TUGAS W 04
MANAJEMEN KONFIGURASI DAN EVOLUSI PERANGKAT LUNAK

PRAKTIKUM REFACTORING

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Refactoring Song.java

1. Identifikasi Bad Smell dalam Song.java

    a. Feature Envy

    Dalam Song.java, metode setGenre terlalu bergantung pada kelas Genre.

```
public void setGenre(Genre genre) {
    this.genre = genre;
}
```

    b. Long Method

    Metode printDetails() dalam Song.java menangani beberapa tugas sekaligus

```
public void printDetails() {
    System.out.println("Title: " + title + ",
Artist: " + artist + ", Duration: " + duration + "
seconds");
}
```

    c. Improper Dependency

    Kelas Song secara langsung mengakses atribut dari kelas lain seperti Album dan Artist, sehingga perlu dipisahkan agar lebih modular.

```
public class Song {
    private String title;
    private String artist;
    private String releaseYear;
    private String url;
}
```

2. Refactoring Song.java

    a. Memisahkan Tanggung Jawab (SRP - Single Responsibility Principle)

    Tanggung jawab dalam Song.java terlalu banyak, sehingga dipisahkan menjadi beberapa kelas seperti Album.java dan Artist.java.

```
public class Song {
    private String id;
    private String title;
    private String releaseYear;
    private String musicFileURL;
    private Genre genre;
    private Album album;
    private Artist artist;
```

```
    public Song(String id, String title, String
releaseYear, String musicFileURL) {
        this.id = id;
        this.title = title;
        this.releaseYear = releaseYear;
        this.musicFileURL = musicFileURL;
        this.genre = Genre.UNDEFINED;
    }
```

b. Penggunaan Getter dan Setter

Enkapsulasi diterapkan dengan mengganti akses langsung ke atribut menggunakan metode getter dan setter.

```
public String getTitle() {
    return title;
}

public Artist getArtist() {
    return artist;
}

public Album getAlbum() {
    return album;
}
```

c. Membuat Helper Method

Metode printInfo() dipecah menjadi metode yang lebih kecil agar lebih modular.

```
public void printInfo(DetailLevel detailLevel) {
        System.out.println("Song title: " + title);
        System.out.println("Release year: " +
releaseYear);
        if (genre != Genre.UNDEFINED) {
            System.out.println("Genre: " + genre);
        }

        if (detailLevel == DetailLevel.ARTIST ||
detailLevel == DetailLevel.FULL) {
            if (artist != null) {
                artist.printInfo();
            }
        }

        if (detailLevel == DetailLevel.ALBUM ||
```

```
detailLevel == DetailLevel.FULL) {
            if (album != null) {
                album.printInfo();
            }
        }
    }
```

3. Perbandingan Kode Sebelum dan Sesudah

   Kode Sebelum:

```
public package Assignment;


public class Song {

    private String id;
    private String title;
    private String releaseYear;
    private String musicFileURL;
    private int genre;

    private String albumName;
    private String albumCoverURL;

    private String artistName;
    private String artistAlias;
    private String artistImageURL;

      public Song(String id, String title, String releaseYear,
String musicFileURL) {
        this.id = id;
        this.title = title;
        this.releaseYear = releaseYear;
        this.musicFileURL = musicFileURL;
    }

     public void setAlbum(String albumName, String albumCoverURL)
{
        this.albumName = albumName;
        this.albumCoverURL = albumCoverURL;
    }
```

```
     public void setArtist(String artistName, String artistAlias,
String artistImageURL) {
        this.artistName = artistName;
        this.artistAlias = artistAlias;
        this.artistImageURL = artistImageURL;
    }

    /**
     * Set the genre of this song
     *
     * 0 = undefined
     * 1 = pop
     * 2 = rock
     * 3 = hip hop
     * 4 = RnB
     * 5 = jazz
     * 6 = instrumentals
     * 7 = clowncore
     *
     * @param genre
     */
    public void setGenre(int genre) {
        this.genre = genre;
    }

    /**
     * Print info of the song based on desired detail level
     *
     * 0 = song info only
     * 1 = song info and artist info
     * 2 = song info and album info
     * 3 = song, artist, and album info
     *
     * @param genre
     */
    public void printInfo(int detailLevel) {
        if (detailLevel == 0) {
            System.out.println("song title: " + title);
            System.out.println("release year: " + releaseYear);
            if (genre > 0) {
                System.out.println("genre: " + genre);
            }
        }else if(detailLevel == 1) {
```

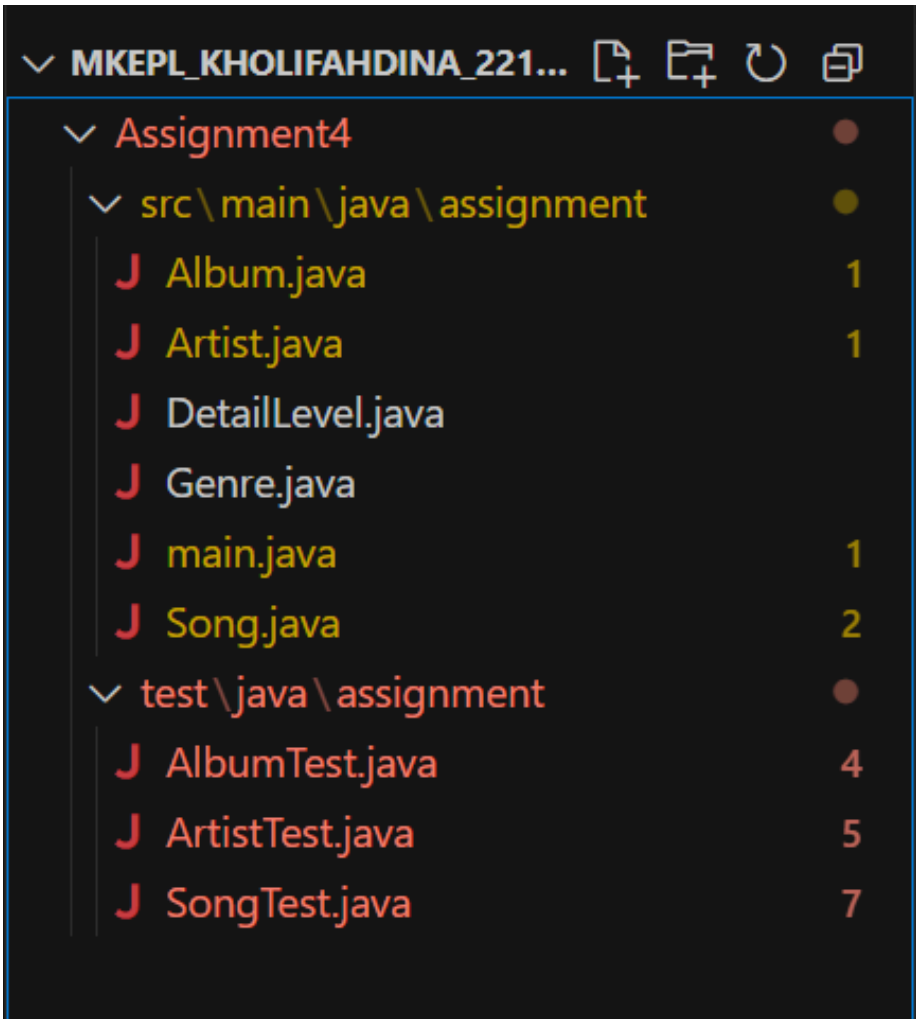
```
            System.out.println("song title: " + title);
            System.out.println("release year: " + releaseYear);
            if (genre > 0) {
                System.out.println("genre: " + genre);
            }
            if (!artistName.equals("")) {
                System.out.println("artist name: " + artistName);
            }
            if (!artistAlias.equals("")) {
                    System.out.println("artist also known as: " +
artistAlias);
            }
        }else if (detailLevel == 2) {
            System.out.println("song title: " + title);
            System.out.println("release year: " + releaseYear);
            if (genre > 0) {
                System.out.println("genre: " + genre);
            }
            if (!albumName.equals("")) {
                System.out.println("album title: " + albumName);
            }
        }else if (detailLevel == 3) {
            System.out.println("song title: " + title);
            System.out.println("release year: " + releaseYear);
            if (genre > 0) {
                System.out.println("genre: " + genre);
            }
            if (!artistName.equals("")) {
                System.out.println("artist name: " + artistName);
            }
            if (!artistAlias.equals("")) {
                    System.out.println("artist also known as: " +
artistAlias);
            }
            if (!albumName.equals("")) {
                System.out.println("album title: " + albumName);
            }
        }
    }

} {

}
```

Kode Setelah:

Modular filenya:



Kodenya:

- Album.java

```java
package assignment;

public class Album {
    private String name;
    private String coverURL;

    public Album(String name, String coverURL) {
        this.name = name;
        this.coverURL = coverURL;
    }
```

```
    public void printInfo() {
        System.out.println("Album title: " + name);
    }
}
```

- Artist.java

```
package assignment;

public class Artist {
    private String name;
    private String alias;
    private String imageURL;

        public  Artist(String  name,  String  alias,  String
imageURL) {
        this.name = name;
        this.alias = alias;
        this.imageURL = imageURL;
    }

    public void printInfo() {
        System.out.println("Artist name: " + name);
        if (!alias.isEmpty()) {
            System.out.println("Also known as: " + alias);
        }
    }
}
```

- DetailLevel.java

```
package assignment;

public enum DetailLevel {
    SONG,       // Hanya info lagu
    ARTIST,     // Info lagu + artis
    ALBUM,      // Info lagu + album
    FULL        // Semua informasi
}
```

- Genre.java

```
package assignment;
```

```
public enum Genre {
    UNDEFINED,
    POP,
    ROCK,
    HIPHOP,
    RNB,
    JAZZ,
    INSTRUMENTALS,
    CLOWNCORE
}
```

- main.java

```
package assignment;


public class main {
    public static void main(String[] args) {
        // Buat objek Song
          Song song = new Song("Genre", "My Song", "2025",
"http://example.com/music.mp3");
        song.setGenre(Genre.POP); // Set genre Pop

        // Buat objek Artist
            Artist artist = new Artist("John Doe", "JD",
"http://example.com/john.jpg");
        song.setArtist(artist);

        // Buat objek Album
                  Album album = new Album("Best Hits",
"http://example.com/album.jpg");
        song.setAlbum(album);

        // Cetak informasi lagu
           song.printInfo(DetailLevel.SONG); // Menampilkan
info lagu, artis, dan album
    }
}
```

- Song.java

```
package assignment;
```

```java
public class Song {
    private String id;
    private String title;
    private String releaseYear;
    private String musicFileURL;
    private Genre genre;
    private Album album;
    private Artist artist;

    public Song(String id, String title, String releaseYear,
String musicFileURL) {
        this.id = id;
        this.title = title;
        this.releaseYear = releaseYear;
        this.musicFileURL = musicFileURL;
        this.genre = Genre.UNDEFINED;
    }

    public void setGenre(Genre genre) {
        this.genre = genre;
    }

    public void setAlbum(Album album) {
        this.album = album;
    }

    public void setArtist(Artist artist) {
        this.artist = artist;
    }

    public void printInfo(DetailLevel detailLevel) {
        System.out.println("Song title: " + title);
        System.out.println("Release year: " + releaseYear);
        if (genre != Genre.UNDEFINED) {
            System.out.println("Genre: " + genre);
        }

        if (detailLevel == DetailLevel.ARTIST || detailLevel
== DetailLevel.FULL) {
            if (artist != null) {
                artist.printInfo();
            }
        }
```

```
        if (detailLevel == DetailLevel.ALBUM || detailLevel
== DetailLevel.FULL) {
            if (album != null) {
                album.printInfo();
            }
        }
    }
}
```

- AlbumTest.java

```
package assignment;

import org.junit.jupiter.api.Test;
import static org.junit.jupiter.api.Assertions.*;

public class AlbumTest {
    @Test
    public void testAlbumCreation() {
                    Album album = new Album("Imagine",
"https://example.com/album-cover.jpg");
        assertEquals("Imagine", album.getName());
    }
}
```

- ArtistTest.java

```
package assignment;

import org.junit.jupiter.api.Test;
import static org.junit.jupiter.api.Assertions.*;

public class ArtistTest {
    @Test
    public void testArtistCreation() {
            Artist artist = new Artist("John Lennon", "The
Dreamer", "https://example.com/john-lennon.jpg");
        assertEquals("John Lennon", artist.getName());
        assertEquals("The Dreamer", artist.getAlias());
    }
}
```

- SongTest.java

```java
package assignment;

import org.junit.jupiter.api.Test;
import static org.junit.jupiter.api.Assertions.*;

public class SongTest {
    @Test
    public void testSongCreation() {
            Song song = new Song("1", "Imagine", "1971",
"https://example.com/imagine.mp3");
        assertEquals("Imagine", song.getTitle());
        assertEquals("1971", song.getReleaseYear());
    }

    @Test
    public void testSetGenre() {
            Song song = new Song("1", "Imagine", "1971",
"https://example.com/imagine.mp3");
        song.setGenre(Genre.ROCK);
        assertEquals(Genre.ROCK, song.getGenre());
    }
}
```

Berikut Link Repository Github: Link