CSE131s PROJECT TASK (1)
DOCUMENTATION
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CODE:

```cpp
#include <iostream>
#include <string>
using namespace std;
// A function to calculate total resistance in series
double seriesResistance(double r1, double r2, double r3) {
    return r1 + r2 + r3;
}

// A function to calculate total resistance in parallel
double parallelResistance(double r1, double r2, double r3) {
    return 1 / (1 / r1 + 1 / r2 + 1 / r3);
}

// A function to calculate current using Ohm's law
double current(double v, double r) {
    return v / r;
}
int main() {
    string input; //entire user input string
    string voltage; //user input string for voltage
    char type; //"S" for series or "P" for parallel
    double v; //voltage applied to the circuit
    double r1, r2, r3; //values of resistances
    double rt; //value of total resistance
    double i; //current

    cout << "Enter Circuit type (S or P) and resistances (separated by spaces): ";
    getline(cin, input); //get entire line as a single string for circuit description

    type = input[0]; //first character is circuit type

    //convert the rest of the string to double using stod
    int space = input.find(' '); //position of first space after type
    r1 = stod(input.substr(space + 1, input.find(' ', space + 1) - space - 1));
    space = input.find(' ', space + 1); //position of second space after r1
    r2 = stod(input.substr(space + 1, input.find(' ', space + 1) - space - 1));
    space = input.find(' ', space + 1); //position of third space after r2
    r3 = stod(input.substr(space + 1));

    cout << "Enter voltage applied to the circuit: ";
    getline(cin, voltage); //get entire line as a single string for voltage

    //convert the voltage string to double using stod
    v = stod(voltage);
```

```cpp
    if (type == 'S'|| type == 's') {
        rt = seriesResistance(r1, r2, r3);
        cout << "Total resistance in series: " << rt << " ohms\n";
        i = current(v, rt);
        cout << "Current in series: " << i << " amps\n";
    }

    else if (type == 'P' || type == 'p') {
        rt = parallelResistance(r1, r2, r3);
        cout << "Total resistance in parallel: " << rt << " ohms\n";
        i = current(v, rt);
        cout << "Current in parallel: " << i << " amps\n";
    }

    else {
        cout << "Invalid input.\n";
    }

    return 0;
}
```

TEST CASES:

```
Enter Circuit type (S or P) and resistances (separated by spaces): S 1 2 3
Enter voltage applied to the circuit: 3
Total resistance in series: 6 ohms
Current in series: 0.5 amps
```

$\because V = 3V$, $R_{eq} = 1 + 2 + 3 = 6\ \Omega$ #PASS

$\therefore I = V/\ Req = 0.5\ Amp$ #PASS

```
Enter Circuit type (S or P) and resistances (separated by spaces): p 2 2 2
Enter voltage applied to the circuit: 6
Total resistance in parallel: 0.666667 ohms
Current in parallel: 9 amps
```

$\because V = 6V$, $R_{eq} = (\frac{1}{2} + \frac{1}{2} + \frac{1}{2})^{-1} = 0.666667\ \Omega$ #PASS

$\therefore I = V/\ Req = 0.5\ Amp$ #PASS

```
Enter Circuit type (S or P) and resistances (separated by spaces): S 4 2 6
Enter voltage applied to the circuit: 7
Total resistance in series: 12 ohms
Current in series: 0.583333 amps
```

$\because V = 7V$, $R_{eq} = 4 + 2 + 6 = 12\ \Omega$ **#PASS**

$\therefore I = V/\ Req = 0.5833$ Amp **#PASS**

```
Enter Circuit type (S or P) and resistances (separated by spaces): p 9 1 4
Enter voltage applied to the circuit: 9
Total resistance in parallel: 0.734694 ohms
Current in parallel: 12.25 amps
```

$\because V = 9V$, $R_{eq} = (\frac{1}{9} + \frac{1}{1} + \frac{1}{4})^{-1} = 0.7347\ \Omega$ **#PASS**

$\therefore I = V/\ Req = 12.25$ Amp **#PASS**

```
Enter Circuit type (S or P) and resistances (separated by spaces): S 8 3 3
Enter voltage applied to the circuit: 5
Total resistance in series: 14 ohms
Current in series: 0.357143 amps
```

$\because V = 5V$, $R_{eq} = 8 + 3 + 3 = 14\ \Omega$ **#PASS**

$\therefore I = V/\ Req = 0.3571$ **#PASS**

◯ GitHub

SCAN THE QR CODE FOR:

- Complete project progress
- Current and previous versions of code
- Source files
- First access to any edits and project extras
- PDFs including:
  - Given tasks.
  - My documentation.
    (LIGHT & DARK themed)

OR VISIT THE LINK:

https://bit.ly/CSE131Proj

[or you can also just click on the **GitHub** icon above :) **]**