Class TV_Program

```java
public class TV_Program {

	private double audienceRate;

	public TV_Program(double audienceRate) {
		this.audienceRate = audienceRate;
	}

	public TV_Program(TV_Program tvP) {
		this.audienceRate = tvP.audienceRate;
	}

	public double getAudienceRate() {
		return audienceRate;
	}

	public void display() {
		System.out.println("Audience rate: " + audienceRate);
	}
}
```

Interface Viewable

```
public interface Viewable {
	public abstract void display();
}
```

Class TV_Channel

```
public abstract class TV_Channel implements Viewable{

	private int views;
	private boolean live;
	protected TV_Program arProg[];
	protected int nbProg;

	public TV_Channel(int views, boolean live) {
		this.views = views;
		this.live = live;
		arProg = new TV_Program[20];
		nbProg = 0;
	}

	public int getViews() {
		return views;
	}

	public boolean isLive() {
		return live;
	}


	public abstract double calcRating();


	public void display() {
		System.out.println("TV_Channel views: " + views);
		System.out.println("TV_Channel live? " + live);
		for(int i = 0; i < nbProg; i++) {
			System.out.print("TV_Program No. " + (i+1) + ": ");
			arProg[i].display();
		}
		System.out.println("Number of programs: " + nbProg);
	}

}
```

Class Sports

```java
public class Sports extends TV_Channel{

	private int nbMatches;

	public Sports(int views, boolean live, int nbMatches) {
		super(views, live);
		this.nbMatches = nbMatches;
	}

	public int getNbMatches() {
		return nbMatches;
	}

	public double calcRating() {
	return nbMatches == 0? -1 : (double) getViews() / nbMatches * 1.5;
	}

	@Override
	public void display() {
		System.out.println("TV_Channel type: Sports");
		super.display();
		System.out.println("Number of matches: " + nbMatches);
	}
}
```

Class News

```
public class News extends TV_Channel{

	private int newsSegment;
	private int breakingNews;

public News(int views, boolean live, int newsSegment, int breakingNews) {
		super(views, live);
		this.newsSegment = newsSegment;
		this.breakingNews = breakingNews;
	}

	public int getBreakingNews() {
		return breakingNews;
	}

	public double calcRating() {
		if(breakingNews == 0 || nbProg == 0)
			return -1;
		double sum = 0;
		for(int i = 0; i < nbProg; i++)
			sum += arProg[i].getAudienceRate();
		return (1.0 * getViews() / breakingNews) + (sum / nbProg);
	}

	@Override
	public void display() {
		System.out.println("TV_Channel type: NEWS");
		super.display();
		System.out.println("News Segments: " + newsSegment);
		System.out.println("Breaking News: " + breakingNews);
	}
}
```