JAVA TUTORIAL | #INDEX POSTS | #INTERVIEW QUESTIONS | RESOURCES

Design Patterns Tutorial

Java Design Patterns

Creational Design Patterns

- Singleton
- Factory
- Abstract Factory
- Builder
- Prototype

Structural Design Patterns

- Adapter
- Composite
- Proxy
- Flyweight
- Facade

YOU ARE HERE: HOME » JAVA » DESIGN PATTERNS » MEDIATOR DESIGN PATTERN IN JAVA

Instantly Search Tutorials...

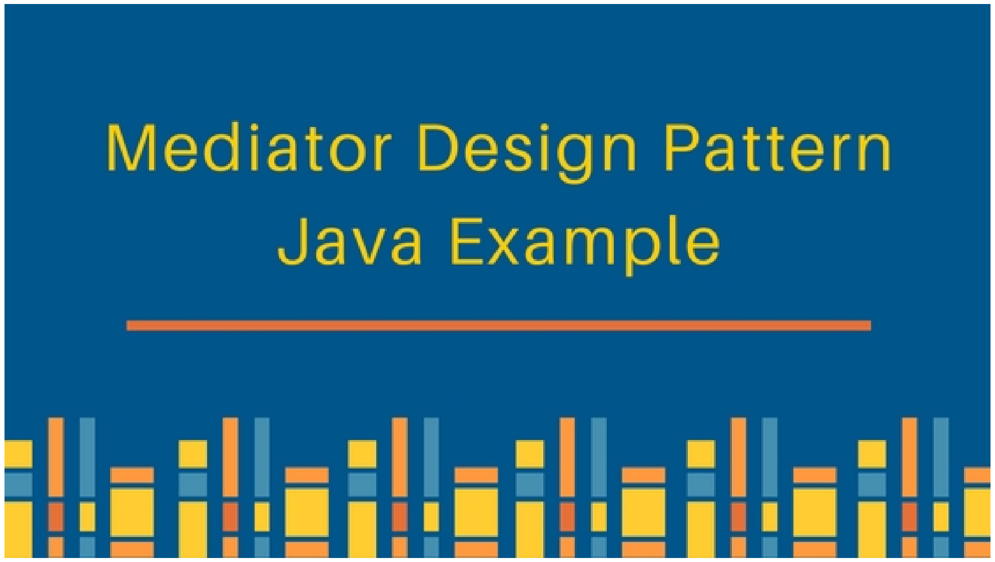
Mediator Design Pattern in Java

PANKAJ — 21 COMMENTS

Mediator design pattern is one of the behavioral design pattern, so it deals with the behaviors of objects. Mediator design pattern is used to provide a centralized communication medium between different objects in a system.

Table of Contents [hide]

Mediator Design Pattern



According to GoF, mediator pattern intent is:

> Allows loose coupling by encapsulating the way disparate sets of objects interact and communicate with each other. Allows for the actions of each object set to vary independently of one another.

Mediator design pattern is very helpful in an enterprise application where multiple objects are interacting with each other. If the objects interact with each other directly, the system components are tightly-coupled with each other that makes higher maintainability cost and not hard to extend. Mediator pattern focuses on provide a mediator between objects for communication and help in implementing lose-coupling between objects.

Air traffic controller is a great example of mediator pattern where the airport control room works as a mediator for communication between different flights. Mediator works as a router between objects and it can have it's own logic to provide way of communication.

The system objects that communicate each other are called Colleagues. Usually we have an interface or abstract class that provides the contract for communication and then we have concrete implementation of mediators.

For our example, we will try to implement a chat application where users can do group chat. Every user will be identified by it's name and they can send and receive messages. The message sent by any user should be received by all the other users in the group.

Mediator Pattern Interface

First of all we will create Mediator interface that will define the contract for concrete mediators.

```
ChatMediator.java


package com.journaldev.design.mediator;

public interface ChatMediator {

        public void sendMessage(String msg, User user);

        void addUser(User user);
}
```

Mediator Pattern Colleague Interface

Users can send and receive messages, so we can have User interface or abstract class. I am creating User as abstract class like below.

```
User.java


package com.journaldev.design.mediator;

public abstract class User {
        protected ChatMediator mediator;
        protected String name;

        public User(ChatMediator med, String name){
                this.mediator=med;
                this.name=name;
        }

        public abstract void send(String msg);

        public abstract void receive(String msg);
}
```

Notice that User has a reference to the mediator object, it's required for the communication between different users.

Concrete Mediator

Now we will create concrete mediator class, it will have a list of users in the group and provide logic for the communication between the users.

ChatMediatorImpl.java

```
        private List<User> users;

        public ChatMediatorImpl(){
```

```
		this.users=new ArrayList<>();
	}

	@Override
	public void addUser(User user){
		this.users.add(user);
	}

	@Override
	public void sendMessage(String msg, User user) {
		for(User u : this.users){
			//message should not be received
by the user sending it
			if(u != user){
				u.receive(msg);
			}
		}
	}

}
```

Mediator Design Pattern Concrete Colleague

Now we can create concrete User classes to be used by client system.

UserImpl.java

```
package com.journaldev.design.mediator;

public class UserImpl extends User {
        public UserImpl(ChatMediator med, String name) {
                super(med, name);
        }

        @Override
        public void send(String msg){
                System.out.println(this.name+": Sending
Message="+msg);
                mediator.sendMessage(msg, this);
        }
        @Override
        public void receive(String msg) {
                System.out.println(this.name+": Received
Message:"+msg);
        }

}
```

Notice that send() method is using mediator to send the message to the users and it has no idea how it will be handled by the mediator.

Mediator Pattern Example Client Program Code

Let's test this our chat application with a simple program where we will create mediator and add users to the group and one of the user will send a message.

`ChatClient.java`

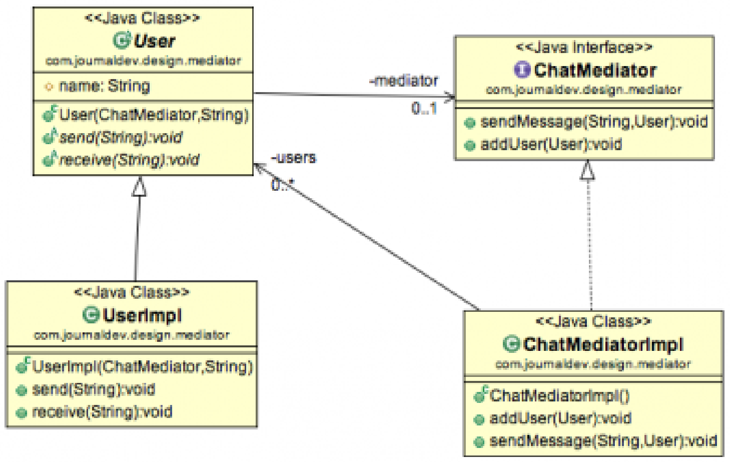
```
package com.journaldev.design.mediator;

public class ChatClient {

        public static void main(String[] args) {
                ChatMediator mediator = new
ChatMediatorImpl();
                User user1 = new UserImpl(mediator,
"Pankaj");
                User user2 = new UserImpl(mediator,
"Lisa");
                User user3 = new UserImpl(mediator,
"Saurabh");
                User user4 = new UserImpl(mediator,
"David");
                mediator.addUser(user1);
                mediator.addUser(user2);
                mediator.addUser(user3);
                mediator.addUser(user4);

                user1.send("Hi All");
```

Notice that client program is very simple and it has no idea how the message is getting handled and if mediator is getting user or not.

Output of the mediator pattern example program is:

```
Pankaj: Sending Message=Hi All
Lisa: Received Message:Hi All
Saurabh: Received Message:Hi All
David: Received Message:Hi All
```

Mediator Pattern Class Diagram



Mediator Pattern Example in JDK

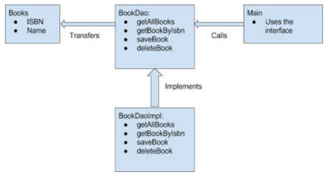
- java.util.Timer class scheduleXXX() methods
- Java Concurrency Executor execute() method.
- java.lang.reflect.Method invoke() method.

Mediator Design Pattern Important Points

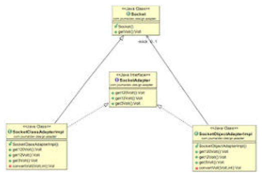
- Mediator pattern is useful when the communication logic between objects is complex, we can have a central point of communication that takes care of communication logic.

- Java Message Service (JMS) uses Mediator pattern along with **Observer pattern** to allow applications to subscribe and publish data to other applications.
- We should not use mediator pattern just to achieve lose-coupling because if the number of mediators will grow, then it will become hard to maintain them.

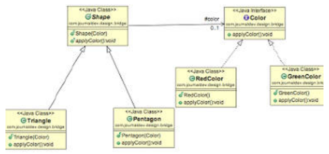
That's all for mediator design pattern and it's implementation in java.



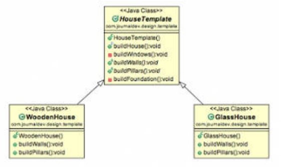
DAO Design Pattern



Adapter Design Pattern in Java

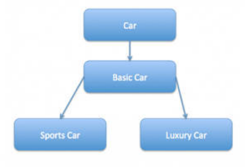


Bridge Design Pattern in Java

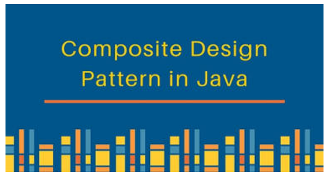


Template Method Design Pattern in Java

Command Design Pattern



Decorator Design Pattern in Java Example



Composite Design Pattern in Java

Why Immu

« PREVIOUS
Iterator Design Pattern in Java

NEXT »
Memento Design Pattern in Java

About Pankaj

If you have come this far, it means that you liked what you are reading. Why not reach little more and connect with me directly on **Facebook** or **Twitter**. I would love to hear your thoughts and opinions on my articles directly.

Recently I started creating video tutorials too, so do check out my videos on **YouTube**.

FILED UNDER: DESIGN PATTERNS

Comments

fatemeh says

OCTOBER 26, 2017 AT 7:53 AM

hello,please help me
i want to know, how use jms from mediator pattern?

thankful

Reply

robothy says

NOVEMBER 22, 2016 AT 10:23 PM

Nice example.

Reply

David says

NOVEMBER 1, 2016 AT 12:27 PM

I knew at this and I can´t see the differences between mediator pattern and observe pattern

Reply

Hari K Bista says

AUGUST 5, 2017 AT 2:09 AM

you are right.

Reply

Hiccup says

OCTOBER 2, 2017 AT 10:20 AM

I think the difference between mediator and observer is

mediator : intent is any object want to initiate communication

but in obeservation subject state triggers and it's mainly broacast..
here i think example is taken is not compete use of mediator. Mediator is not about broadcast always..it's a selective communication. Interested object communicate and that mapping is with the mediator either in the form of hash map or any other data structure…
Reply

vinod says
MAY 18, 2018 AT 11:26 AM
In observer, many objects are interested in the state change of one object. They are not interested in each other. So the relation is one to many.
In mediator, many objects are interested to communicate many other objects. Here the relation is many to many.
Reply

Annappa says
MARCH 25, 2016 AT 5:07 AM
Nice explanation.
Reply

Ashwin says

SEPTEMBER 27, 2015 AT 7:34 AM

Really crisp and good writeups

Reply

Aditya says

SEPTEMBER 14, 2015 AT 4:27 AM

how mediator pattern is implemented in ExecutorService API.Kindly explain

Reply

mohammad says

JULY 31, 2015 AT 1:55 PM

hi.

tanck you for your nice tutorial.

Reply

Mohit Gupta says

JULY 31, 2015 AT 6:26 AM

Awesome explaination thanks

Reply

abc says

APRIL 24, 2015 AT 5:46 AM

who is the mediator here?

Reply

Leo says

MAY 23, 2015 AT 10:35 AM

ChatMediator.

Reply

Avinash Pandey says

FEBRUARY 18, 2015 AT 4:12 AM

Your tutorials are nice and explanatory.

Reply

Ilia Sokolovski says

JANUARY 20, 2015 AT 9:01 AM

Hey,

That was actually very helpful, Thanks!

Reply

Lalit Upadheyay says

DECEMBER 23, 2014 AT 8:34 PM

I think that the line(s) mediator.addUser in ChatClient can be avoided by delegating this call in User constructor by appending one line this.mediator.addUser(this);
Also we should implemnet Mediator as a singleton, to avoid scenario when different mediator instances can be tied to a partcipating object. This would cause synchronized message relay issue and the implementation will fail to serve its purpose.

Reply

Rishi says

MARCH 7, 2016 AT 7:56 AM

Agree 100%

Reply

venkatesh says

JUNE 22, 2017 AT 4:52 AM

how would we use multiple group chats if mediator is singleton

Reply

Shyam says

MAY 2, 2016 AT 11:19 PM

This is an classic example for people to understand what is the use of mentioned designed pattern. Later after understanding its up to one how to use his knowledge.
If you are so great at making code perfect, make an tutorial and help others.
Please don't boast too much.

Reply

Koteshwar says

SEPTEMBER 7, 2014 AT 4:33 PM

Excellent..Thank you so much

Reply

Krishna says

JANUARY 17, 2014 AT 7:48 AM

Thanks for best and easiest example with explanation

Reply

Leave a Reply

Your email address will not be published. Required fields are marked *

Comment

Name *

Email *

POST COMMENT