Object Adapter

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23 September 2014

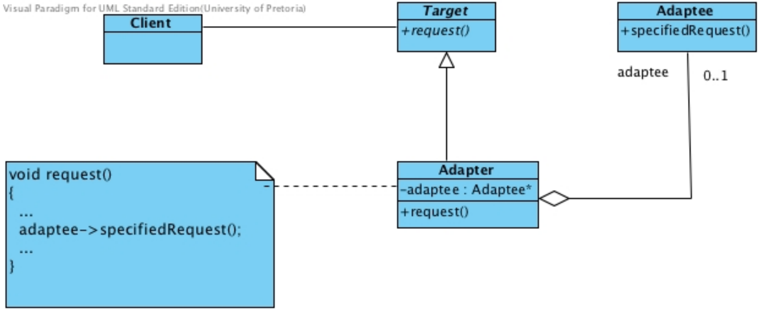
Overview

1. Identification
2. Structure
3. Discussion
4. Participants
5. Related Patterns
6. Examples
    - Billboard
    - Maths

Name and Classification: Adapter (Object and Class Structural)

Intent: “Convert an interface of a class into another interface clients expect. Adapter lets classes work together that couldn’t otherwise because of incompatible interfaces. ” GoF(139)

Object Adapter



```
void request()
{
  ...
  adaptee->specifiedRequest();
  ...
}
```

- Used to modify exsiting interfaces make it work after it has been designed
- Object Adapter makes use of object composition to delegate to Adaptee.

Target

- Domain specific interface used by the client

Adapter

- Adapts the interface of Adaptee to the Target interface

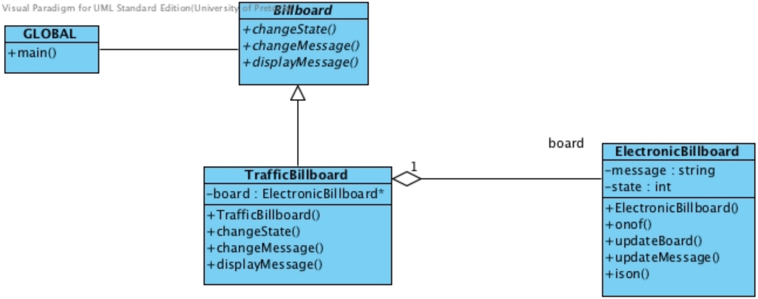
Adaptee

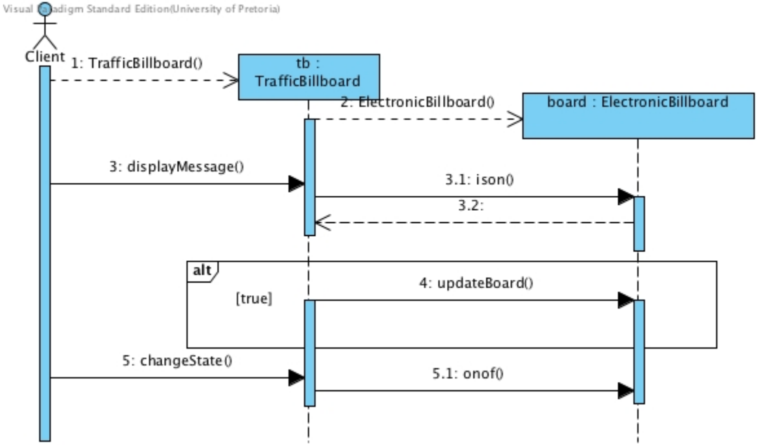
- The existing interface that needs to be adapted

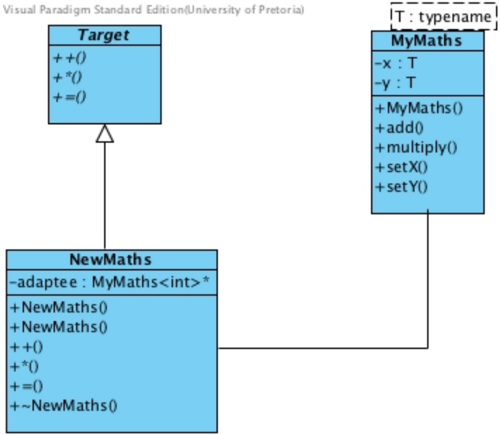
Client

- Manipulates objects conforming to the interface specified by the abstract class Target

- **Bridge** () : Structurally they are similar. However their intent is different, the Adapter changes the interface while the Bridge separates the implementation from the interface.
- **Decorator** () : Enhances an object without changing the interface.
- **Proxy** () : Defines a surrogate of to an object without changing its interface.


Visual Paradigm for UML Standard Edition(University of Preto
GLOBAL
+main()
Billboard
+changeState()
+changeMessage()
+displayMessage()
TrafficBillboard
-board : ElectronicBillboard*
+TrafficBillboard()
+changeState()
+changeMessage()
+displayMessage()
1
board
ElectronicBillboard
-message : string
-state : int
+ElectronicBillboard()
+onof()
+updateBoard()
+updateMessage()
+ison()


Visual Paradigm Standard Edition(University of Pretoria)
Client
1: TrafficBillboard()
tb : TrafficBillboard
2: ElectronicBillboard()
board : ElectronicBillboard
3: displayMessage()
3.1: ison()
3.2:
alt
[true]
4: updateBoard()
5: changeState()
5.1: onof()



Target

++()
+()*
+=()

T : typename

MyMaths

-x : T
-y : T

+MyMaths()
+add()
+multiply()
+setX()
+setY()

NewMaths

-adaptee : MyMaths<int>*

+NewMaths()
+NewMaths()
++()
+*()
+=()
+~NewMaths()

```
#ifndef MYMATHS_H
#define MYMATHS_H

template <typename T>
class MyMaths {
public:
    MyMaths(T, T);
    T add ();
    T multiply();
 //protected:
    void setX(T);
    void setY(T);
  private:
    T x;
    T y;
};

#include "MyMaths.cpp"

#endif
```

```
template <typename T>
MyMaths<T>::MyMaths(T v1, T v2)
{
    x = v1;
    y = v2;
}

template <typename T>
T MyMaths<T>::add()
{
    return x + y;
}


template <typename T>
T MyMaths<T>::multiply()
{
    return x * y;
}
```

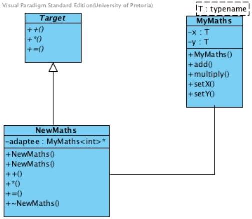
```
template <typename T>
void MyMaths<T>::setX(T object)
{
    x = object;
}

template <typename T>
void MyMaths<T>::setY(T object)
{
    y = object;
}
```

T must be:

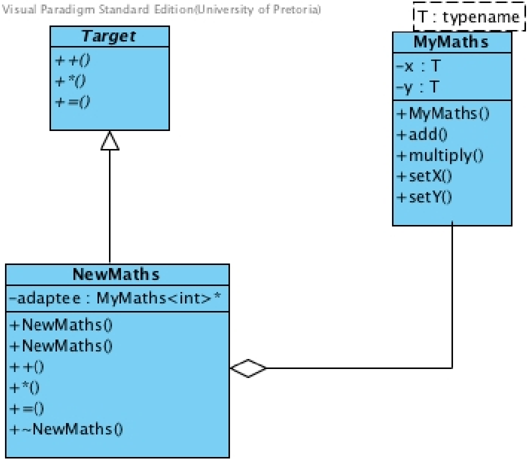
- assignable
- copy constructible; and
- operators + and $*$ must be defined

```
#ifndef TARGET_H
#define TARGET_H

class Target {
public:
    virtual int operator+(int) = 0;
    virtual int operator*(int) = 0;
    virtual int operator=(int) = 0;
};

#endif
```

```
#ifndef NEWMATHS_H
#define NEWMATHS_H

#include "Target.h"
#include "MyMaths.h"

class NewMaths : public Target
{
public:
    NewMaths();
    NewMaths(int);
    virtual int operator+(int);
    virtual int operator*(int);
    virtual int operator=(int);
    ~NewMaths();
private:
    MyMaths<int>* adaptee;

};

#endif
```



Visual paradigm draws the association between `NewMaths` and `MyMaths` without a specific type.



Target

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-x : T
-y : T

+MyMaths()
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+setX()
+setY()

NewMaths

-adaptee : MyMaths<int>*

+NewMaths()
+NewMaths()
++()
+*()
+=()
+~NewMaths()

```
#include <iostream>
#include "Target.h"
#include "NewMaths.h"

using namespace std;

int main()
{
    Target* obj = new NewMaths(4);

    int temp;
    temp  = (*obj +3);
    cout << temp << endl;

    *obj = 10;
    temp  = (*obj + 3);
    cout << temp << endl;

    return 0;
}
```