**Sample Problem 1: School Results Application**

1. Class Diagram

+------------------+ 1 \* +------------------+

| Student |---------------------->| Subject |

+------------------+ +------------------+

| - name: String | | - name: String |

| - id: int | | - marks: int |

+------------------+ +------------------+

|

| uses

v

+--------------------------+

| GradeCalculator |

+--------------------------+

| +calculateGrade(s:Student): String |

+--------------------------+

1. Object Diagram

Objects at a point in time:

+-----------------------+

| Student |

| name = "John" |

| id = 101 |

+-----------------------+

|

| has

v

+-------------------+ +--------------------+

| Subject | | Subject |

| name = "Maths" | | name = "Science" |

| marks = 90 | | marks = 85 |

+-------------------+ +--------------------+

1. Sequence Diagram (Grade Calculation Scenario)

Actor Student GradeCalculator

| | |

|---requestGrade()------------------->|

| |

| calculateGrade() |

|<--------------grade: "A"-----------|

| |

**Sample Problem 2: Grocery Store Bill Generation Application**

1. Class Diagram

+--------------------+ 1 \* +---------------------+

| Customer |-------------------->| Product |

+--------------------+ +---------------------+

| - name: String | | - name: String |

| | | - quantity: double |

| | | - pricePerUnit: double |

+--------------------+ +---------------------+

|

| uses

v

+------------------------------+

| BillGenerator |

+------------------------------+

| +generateBill(c: Customer): double |

+------------------------------+

1. Object Diagram

Snapshot of objects:

+------------------------+

| Customer |

| name = "Alice" |

+------------------------+

|

| has

v

+----------------------------+ +-----------------------------+

| Product | | Product |

| name = "Apples" | | name = "Milk" |

| quantity = 2.0 | | quantity = 1.0 |

| pricePerUnit = 3.0 | | pricePerUnit = 2.0 |

+----------------------------+ +-----------------------------+

1. Sequence Diagram

Actor Customer BillGenerator

| | |

|---checkout()------------------->|

| |

| generateBill() |

|<--------- total: $8 -----------|