Design Pattern Questions for Practice

Question 1

Let's consider a situation, where you are a pro-level software engineer. Now, you are being hired by Twitter. At this moment, Twitter wants to develop a website where they want to create a small version of YouTube.Now, since it is a small version of YouTube, thus they want you to make sure that it has only one channel which is named "Twitter". They want you to ensure that no other channel can be made within this newly developed YouTube Platform. They want you to make sure that the site will be able to notify its users once a video is released. Now, your job is to choose suitable design pattern that can help to develop the software. [8]

Question 2

Let's consider a situation, where you are a pro-level software engineer. Now, you are being hired by Twitter. At this moment, Twitter wants to develop a website where they want to create a small version of YouTube. However, it can have multiple channels like normal YouTube. Now, the new version of your developed YouTube will have to have a channel named Twitter. That will post similar videos, reels/shorts like Linus-Tech-Tips. Also, users will get notified for the newly uploaded videos. Now, your job is to choose suitable design pattern that can help to develop the software. [8]

Question 3

Let's consider a situation where you want to develop software called WECHAT that will have a chatting option like Messenger, news feed, and friends group option like Facebook and a streaming option like Twitch. Now, in order to complete the process, you also hired some new people who can work with you in this project. You want to make sure that there will be only one Application that can solve the problem of All the mentioned Applications. Now, for Facebook, you can implement the feature called newsfeed and groups. For Messenger, you can only implement the feature of Chatting. In addition, for Twitch you can develop feature like video streaming. Now, your job is to choose suitable design patterns that can help to develop the software. [7]

//Driver Code JAVA version	//Driver Code Python version

WECHAT weChat = WECHAT.getInstance( );
 weChat.streamingVideo( );
 WECHAT weChat2 =WECHAT.getInstance( ) ;
 weChat.sendMessage( );
 weChat.createFriendsGroup( );
 weChat2.useNewsFeed( );
 System.out. println(weChat);
	weChat =WECHAT. getInstance( );
	 weChat.streamingVideo( );
	 weChat2 =WECHAT. getInstance( ) ;
	 weChat.sendMessage( );
	 weChat.createFriendsGroup( );
	 weChat2.useNewsFeed( );
	 print(weChat);

System.out. println(weChat2);	print(weChat2);

Question 4

In Tech-Park, "Magic Sweets" was famous for its magical cakes, crafted solely by Mr. Shaheed, the master baker. His secret was consistency—each cake tasted exactly like the first, and only he was allowed to make them to maintain this perfect standard. When Jamie, a new baker, suggested allowing others to help increase production, Mr. Shaheed explained, "Our success comes from having one source—the master baker—ensuring every cake is consistently perfect, just like the first." Inspired, Jamie applied this idea to their software system by implementing a design pattern for configuration settings. Just as Mr. Shaheed's approach kept the cakes consistent, the design pattern ensured the class maintained stable and controlled settings.[7]

Question 1 Answer: Singleton, Observer

```
hey Ching Chongyour subscribe  channel Twitter uploaded new video
Video NameNew Video 1
Youtube@7530d0a
hey Ching Chongyour subscribe  channel Twitter uploaded new video
Video NameNew Video 2
Youtube@7530d0a
hey Ching Chongyour subscribe  channel Twitter uploaded new video
Video NameNew Video 4
Youtube@7530d0a
hey Ching Chongyour subscribe  channel Twitter uploaded new video
Video NameNew Video 6
Youtube@7530d0a
Youtube@7530d0a
```

```java
import java.util.ArrayList;
import java.util.List;

public class Youtube {

   private List<Subscriber> subscribersList= new ArrayList<Subscriber>();
   public static List <String> videos = new ArrayList<String>();
   public String channelName = "Twitter";
   private static final Youtube Twitter = new Youtube();

  // privatization constructor to stop creating multiple object
   private Youtube(){        }

   public void subscribe(Subscriber s)
   {    //Adding subscriber to subscribe list
       subscribersList.add(s);
       s.channel  = this;
   }
   public void notification(){
     //notify the subscriber
    for(int i=0; i<subscribersList.size(); i++)
    {
        f.update(subscribersList[i]);
    }
   }

   public static Youtube provideObject( )
   {     //returning single object
       return Twitter;
   }
   public void contentUpload(String content)
   {
       videos.add(content);
       this.notification();
   }
}
```

```java
public class Subscriber {

    public Youtube channel;
    public String userName;

    public Subscriber(String user)
    {
        userName = user;
    }

    public void update(Youtube c)
    {
        System.out.println("hey " + userName + "your subscribe  channel "
                + c.channelName + " uploaded new video");
        for(int i=0; i<c.videos.size(); i++)
        {
            if( i== c.videos.size()-1)
            {
                System.out.println("Video Name"+ c.videos.get(i));
            }
        }
    }


    public void subscribeTwitter( )
    {
        Youtube channel = Youtube.provideObject( );
        channel.subscribe(this);
    }

}
```

```java
/////////////////////////////// Driver Code ///////////////////////////////
public class Main {
    public static void main(String[] args) {
        /////////////////////// Driver Code ///////////////////////
        Subscriber Subscriber1 = new Subscriber ("Ching Chong");
        Subscriber1.subscribeTwitter();
        Youtube twitter = Youtube.provideObject();
        twitter.contentUpload("New Video 1");
        twitter.contentUpload("New Video 2");
        twitter.contentUpload("New Video 4");
        twitter.contentUpload("New Video 6");

        System.out.println(twitter);
    }
}
```

Question 2 Answer: Adapter, Observer

```java
public interface ChannelInterface {

    public void uploadContent(String contentName);
}
```

```java
public class LinusChannel {

    public void postFunnyVideo()
    {
        System.out.println("Linus channel video uploaded on Nvidia gpu");
    }
}
```

```java
public class Youtube extends LinusChannel implements ChannelInterface {

    private List<Subscriber> subscribersList = new ArrayList();

    public static List<String> videos = new ArrayList();

    public String channelName;

    public Youtube(String channelName) {
        this.channelName = channelName;
    }

    public void subscribe(Subscriber s) {
        this.subscribersList.add(s);
        s.channel = this;
    }

    public void notification(){
     for(int i=0; i<subscribersList.size(); i++)
     {
         f.update(subscribersList[i]);
     }
    }


    public void uploadContent(String contentName) {
        super.postFunnyVideo();
        videos.add(contentName);
        this.notification();
    }
}
```

```java
public class Subscriber {

    public Youtube channel;
    public String userName;


    public Subscriber(String user)
    {
        userName = user;
    }


    public void update(Youtube c)
    {
        System.out.println("hey " + userName + "your subscribe  channel "
                + c.channelName + " uploaded new video");
        for(int i=0; i<c.videos.size(); i++)
        {
            if( i== c.videos.size()-1)//notify About latest video
            {
                System.out.println("Video Name"+ c.videos.get(i));
            }
        }

    }

    public void subscribeTwitter( )
    {
        Youtube channel = Youtube.provideObject( );
        channel.subscribe(this);
    }

}
```

```java
////////////////////////////////Driver Code ////////////////////////////////
public class Main {
    public static void main(String[] args) {
        Subscriber Subscriber1 = new Subscriber ("Ching Chong");
        Subscriber1.subscribeTwitter();
        Youtube twitter = Youtube.provideObject();
        twitter.contentUpload("New Video 1");
        twitter.contentUpload("New Video 2");
        twitter.contentUpload("New Video 4");
        twitter.contentUpload("New Video 6");
        //twitter.notification();
        System.out.println(twitter);

    }
```

```
}
C:\Users\SECL\.jdks\corretto-1.8.0_362\bin\java.exe ...
Linus channel video uploaded on Nvidia gpu
hey Ching Chongyour subscribe  channel Twitter uploaded new video
Video NameNew Video 1
Youtube@1b6d3586
Linus channel video uploaded on Nvidia gpu
hey Ching Chongyour subscribe  channel Twitter uploaded new video
Video NameNew Video 2
Youtube@1b6d3586
Linus channel video uploaded on Nvidia gpu
hey Ching Chongyour subscribe  channel Twitter uploaded new video
Video NameNew Video 4
```

Question 3 Answer: Adapter, Singleton

```java
public class WECHAT  {

   private static final  WECHAT weChat = new WECHAT();
   public facebook facebook = new facebook();
   public twitch twitch = new twitch();
   public  messenger messenger = new messenger();

   public static WECHAT getInstance( )
   {
      return weChat;
   }

   public void sendMessage()
   {
      System.out.println("We chat has it's own message to send");
      messenger.sendMessage();
   }

   public  void useNewsFeed()
   {
      System.out.println("Let's use the NewFeed");
      facebook.useNewFeed();
   }

   public void streamingVideo()
   {
      System.out.println("Let's stream videos");
      twitch.streamingVideo();
   }

   public void createFriendsGroup()
   {
      System.out.println("Let's create friends group");
      facebook.createFriendsGroup();
   }
}
```

```java
public class facebook {
   public void createFriendsGroup()
   {
      System.out.println("Welcome to the group");
   }
   public void useNewFeed()
   {
      System.out.println("Scroll through news feed");
   }
}
```

```java
public class messenger {
    public void sendMessage()
    {
        System.out.println("Let's Message each other");
    }
}
```

```java
public class twitch {
    public void streamingVideo()
    {
        System.out.println("Videos from twitch");
    }
}
```

```java
///////////////////////////Driver Code ////////////////////////////
public class Main {
    public static void main(String[] args) {

        WECHAT weChat = WECHAT.getInstance();
        weChat.streamingVideo();
        WECHAT weChat2 = WECHAT.getInstance();
        weChat.sendMessage();
        weChat2.useNewsFeed();
        System.out.println(weChat);
        System.out.println(weChat2);

    }
}
```

```
C:\Users\SECL\.jdks\corretto-1.8.0_362\bin\java.exe ...
Let's stream videos
Videos from twitch
We chat has it's own message to send
Let's Message each other using messenger
Let's use the NewFeed
Scroll through facebook news feed
WECHAT@1b6d3586
WECHAT@1b6d3586


Process finished with exit code 0
```

Question 4 Answer: Singleton

```
//////////////////////////////////Driver Code ///////////////////////////////////

public class Main {
    public static void main(String[] args) {

        magicalCake cake1 = magicalCake.prepareMagicalCake();
        magicalCake cake2 = magicalCake.prepareMagicalCake();
        magicalCake cake4 = magicalCake.prepareMagicalCake();
        magicalCake cake6 = magicalCake.prepareMagicalCake();

        System.out.println(cake1);
        System.out.println(cake2);
        System.out.println(cake4);
        System.out.println(cake6);
    }
}

public class magicalCake {

    private static final magicalCake MagicalCake = new magicalCake();

    private magicalCake(){}


    public static magicalCake prepareMagicalCake()
    {
        return MagicalCake;
    }
}
```

Output : Same obj ref

```
C:\Users\SECL\.jdks\corretto-1.8.0_362\bin\java.exe ...
magicalCake@1b6d3586
magicalCake@1b6d3586
magicalCake@1b6d3586
magicalCake@1b6d3586

Process finished with exit code 0
```