Goal

Design and implement "Shipment Management" program with unit tests.

Problem Statement

Our firm has trading arrangement with a supplier to ship goods to us. As part of trade agreement, the supplier agrees to ship X metric tons of goods in N number of shipments. N can be one or more. The supplier can alter the shipments allowing her to split or merge shipments.

- **Split**
  Split operation on a shipment, would create more than one shipments with specified quantities. Sum of all child shipment quantities should be equal to parent shipment quantity.

- **Merge**
  Merge operation on more than one shipment, would create one child shipment with summed up quantity. Sum of all parent shipment quantities should be equal to child shipment quantity.

- **Change root quantity**
  This operation applies to trade. When trade quantity is changed, all shipment quantities should be updated proportionally.

A trade would always start with one shipment initially. This shipment quantity would be same as trade quantity. The shipments would grow in number based on splits / merges.

Evaluation Points

- Working Solution

- Requirement Analysis

- Design

- Test Coverage

- Code Quality

Split

```
        100
         |
  ┌──────┼──────┐
  ▼      ▼      ▼
 20     30     50
         │      │
         └───┬──┘
             ▼
```

Merge

```
            80
```

```
        200
         |
  ┌──────┼──────┐
  ▼      ▼      ▼
 40     60     100
         │      │
         └───┬──┘
             ▼
```

Increase root
quantity

```
            160
```

Decrease root
quantity

```
         50
         |
  ┌──────┼──────┐
  ▼      ▼      ▼
 10     15     25
         │      │
         └───┬──┘
             ▼
            40
```