EX NO: 00 DATE:

JAVA APPLICATION FOR R-L-C PARALLEL SERIES CIRCUITS

AIM:

To develop a Java console application to find the total resistance, inductance, and capacitance of series and parallel combination of resistor, inductor, capacitors and display the result.

ALGORITHM:

STEP 1: Declare class Resistor with resistance data member, readValue, printValue, series, parallel member functions and constructors.

STEP 2: Declare class Inductor with inductance data member, readValue, printValue, series, parallel member functions and constructors.

STEP 3: Declare class Capacitor with capacitance data member, readValue, printValue, series, parallel member functions and constructors.

STEP 4: Declare class Calculation2 with a static main function.

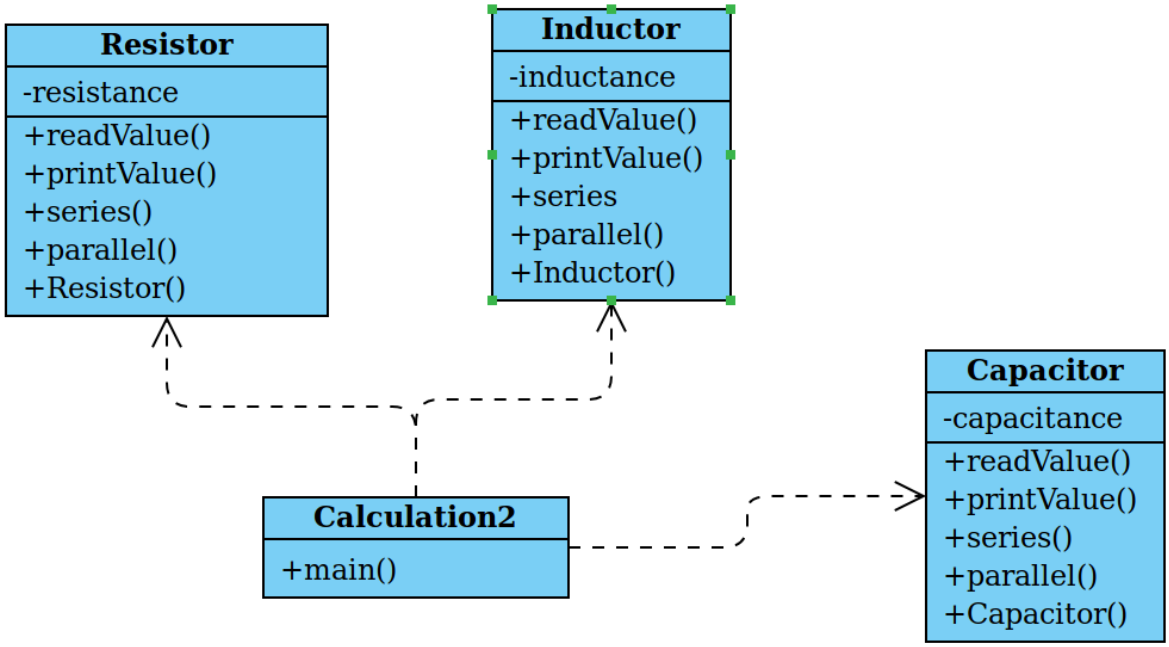
STEP 5: Create objects of type Resistor, Inductor, and Capacitor.

STEP 6: Get the input from user.

STEP 7: Calculate the parallel series combinations.

STEP 8: Display the results.

CLASS DIAGRAM



PROGRAM:

Resistor.java

```
/**
 * Program to represent resistor
 *
 * Developed by
 * C. Obed Otto,
 * Associate Professor, Saveetha Engineering College
 * obedotto@saveetha.ac.in
 */
package electricalcomponents;

import java.io.*;
import java.util.*;


/***************
 * To represent resistor
 *
```

```
 * @author obedotto@saveetha.ac.in
 *
 */
public class Resistor {

	/***
	 * Resistance value in ohm
	 */
	double resistance;


	/****
	 * To initialize the resistor with inital value
	 *
	 * @param v value of the resistance in ohm
	 */
	public Resistor(double v)
	{
		resistance=v;
	}

	/********
	 * Create a resistor with zero resistance
	 */
	public Resistor()
	{
		resistance=0;
	}

	/*************
	 * To read the resistance value from the user
	 */
	void readValue()
	{
		Scanner sc=new Scanner(System.in);
		System.out.print("\nEnter the resistance value ");
		resistance=sc.nextDouble();
	}

	/*******
	 * To print the resistance value
	 */
	void printValue()
	{
```

```
		System.out.print(" "+resistance+" ohm");
	}


	/********
	 * To calculate effective resistance value of two parallel resistors
	 *
	 * @param v Resistor object which is to be connected in parallel
	 * @return Returns the effective total resistance
	 */
	Resistor parallel(Resistor v)
	{
		Resistor r;

			r=new Resistor();
			r.resistance=(v.resistance*this.resistance)/(v.resistance+this.resistance);

			return r;
	}

	/**********
	 * To calculate effective resistance value of two series resistors
	 *
	 * @param v Resistor object which is to be connected in series
	 * @return Returns the effective total resistance
	 */
	Resistor series(Resistor v)
	{
		Resistor r;

			r=new Resistor();
			r.resistance=v.resistance+this.resistance;

			return r;
	}
}
```

Inductor.java

```
/**
```

```
 * Program to represent inductor
 *
 * Developed by
 * C. Obed Otto,
 * Associate Professor, Saveetha Engineering College
 * obedotto@saveetha.ac.in
 */
package electricalcomponents;


import java.util.Scanner;


/***************
 * To represent inductor
 *
 * @author obedotto@saveetha.ac.in
 *
 */
public class Inductor {

	/***
	 * Inductance value in Henry
	 */
	double inductance;


	/****
	 * To initialize the inductor with inital value
	 *
	 * @param v value of the capacitance in henry
	 */
	public Inductor(double v)
	{
		inductance=v;
	}


	/********
	 * Create a inductor with zero inductance
	 */
	public Inductor()
	{
		inductance=0;
```

```
}


/*************
 * To read the inductance value from the user
 */
void readValue()
{
	Scanner sc=new Scanner(System.in);
	System.out.print("\nEnter the inductance value ");
	inductance=sc.nextDouble();
}

/*******
 * To print the inductance value
 */
void printValue()
{
	System.out.print(" "+inductance+" henry");
}


/********
 * To calculate effective inductance value of two parallel inductors
 *
 * @param v Inductor object which is to be connected in parallel
 * @return Returns the effective total inductance
 */
Inductor parallel(Inductor v)
{
	Inductor i;

		i=new Inductor();
		i.inductance=(v.inductance*this.inductance)/(v.inductance+this.inductance);

		return i;
}

/**********
 * To calculate effective inductance value of two series inductors
 *
 * @param v Inductor object which is to be connected in series
 * @return Returns the effective total inductance
 */
```

```
	Inductor series(Inductor v)
	{
		Inductor i;

			i=new Inductor();
			i.inductance=v.inductance+this.inductance;

			return i;
	}
}
```

Capacitor.java

```
/**
 * Program to represent Capacitor
 *
 * Developed by
 * C. Obed Otto,
 * Associate Professor, Saveetha Engineering College
 * obedotto@saveetha.ac.in
 */
package electricalcomponents;
import java.util.Scanner;

/***************
 * To represent capacitor
 *
 * @author obedotto@saveetha.ac.in
 *
 */
public class Capacitor {
	/***
	 * Capacitance value in Farad
	 */
	double capacitance;

	/****
	 * To initialize the capacitor with inital value
	 *
	 * @param v value of the capacitance in farad
```

```
 */
public Capacitor(double v)
{
	capacitance=v;
}

/********
 * Create a capacitor with zero capacitance
 */
public Capacitor()
{
	capacitance=0;
}


/*************
 * To read the capacitance value from the user
 */
void readValue()
{
	Scanner sc=new Scanner(System.in);

	System.out.print("\nEnter the capacitance value ");
	capacitance=sc.nextDouble();
}

/*******
 * To print the capacitance value
 */
void printValue()
{
	System.out.print(" "+capacitance+" farad");
}


/********
 * To calculate effective capacitance value of two parallel capacitors
 *
 * @param v Capacitor object which is to be connected in parallel
 * @return Returns the effective total capacitance
 */
Capacitor parallel(Capacitor v)
{
	Capacitor c;
```

```
		c=new Capacitor();
		c.capacitance=v.capacitance+this.capacitance;

		return c;
	}

	/**********
	 * To calculate effective capacitance value of two series capacitors
	 *
	 * @param v Capacitor object which is to be connected in series
	 * @return Returns the effective total capacitance
	 */
	Capacitor series(Capacitor v)
	{
		Capacitor c;

		c=new Capacitor();
		c.capacitance=(v.capacitance*this.capacitance)/(v.capacitance+this.capacitance);

		return c;
	}
}
```

Calculation2.java

```
/**
 * Program to calculate the effective resistance, inductance and capacitance values
 *
 * Developed by
 * C. Obed Otto,
 * Associate Professor, Saveetha Engineering College
 * obedotto@saveetha.ac.in
 */
package electricalcomponents;

/*****
 * To perform series, parallel RLC calculation
 *
 * @author obedotto@saveetha.ac.in
 *
 */
public class Calculation2 {
```

```
	/********
	 * Program Entry Point
	 * @param args command line parameters
	 */
	public static void main(String[] args) {
		Resistor r1,r2,r3,r4;


			r1=new Resistor();
			r1.readValue();

			r2=new Resistor();
			r2.readValue();


			r3=r1.parallel(r2);
			System.out.print("Effective parallel resistance:");
			r3.printValue();

			r4=r1.series(r2);
			System.out.print("\nEffective series resistance:");
			r4.printValue();
		}
}
```

OUTPUT:

Enter the resistance value 100

Enter the resistance value 100

Effective parallel resistance: 50.0 ohm

Effective series resistance: 200.0 ohm

RESULT:

Thus a Java console application is developed to find the overall resistance, inductance, and capacitance of parallel, series resistor, inductor, and capacitors.