 16.0% | 16 |
| **Requirement 5** | 10 | 6.0% | 6.0% | 6 |
| **Requirement 6** | 10 | 14.0% | 14.0% | 14 |
| **Requirement 7** | 10 | 10.8% | 11.0% | 11 |
| **Requirement 8** | 10 | 10.1% | 10.0% | 10 |
| **Total** | | 100.0% | 100.0% | |

Verification Score Card (Updated)

| System Requirements | Vehicle Reqs | Score Rubric | Score |
|---|---|---|---|
| **Average Time to Recharge Vehicle** | <=40min | -3% for each more min | 17 |
| **Load** | >=2 Trash Bag | 50% for each bag | 12 |
| **Stopping Precision** | <=6inch | 0%/100% | 14 |
| **Average Time for Vehicles to travel to T-cans** | <=15min | -5% for each more min | 16 |
| **Price for each vehicle** | <=$500 | -10% for each more $100 | 6 |
| **The average usage time for each vehicle after recharge** | >=4h | -10% for each less 10 min | 14 |
| **The service life period of each vehicle** | >=5years | - 25% for each less year | 11 |
| **Number of People to Maintain** | <=3people | -20% for each more person | 10 |

The average recharge time for each vehicle is related to cheap, convenient, frequent, and reliable,

as when vehicles are recharging, it cannot carry and transport garbage bags. The time of <= 40min is

requirement, as the market of vehicles with <=$500.  So, the requirement 1 has 1 on clean, 3 on

convenient, 9 on frequent, and 3 on reliable. The load of vehicles is related to clean, convenient, cheap,

and frequent. If the load is more, the campuses need to buy less vehicles and the vehicles need less

frequency to do the same job. The load of 2 bags is requirement, as this load decrease the number of vehicles that required, and also increase working efficiency with less energy. So, requirement 2 has 3 on clean, 1 on cheap, 3 on convenient, and 3 on frequent. Stopping precision is related to clean, convenient, and reliable. If the vehicle cannot stop precisely, the trash-can will not push the trash bag on car which brings the problem of not clean and not reliable, and if it can park precisely, it do not need a person to help it to park. <=6inch is the requirement, as both the trash bags and car are much bigger than 6inch, so imprecision of 6 inch is acceptable. So, requirement 3 has 9 on clean, 1 on convenient, and 3 on reliable. The average time for vehicles to travel to T-cans is related to clean, safe, and frequent; as the trash bags around trash cans infect the school's environment, and <=15min is ideal because it is rare for trash cans to be refilled in 15mins. So, requirement 4 has 3 on clean, 9 on frequent, and 3 on reliable. The price for each vehicle is related to the user needs --cheap, as if the price for each vehicle is too expensive, no one will try to use this product. The price of <=$500 is reasonable in the market of t-cans and cars. So, requirement 5 has 9 on cheap. The average usage time for each vehicle after recharge is related to frequent, safe, and reliable, as when vehicles are recharging, it cannot carry and transport garbage bags, and it is dangerous to stop on the road. The time of >=4h is reasonable in the market of battery for cars with prices of less or equal $500.  So, requirement 6 has 9 on frequent, 3 on reliable, and 1 on safe. The service life period of each vehicle is related to cheap, reliable, and long-term. Because if the longer vehicles can be used, the less a campus needs to buy and the qualities of each vehicle can be guaranteed. >=5 years for service life period of each vehicle are ideal, as they are close to the average service life period of normal electronic cars (both batteries and motors). So, requirement 7 has 1 on cheap, 3 on reliable, 9 on long-term, and 3 on safe. The number of people to maintain is related to cheap and convenient. If the product needs a lot of people to maintain, the product will spend a lot of workers, and it has no advantages compared to campus maintains for now. The number of 3 people is reasonable, as the work for maintenance is not a lot. The only work for maintaining is

recharging vehicles and make sure that the system works well.  So, requirement 8 has 3 on cheap and 9

on safe.