

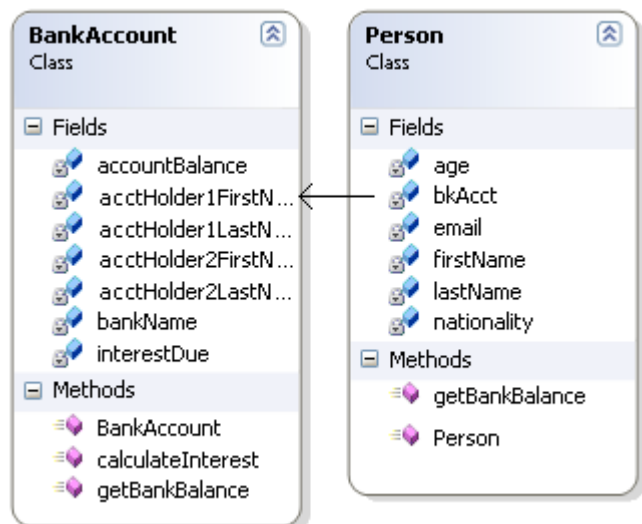
CSC 317 JAVA II

Week 2

Objectives:

1. How inheritance promotes software reusability.
2. To use keyword *extend* to create a class that inherits attributes and behaviors from another class.
3. To access superclass members with *super*

Composition Examples



```
public class BankAccount {
    private String acctHolder1FirstName;
    private String acctHolder1LastName;
    private String acctHolder2FirstName;
    private String acctHolder2LastName;
    private String bankName;
    private double accountBalance;
    private boolean interestDue = true;
```

```

    public BankAccount(String acctHldrFirst, String acctHldrLast, String bnkNm,
                       double alance, boolean intDue) {
        acctHolder1FirstName = acctHldrFirst;
        acctHolder1LastName = acctHldrLast;
        bankName = bnkNm;
        accountBalance = balance;
        interestDue = intDue;
    }
    public void calculateInterest() {
        if (interestDue) {
            //Calculate simple interest of 5%
            accountBalance = accountBalance * 1.05;
        }
    }
    public double getBankBalance() {
        return accountBalance;
    }
}

public class Person {

    private String firstName;
    private String lastName;
    private String nationality;
    private String email;
    private int age;

    private BankAccount bkAcct; //Object of type BankAccount

    public Person(String first, String last, int a, String nation, String eml, String bnkNm, double
                  bal, boolean b) {
        firstName = first;
        lastName = last;
        nationality = nation;
        age = a;
        email = eml;
        bkAcct = new BankAccount(first, last, bnkNm, bal, b);
    }

    public double getBankBalance () {
        return bkAcct.getBankBalance();//We access the BankAccount obj directly
    }
}

```

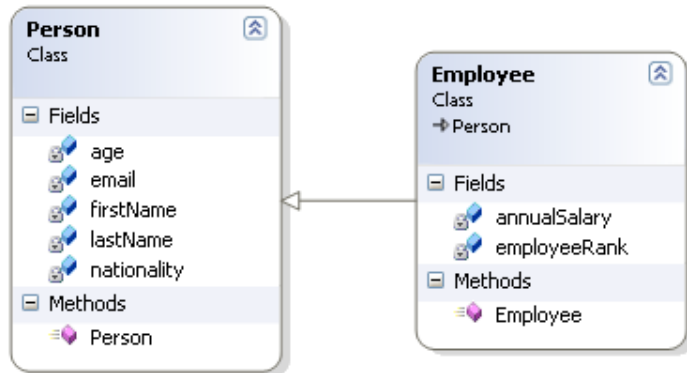
H/W Exercise – Composition

- Design and implement a DuAccount class to be used with Person, this new DuAccount class should calculate a customer's monthly "Du" bill according to the following criteria:
 - The monthly flat rate is AED 100.
 - A customer may have 5 TV channels at no extra charge but each additional channel incurs a charge of 10 Dirhams each.
 - Phone calls to landlines ('04') are free but calls to mobiles ('05') are charged at 0.5 Dirhams per minute.
- Since the DuAccount class is not directly accessible, design a test class to verify that DuAccount is working correctly.
- input for the test class might be something like this:-
 - The 3rd argument represents the number of TV channels, the 4th
 - argument indicates the number of minutes talking to '05' numbers

```
Person david = new Person("David", "Smith", 11, 25);
```
- The object's output should be formatted like this:

David Smith's Du bill for this month is AED 140.55

Inheritance Example



```
public class Employee extends Person {
    //the Employee subclass adds 2 extra fields
    private double annualSalary;
    private String employeeRank;
    public Employee(String first, String last, int a, String nation, String eml, double sal,
                    String rank) {
        super(first, last, a, nation, eml);
        annualSalary = sal;
        employeeRank = rank;
    }
}
```

H/W Exercise – Inheritance

Design and implement “Student class” derived from the “Person class”. The Student class should implements the following functionalities:

- I. A String array to store the completed courses.
- II. A String field to indicate level.
- III. A DisplayInfo method which display student information as following:

Student name: Jone Smith

Level: Second level

Complete courses: CSC 209, COA 101, CSC 303.

Please submit your answers as:

1. Class Diagrams.
2. Java source code.
3. Screen capture of the output.

Note:

The mark for this exercise will constitute part of the final grade.