

CSE131s PROJECT TASK (2)

DOCUMENTATION

Shehab Mahmoud Salah Hafez

2100320

SECTION 7

CODE:

```
#include <iostream>
#include <string>
#include <cmath>
using namespace std;

// Define a function that can handle series circuits
double Series(string input) {
    double SeriesResistance = 0;
    input = input.substr(2, input.length());
    while (toupper(input[0]) != 'E') //-> we assume a user might be lazy and forgets to
    capitalize 'E' :D
    {
        SeriesResistance += stod(input);
        input = input.substr(input.find(" ") + 1, input.length());
    }
    return SeriesResistance;
}

// Define a function that can handle parallel circuits
double Parallel(string input) {
    double ParallelResistance = 0;
    input = input.substr(2, input.length());
    while (toupper(input[0]) != 'E')
    {
        ParallelResistance += pow(stod(input), -1);
        input = input.substr(input.find(" ") + 1, input.length());
    }
    return pow(ParallelResistance, -1);
}

int main() {

    //declare variables
    string input; // Declare a variable to store the circuit description
    cout << "Enter circuit type (S or P) and resistances (separated by spaces): ";
    getline(cin, input); // Get user input for the circuit description

    double v; // Declare a variable to store voltage applied
    cout << "Voltage applied: ";
    cin >> v; // Get user input for voltage applied

    double rt; // Declare a variable to store total resistance
```

```

switch (toupper(input[0])) // Use toupper function to convert input to uppercase
{
case 'S': // If circuit type is S
    rt = Series(input); // Call series function
    break;
case 'P': // If circuit type is P
    rt = Parallel(input); // Call parallel function
    break;
default: // If circuit type is neither S nor P
    cout << "Wrong Circuit Type." << endl;
    return 1; // Terminate program with error code 1
}
cout << "Total resistance: " << rt << endl;
cout << "Circuit current = " << v / rt << endl;
return 0;
}

/* ALTERNATIVE TO SWITCH CASE STATEMENT:
if (toupper(input[0]) == 'S')
{
    rt = Series(input);
}
else if (toupper(input[0]) == 'P')
{
    rt = Parallel(input);
}
else
{
    cout << "Wrong Circuit Description." << endl;
    return 1;
}
*/

```

TEST CASES:

```

Enter circuit type (S or P) and resistances (separated by spaces):
S 1.5 12.85 3.6 5 6.6 7 E
Voltage applied:
3.8
Total resistance: 36.55
Circuit current = 0.103967

```

$$\therefore V = 3.8 \text{ V} \quad , \quad R_{eq} = 1.5 + 12.85 + 3.6 + 5 + 6.6 + 7 = 36.55 \, \Omega$$

#PASS

$$\therefore I = V / R_{eq} = 0.103967 \text{ Amp}$$

#PASS

```
Enter circuit type (S or P) and resistances (separated by spaces):  
L 2.5 5.2 E  
Voltage applied:  
9  
Wrong Circuit Type.
```

```
** Process exited - Return Code: 1 **
```

∴ Circuit type is of the wrong input

∴ Program will exit with code 1

#PASS

```
Enter circuit type (S or P) and resistances (separated by spaces):  
P 1.4 2.26 3 E  
Voltage applied:  
7  
Total resistance: 0.671097  
Circuit current = 10.4307
```

∴ $V = 7\text{ V}$, $R_{eq} = \left(\frac{1}{1.4} + \frac{1}{2.26} + \frac{1}{3}\right)^{-1} = 0.671\ \Omega$

#PASS

∴ $I = V / R_{eq} = 10.43\text{ Amp}$

#PASS

```
Enter circuit type (S or P) and resistances (separated by spaces):  
S 9 E  
Voltage applied:  
9  
Total resistance: 9  
Circuit current = 1
```

∴ $V = 9\text{ V}$, $R_{eq} = 9 = 9\ \Omega$

#PASS

∴ $I = V / R_{eq} = 1\text{ Amp}$

#PASS

```
Enter circuit type (S or P) and resistances (separated by spaces):  
Z 8.2 3.1 1.3 7.8 E  
Voltage applied:  
5  
Wrong Circuit Type.
```

```
** Process exited - Return Code: 1 **
```

∴ Circuit type is of the wrong input

∴ Program will exit with code 1

#PASS

```
Enter circuit type (S or P) and resistances (separated by spaces):
```

```
P 8.2 3.1 1.3 7.8 E
```

```
Voltage applied:
```

```
5
```

```
Total resistance: 0.745174
```

```
Circuit current = 6.70984
```

$$\therefore V = 5 \text{ V} \quad , \quad R_{\text{eq}} = \left(\frac{1}{8.2} + \frac{1}{3.1} + \frac{1}{1.3} + \frac{1}{7.8} \right)^{-1} = 0.745 \, \Omega$$

#PASS

$$\therefore I = V / R_{\text{eq}} = 6.7 \text{ Amp}$$

#PASS



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)



SCAN ME

OR VISIT THE LINK:

<https://bit.ly/CSE131Proj>

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