Sample Problem 1: School Results Application
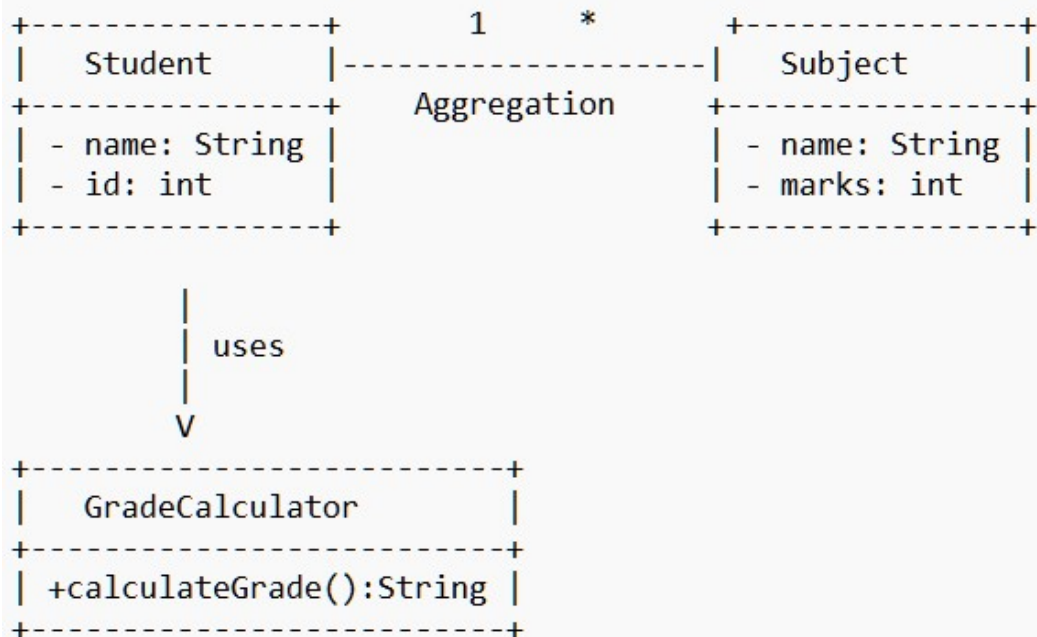
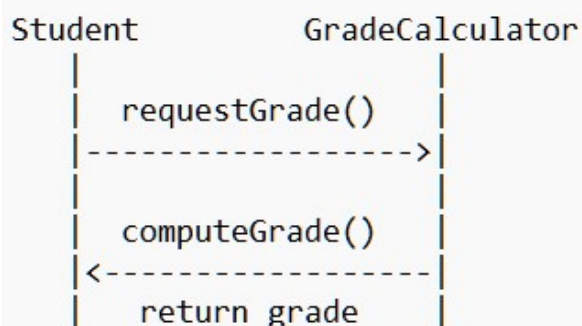```
> Class Diagram

+----------------+   1   *   +---------------+
| Student |--------------------------| Subject |
+----------------+   Aggregation   +---------------+
| - name: String | | - name: String |
| - id: int | | - marks: int |
+----------------+   +---------------+

        |
        | uses
        |
        V
+-------------------------+
| GradeCalculator |
+-------------------------+
| +calculateGrade():String |
+-------------------------+

> Object Diagram (Snapshot)

Student: John
|
+-- Subject: Maths
| marks = 90
||
+-- Subject: Science
       marks = 85

> Sequence Diagram

Student   GradeCalculator
    | |
    | requestGrade() |
    |------------------>|
    | |
    | computeGrade() |
    |<------------------|
    | return grade |
```

# Sample Problem 2: Grocery Store Bill Generation Application
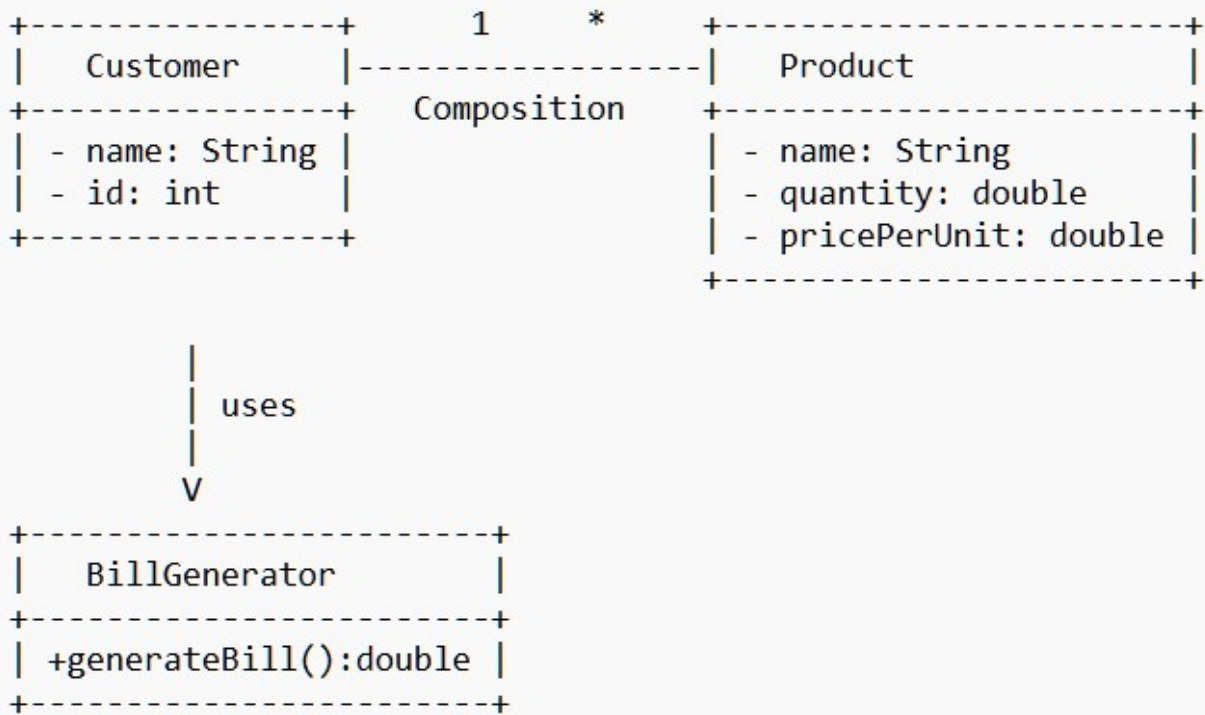
```
> Class Diagram

+----------------+   1   *   +--------------------------+
| Customer |-------------------| Product |
+----------------+   Composition   +--------------------------+
| - name: String | | - name: String |
| - id: int | | - quantity: double |
+----------------+ | - pricePerUnit: double |
                                     +--------------------------+

          |
          | uses
          |
          V
+------------------------+
| BillGenerator |
+------------------------+
| +generateBill():double |
+------------------------+

> Object Diagram (Snapshot)

Customer: Alice
|
+-- Product: Apples
| quantity = 2kg
| pricePerKg = $3
|
+-- Product: Milk
| quantity = 1L
| pricePerL = $2
|

> Sequence Diagram

Customer   BillGenerator
    | |
    | requestBill() |
    |---------------->|
    | |
    | generateTotal()|
    |<----------------|
    | return totalBill |
```
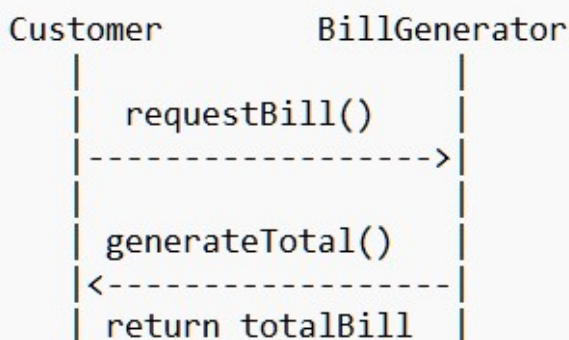
* Comparison Table *

| Feature | School Results Application | Grocery Store Bill Application |
|----------------------|----------------------------------------|----------------------------------------|
| Classes | Student, Subject, GradeCalculator | Customer, Product, BillGenerator |
| Relationships | Aggregation | Composition |
| Functionality | Calculate grade | Generate total bill |
| Key Entities | Students, Subjects, Grades | Customers, Products, Bills |