City University

SE 416: Software Engineering Laboratory

Lecture 1 & 2

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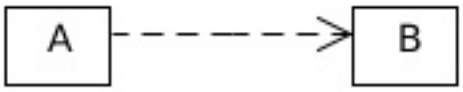
Relationships in UML

> *It is the messages sent among objects that give a system dynamic behavior, and these are represented in UML through the relationships among classes. There are four kinds of relationships.*

1. Dependency: A depends on B. This is a very loose relationship.




```
public class Customer {
    private String customerId;
    private String customerName;
    //getter and setter
    }
```

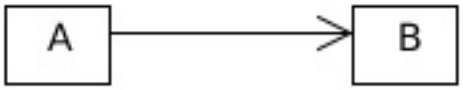
```
public class CustomerView {

    public void displayCustomer(Customer c){
        System.out.println("Customer Id:"+c.getCustomerId(
```

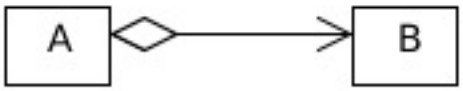
```
)+
                    " Customer Name:"+c.getCustomerName()+" "
                    );
    }
}
```

```
public class CustomerTest {
    public static void main(String[] args) {
        Customer richard = new Customer();
        richard.setCustomerId("C001");
        richard.setCustomerName("Richard");
        CustomerView cv = new CustomerView();
        cv.displayCustomer(richard);
    }
}
```

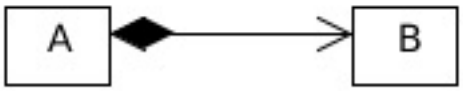
2. Association: A sends messages to a B. In programming terms, it means instances of A can call methods of instances of B, for example, if a B is passed to a method of an A.



3. Aggregation: An A is made up of B. This is a part-to-whole relationship, where A is the whole and B is the part. In code, this essentially implies A has fields of type B.



4. Composition: An A is made up of B with lifetime dependency. That is, A aggregates B, and if the A is destroyed, its B are destroyed as well.

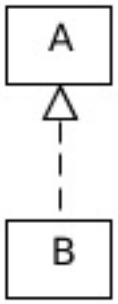


Two other important relationships deal with the relationship among classes.

1. Generalization: A generalizes B. Equivalently, B is a subclass of A. In Java, this is extends.

2. Realization: B realizes (the interface defined in) A. As the parenthetical name implies, this is used to show that a class realizes an interface. In Java, this is implements, and so it would

be common for A to have the «interface» stereotype.



Practice Problem

https://www.dariawan.com/tutorials/java/association-aggregation-and-composition-in-java/

http://www.cs.sjsu.edu/~pearce/modules/lectures/uml/class/association