

Object Oriented Methods with UML



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Implementation of OO designs in
C++

***Teaching Methodology: Flipped
classroom***

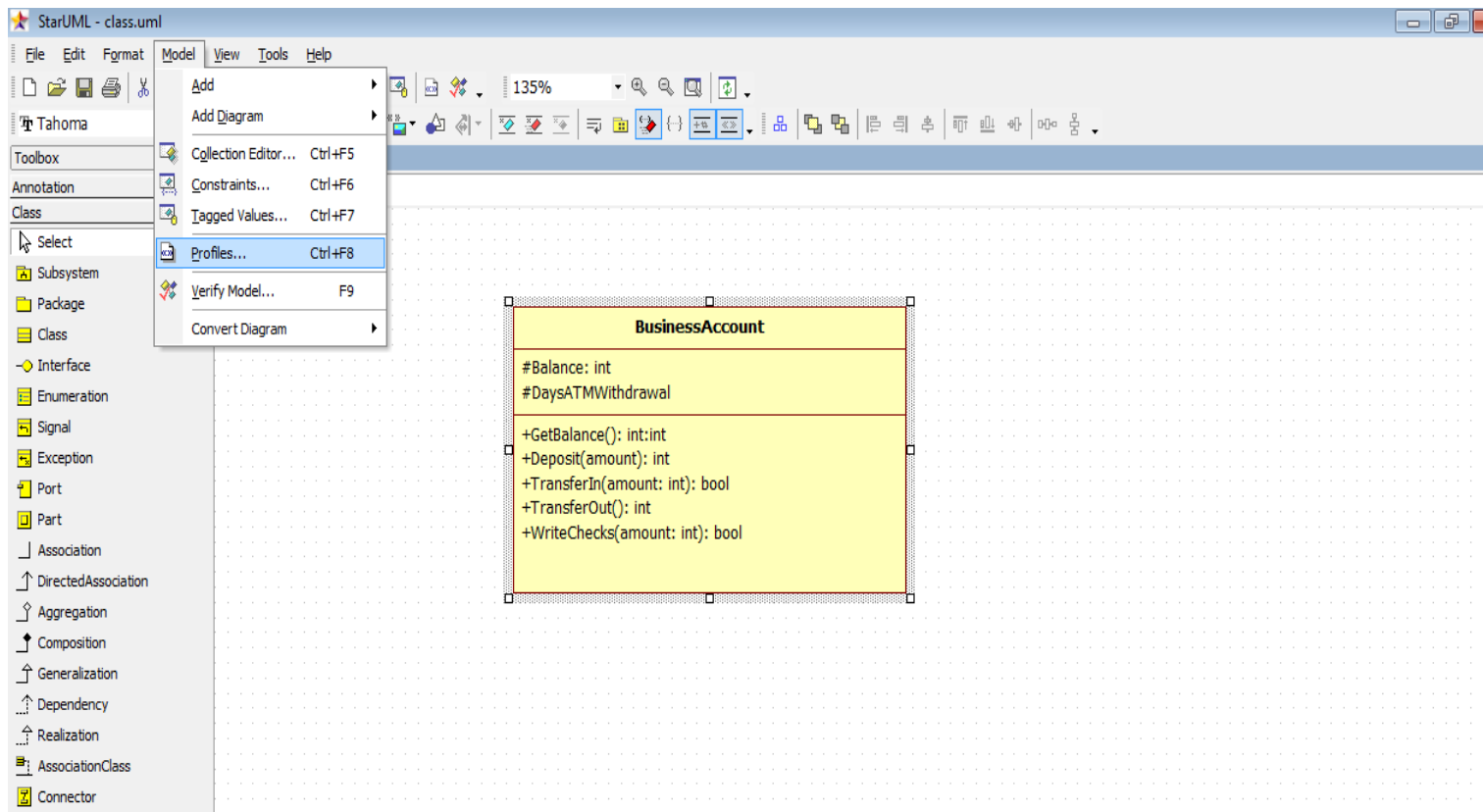
■ Topics(26/04/16)

- Steps to Generate code in Star UML for C++
- Mapping Class diagram to C++ code.

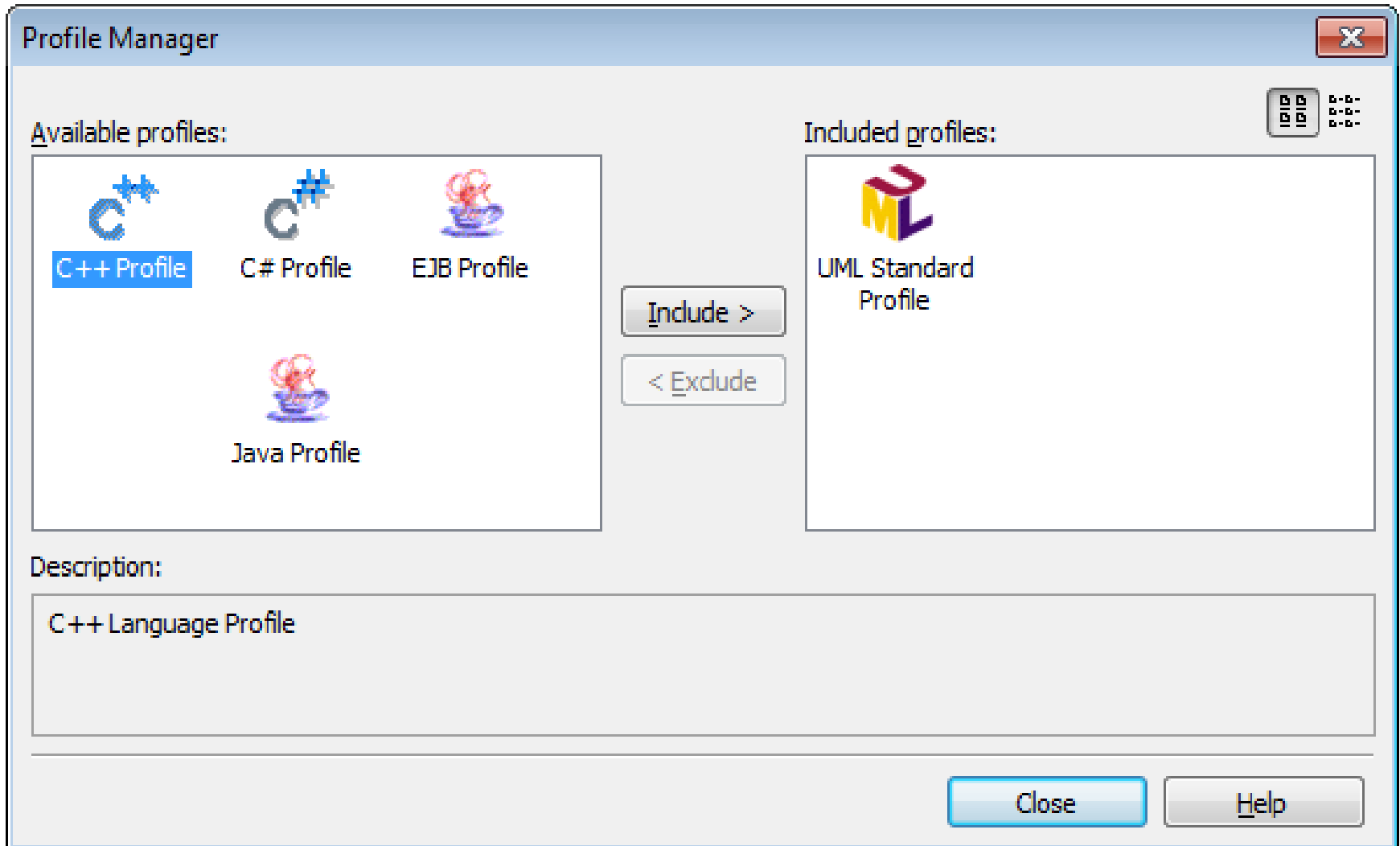
To Generate C++ Code



- Navigate to the Menu Model/Profile to Include C++ Profile



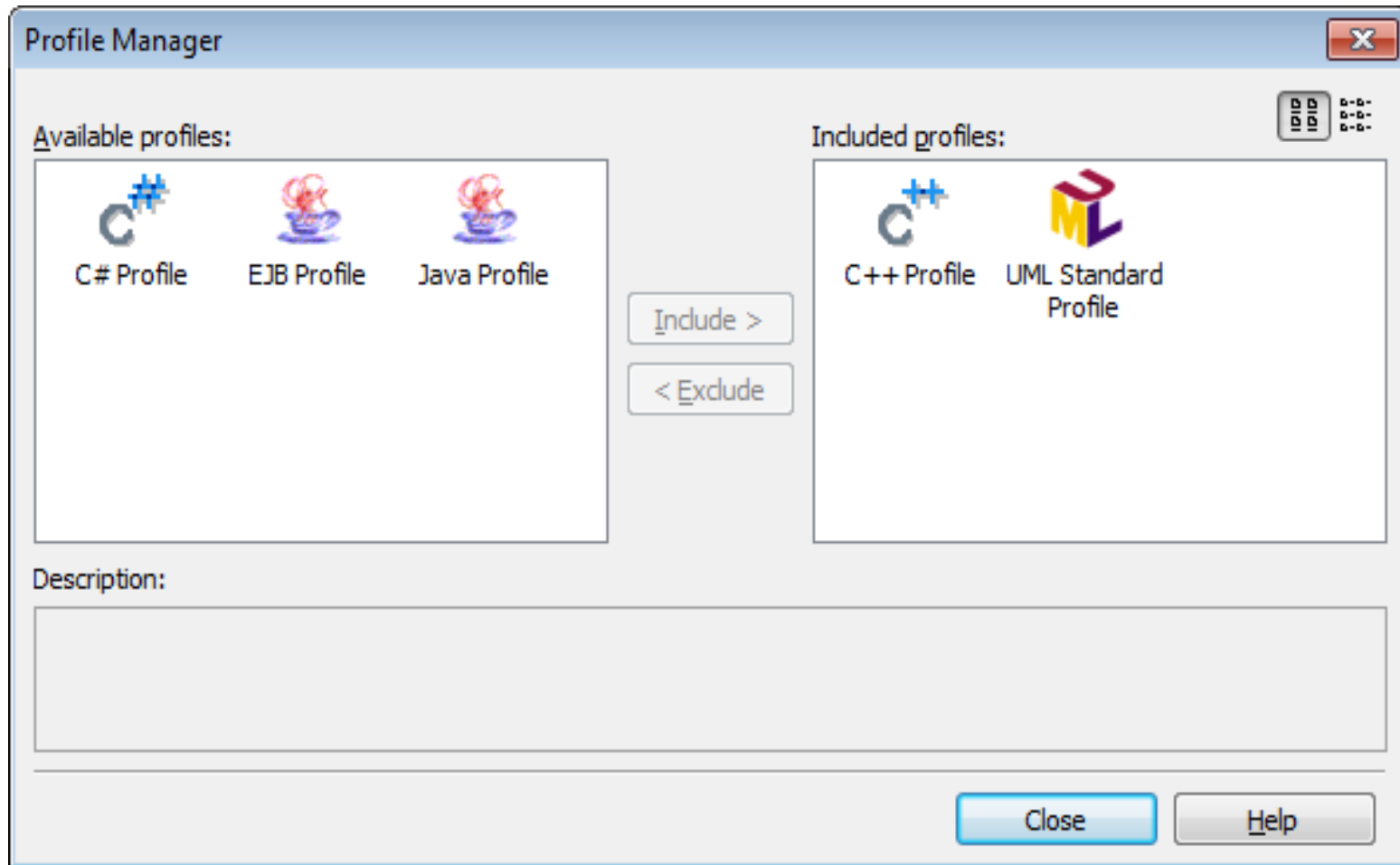
Include C++ Profile using Include Button



C++ profile Included in star UML



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Select Tools /C++/Generate Code



The screenshot shows the StarUML application window titled "StarUML - class.uml". The menu bar includes File, Edit, Format, Model, View, Tools, and Help. The "Tools" menu is open, showing options: Options..., Add-In Manager..., C++ (selected), C#, StarUML Generator..., Java, and Apply Pattern... The "C++" sub-menu is also open, showing "Generate Code..." (highlighted) and "Reverse Engineer...".

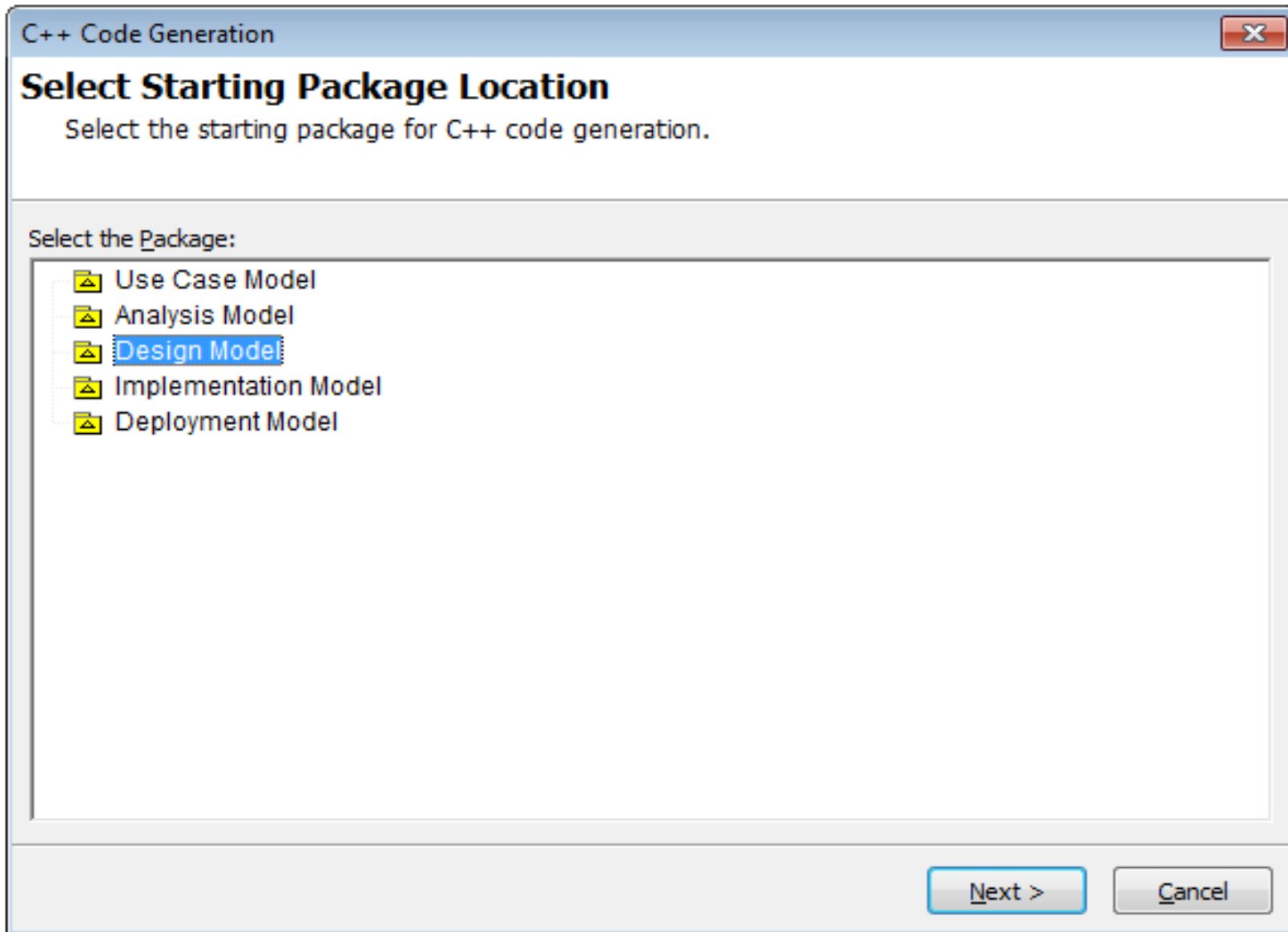
The main workspace displays a UML class diagram for a class named "BusinessAccount". The class has the following attributes and methods:

- Attributes:
 - #Balance: int
 - #DaysATMWithdrawal
- Methods:
 - +GetBalance(): int
 - +Deposit(amount): int
 - +TransferIn(amount: int): bool
 - +TransferOut(): int
 - +WriteChecks(amount: int): bool

The status bar at the bottom shows the current element: (UMLClass)::Design Model::BusinessAccount. The system tray at the bottom right shows the time as 12:38 PM on 4/21/2016.

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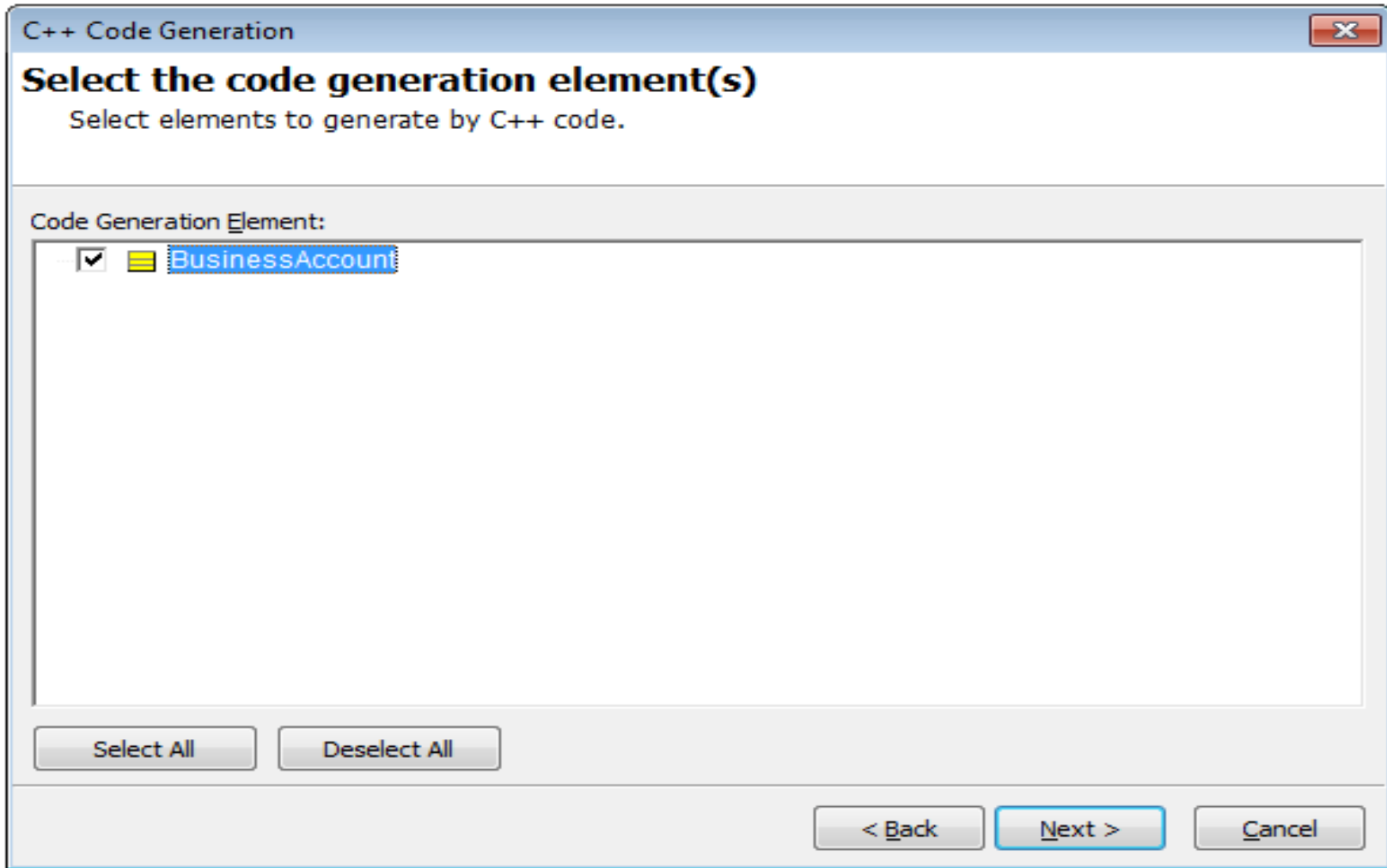
Select Design Model and click Next



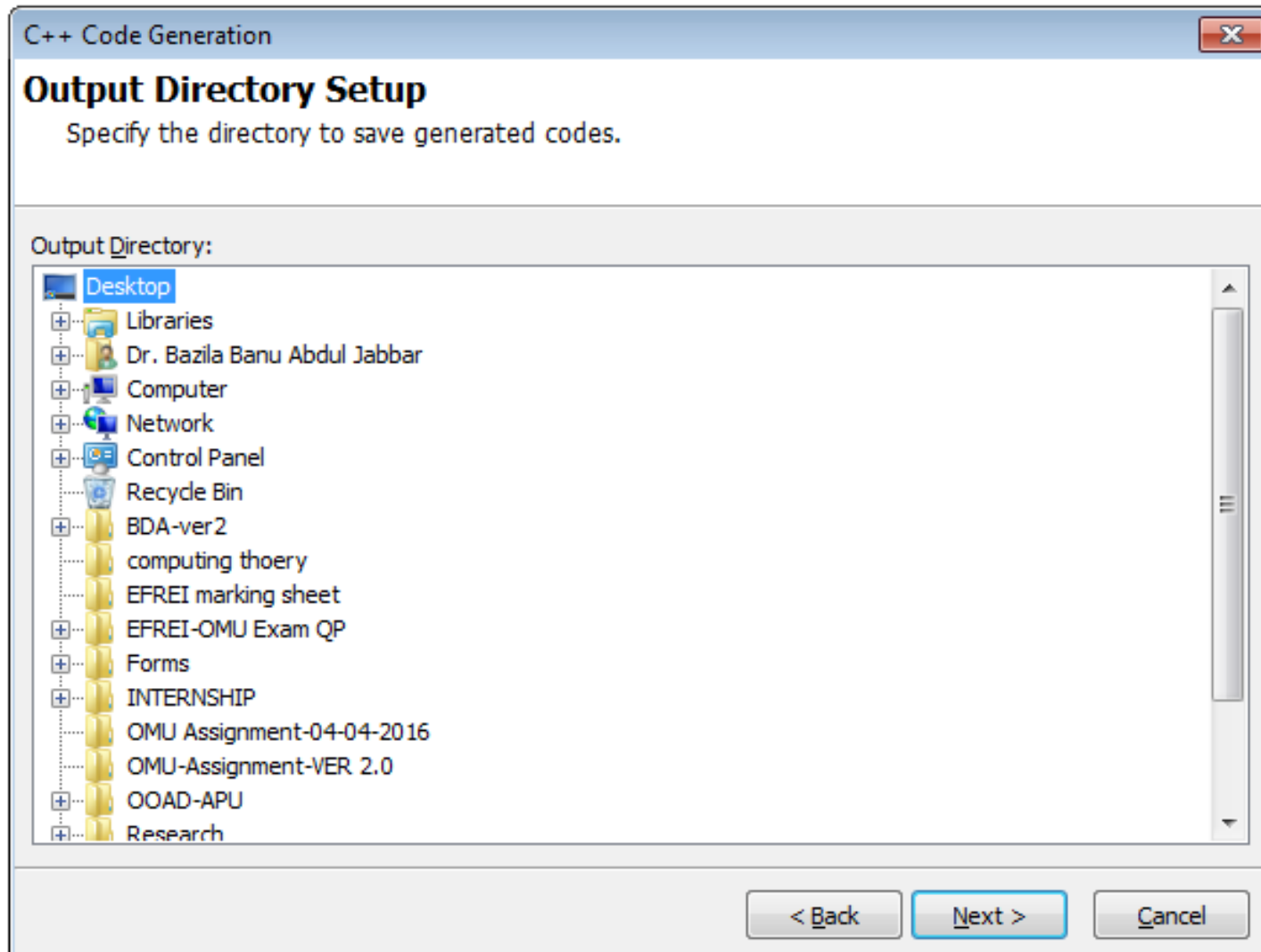
Select the class to generate code



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Select the location for C++ code repository



Configure Option and click next



C++ Code Generation

Option Setup

Configure options for code generation.

Generation file Setup

Header file:

Implementation file:

File name:

Code Style

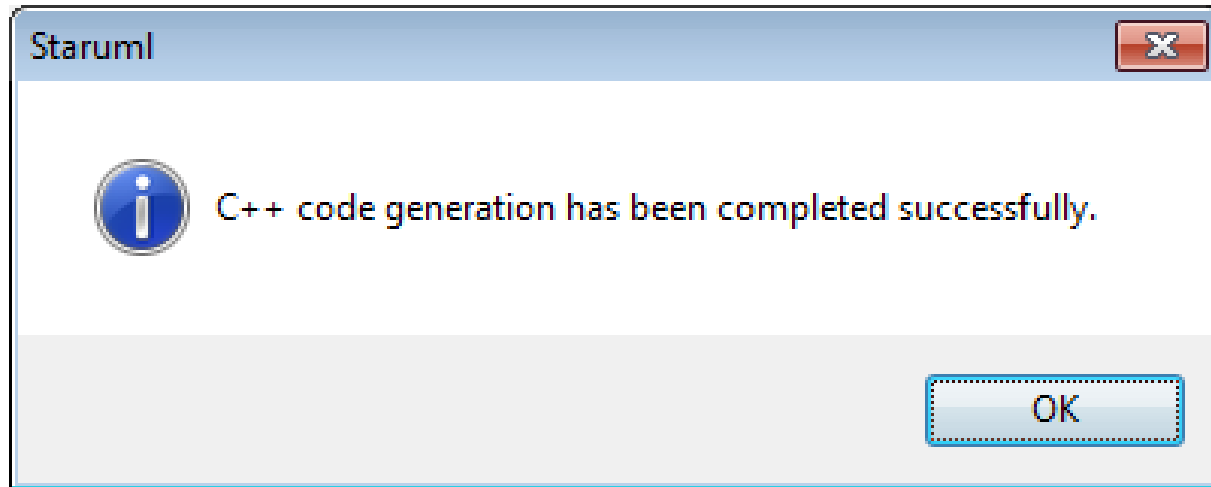
Tab width:

Code Generation

Member in order:

Code Generation Options | File Header Comment and Default Include

Message- StarUML



Class- BusinessAccount



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BusinessAccount

#Balance: int

#DaysATMWithdrawal

+GetBalance(): int

+Deposit(amount): int

+TransferIn(amount: int): bool

+TransferOut(): int

+WriteChecks(amount: int): bool

C++ Code for BusinessAccount class

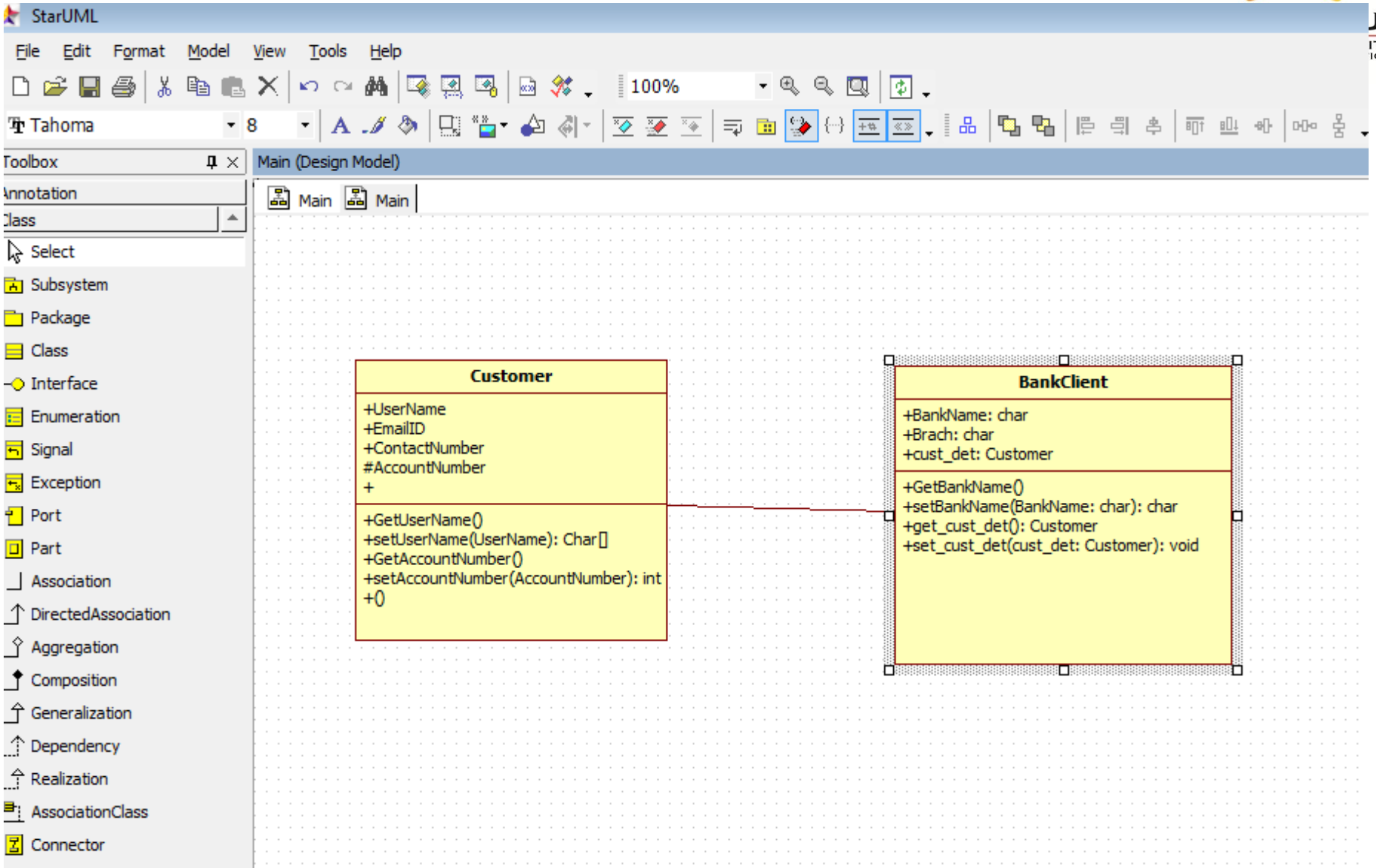


```
BusinessAccount - Notepad
File Edit Format View Help
//
// Generated by StarUML(tm) C++ Add-In
//
// @ Project : Untitled
// @ File Name : BusinessAccount.h
// @ Date : 4/21/2016
// @ Author : Bazila Banu.A|
//
//
#ifndef _BUSINESSACCOUNT_H
#define _BUSINESSACCOUNT_H

class BusinessAccount {
public:
    int GetBalance();
    int Deposit(int amount);
    bool TransferIn(int amount);
    int TransferOut();
    bool writeChecks(int amount);
protected:
    int Balance;
    int DaysATMwithdrawal;
};

#endif // _BUSINESSACCOUNT_H
```

Association



C++ code for Association



```
BankClient - Notepad
File Edit Format View Help

//
//
// Generated by StarUML(tm) C++ Add-In
//
// @ Project : Untitled
// @ File Name : BankClient.h
// @ Date : 4/21/2016
// @ Author :
//
//

#if !defined(_BANKCLIENT_H)
#define _BANKCLIENT_H

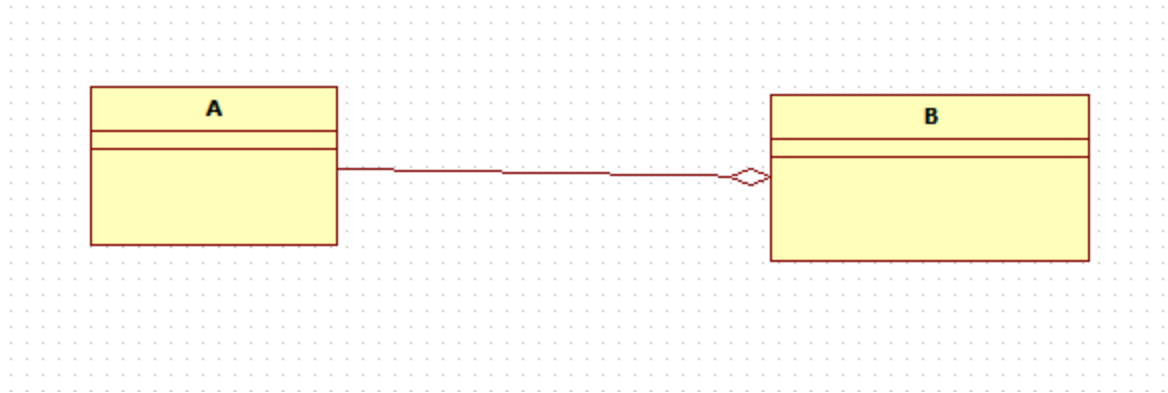
#include "Customer.h"

class BankClient {
public:
    char BankName;
    char Brach;
    Customer cust_det;
    void GetBankName();
    char setBankName(char BankName);
    Customer get_cust_det();
    void set_cust_det(Customer cust_det);
};

#endif // _BANKCLIENT_H
```

Aggregation

- If the relationship between objects is weak then , it can be represented as an instance variable to indicate the relationship.



C++ code for Aggregation



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Example: Relationship between teacher and department

```
class Department{
    string dept_name;
public:
    void setDeptName(string name)
    {
        this.dept_name=name;
    }

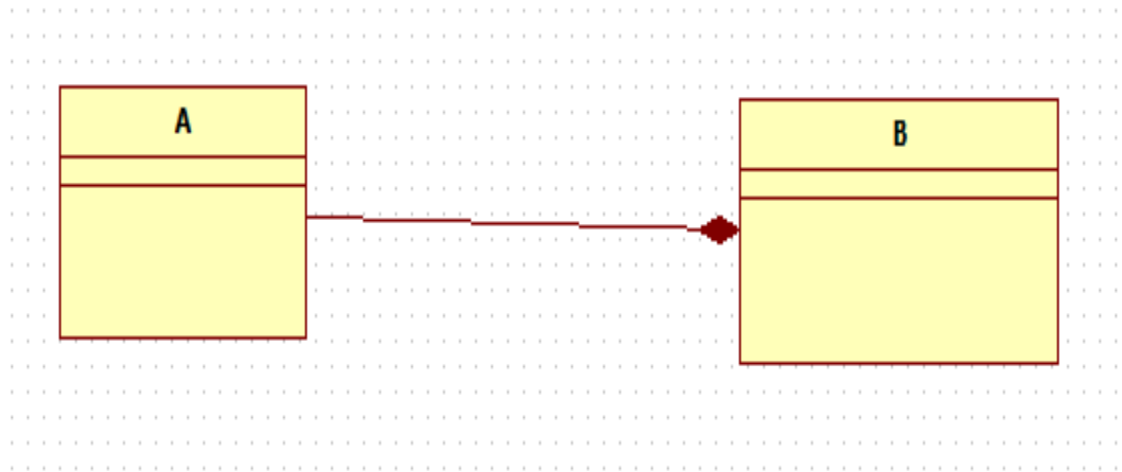
    string getDeptName()
    {
        return dept_name;
    }
};

Department DepartmentObject = new Department();

class Teacher{
    string dept_name;
public:
    setDeptName(string name)
    {
        this.dept_name = DepartmentObject.getDeptName(); //You only need to invoje this method
    }
}
};
```

Composition

- If one object is an integral part of another object,



C++ code for Composition

For example, Scenario of Houses and Rooms



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```
class House{
    string _HouseType;
public:
void setHouseType(string house_type)
{
    this._HouseType = house_type;
}

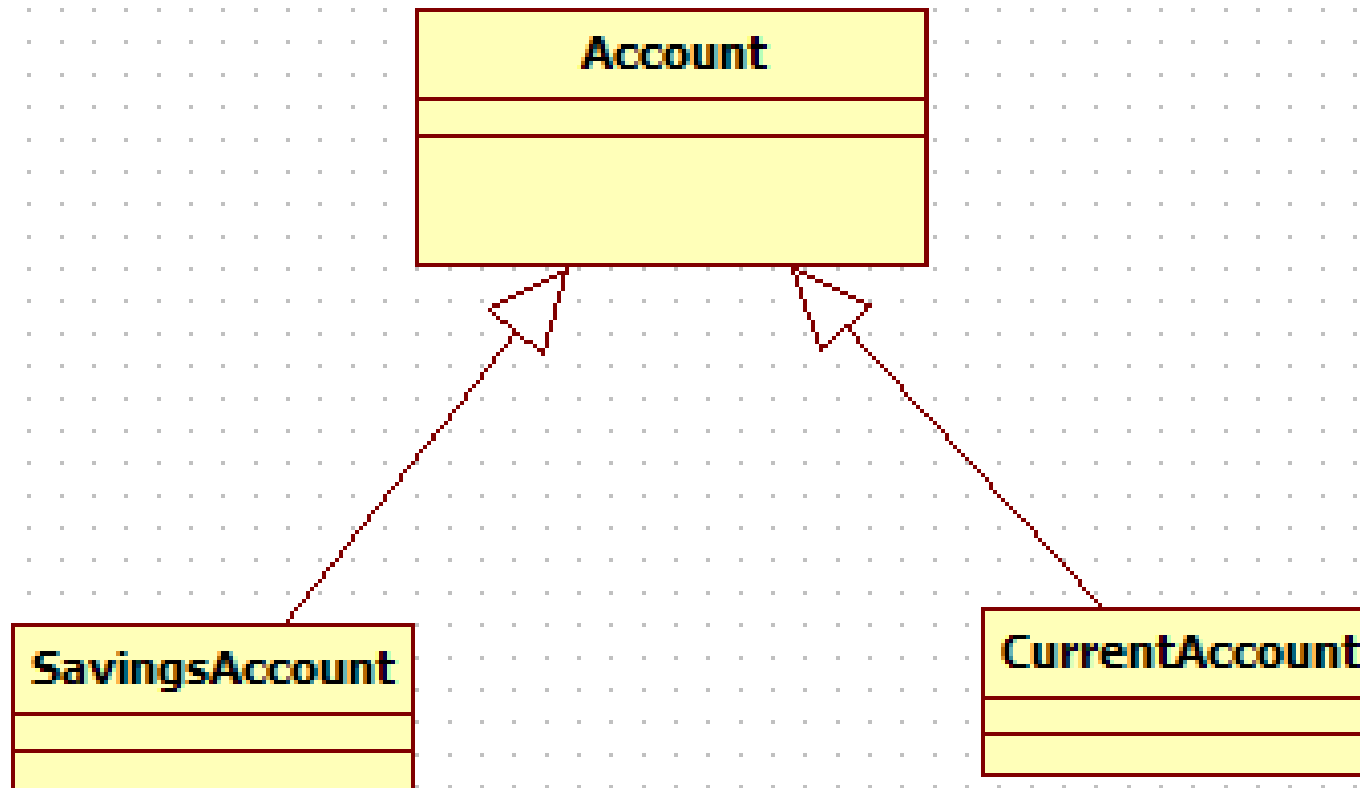
string getHouseType()
{
    return _HouseType;
}
};

House HouseObject = new House();

class Room{

public:
Room(string HouseType) {
    this._HouseType = HouseObject.getHouseType(); //as in my system a room cannot exist
}
}
```

Generalization



C++ code for Generalization



CurrentAccount - Notepad

File Edit Format View Help

```
//  
//  
// Generated by StarUML(tm) C++ Add-In  
//  
// @ Project : Untitled  
// @ File Name : CurrentAccount.h  
// @ Date : 4/21/2016  
// @ Author :  
//  
//  
//  
  
#if !defined(_CURRENTACCOUNT_H)  
#define _CURRENTACCOUNT_H  
  
#include "Account.h"  
  
class CurrentAccount : public Account {  
};  
  
#endif // _CURRENTACCOUNT_H
```

C++ code for Generalization



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```
File Edit Format View Help
//
// Generated by StarUML(tm) C++ Add-In
//
// @ Project : Untitled
// @ File Name : SavingsAccount.h
// @ Date : 4/21/2016
// @ Author :
//
//
#if !defined(_SAVINGSACCOUNT_H)
#define _SAVINGSACCOUNT_H
#include "Account.h"
class SavingsAccount : public Account {
};
#endif // _SAVINGSACCOUNT_H
```

References



- http://portal.aauj.edu/portal_resources/downloads/uml/programming_object_oriented_analysis_c_plus_plus_unl.pdf