

Problem № 36
«Cagliostro's resistor»

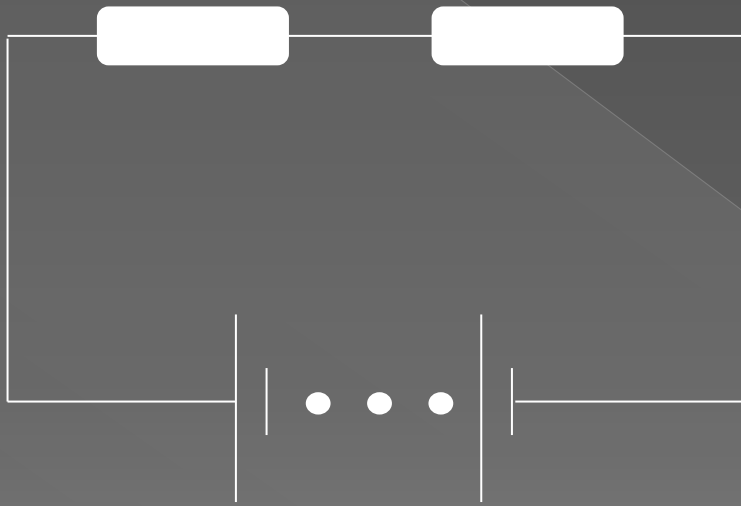
Team Richelieu (Odessa, Ukraine)

Plan of our work

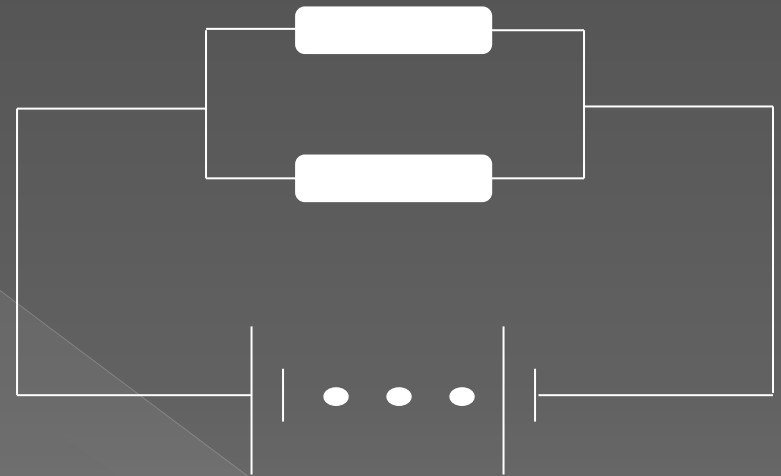
- Theory of series and parallel connection.
- Theoretical solution
- Experimental realization
- Conclusions

Two types of connection

Series



Parallel



$$R = \sum R_i$$

$$\frac{1}{R} = \sum \frac{1}{R_i}$$

First step – Parallel connection

$$\frac{1}{3,75\Omega} = \frac{4}{15\Omega} = \frac{1}{10\Omega} + \frac{1}{10\Omega} + \frac{1}{15\Omega}$$

- So we can connect parallel resistors 10Ω , 10Ω and 15Ω .

Second step – Series connection

- ◉ We have to get the combined resistor with resistance of 15Ω .

$$15\Omega = 10\Omega + 5\Omega$$

- ◉ We can connect series the resistors of 10Ω and 5Ω .

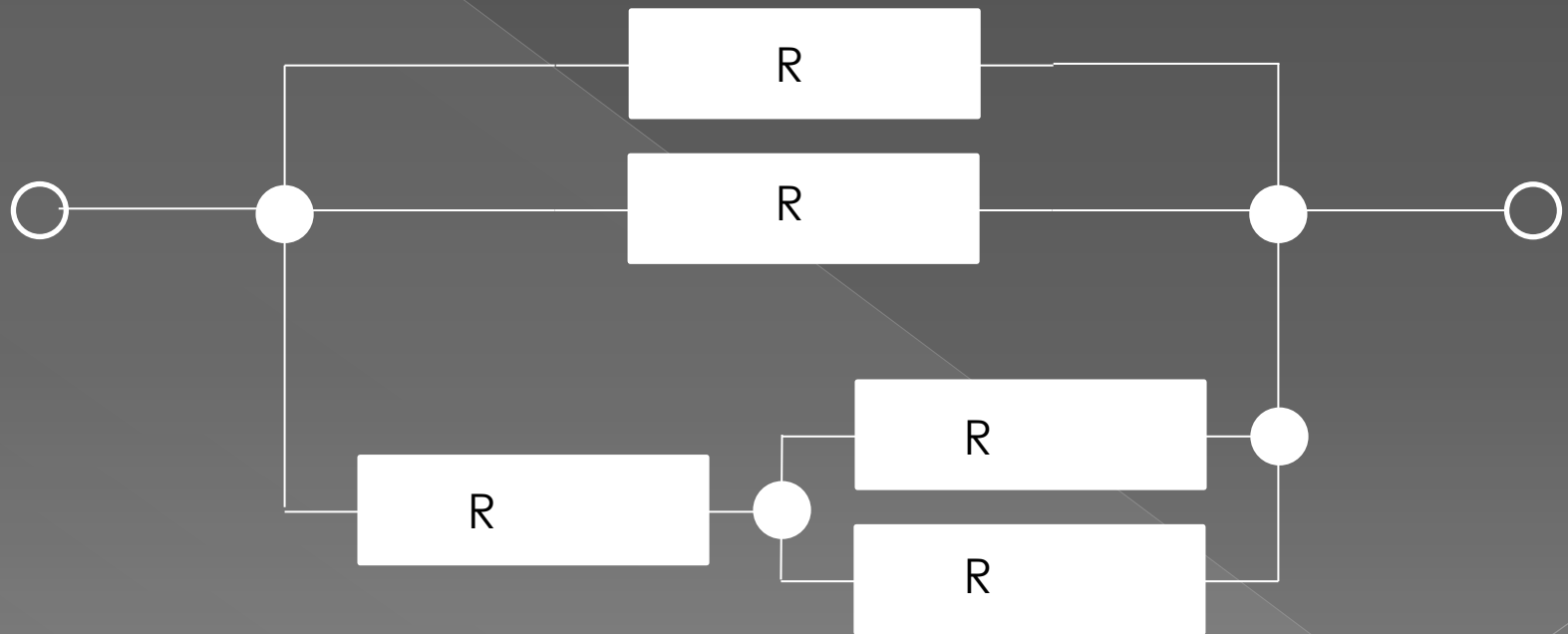
Third step – Parallel connection

- ◉ We have to get the resistance of 5Ω .

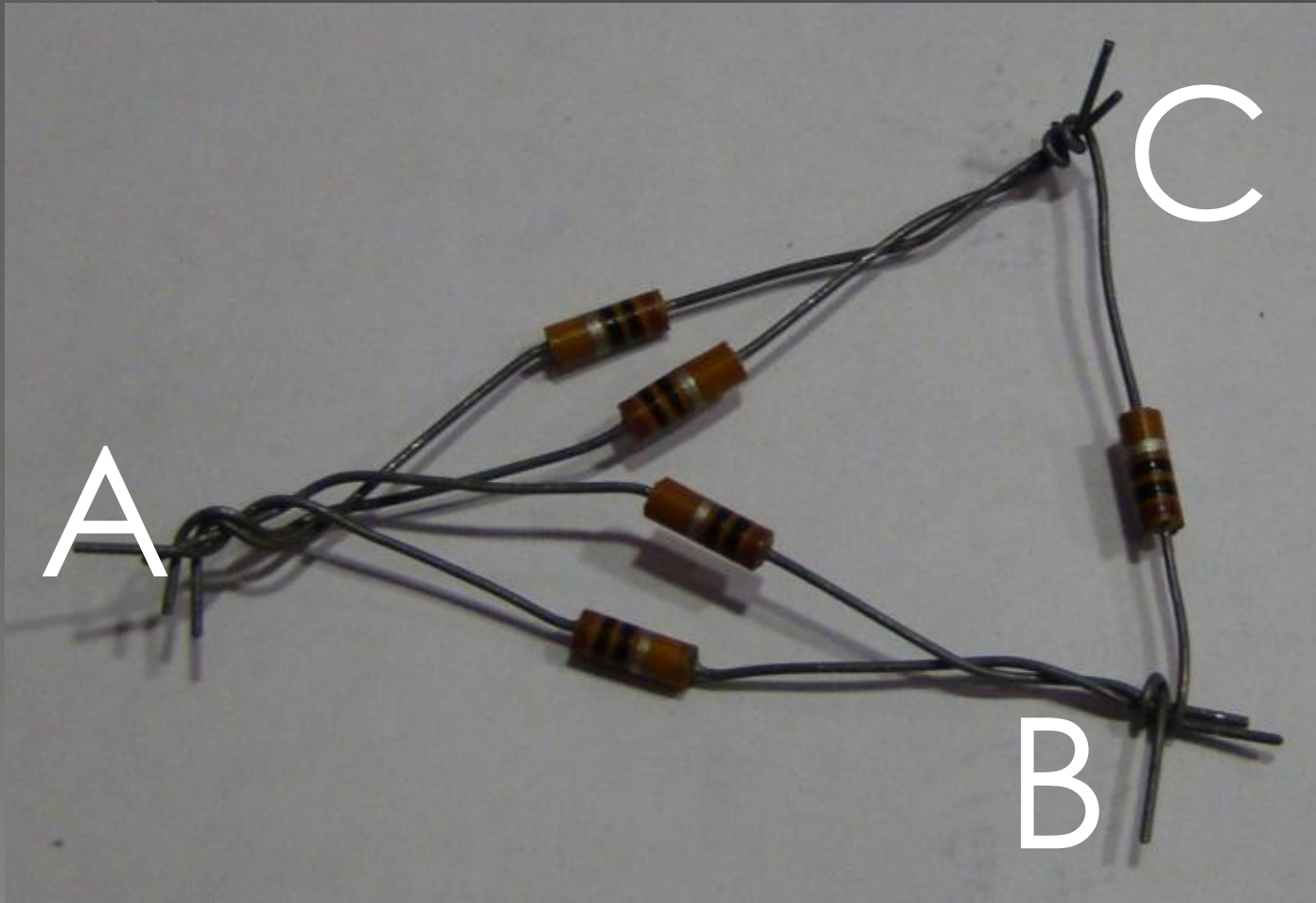
$$\frac{1}{5\Omega} = 2 \cdot \frac{1}{10\Omega}$$

- ◉ We can connect 2 resistors of 10Ω .

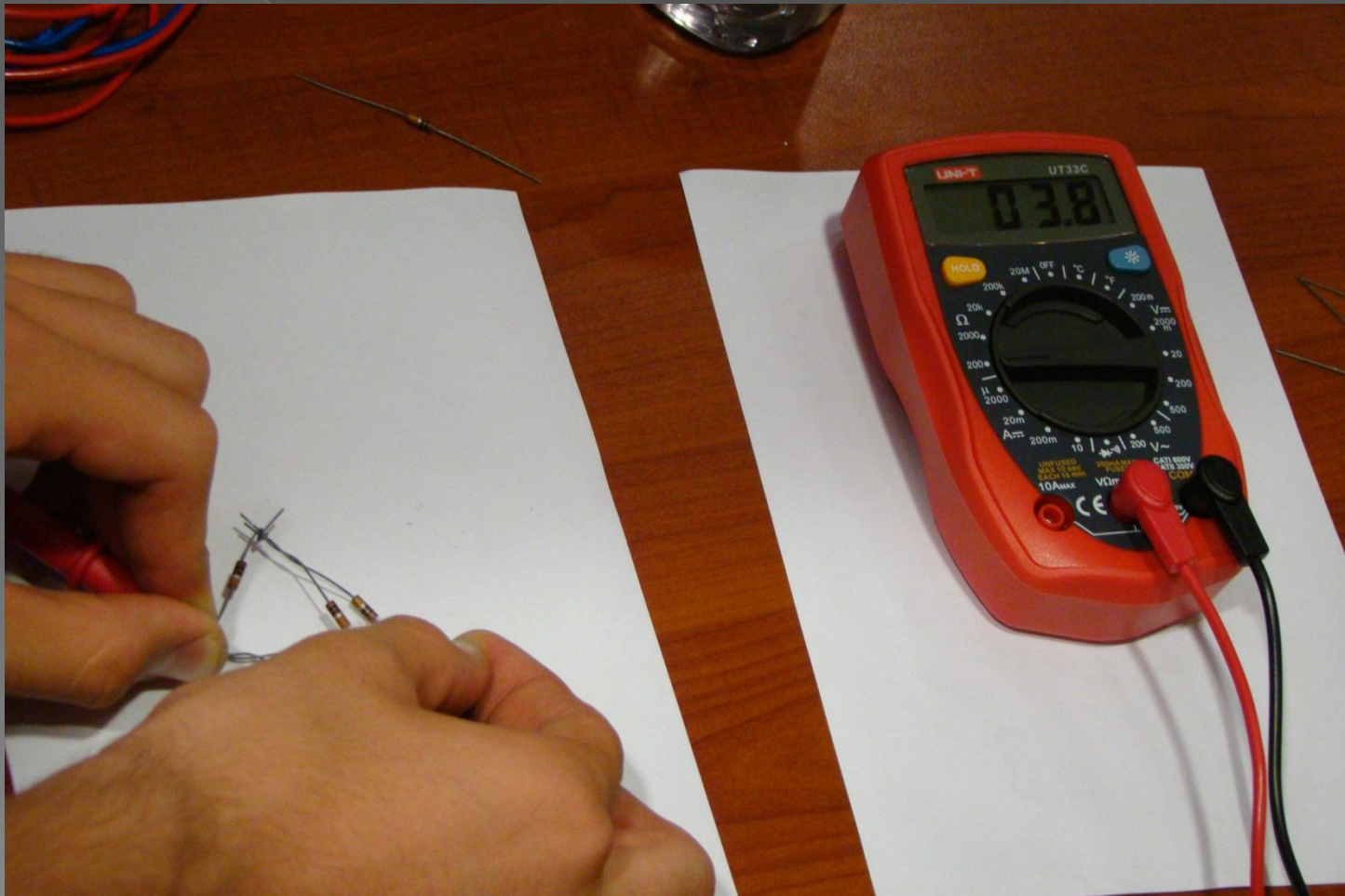
Final scheme



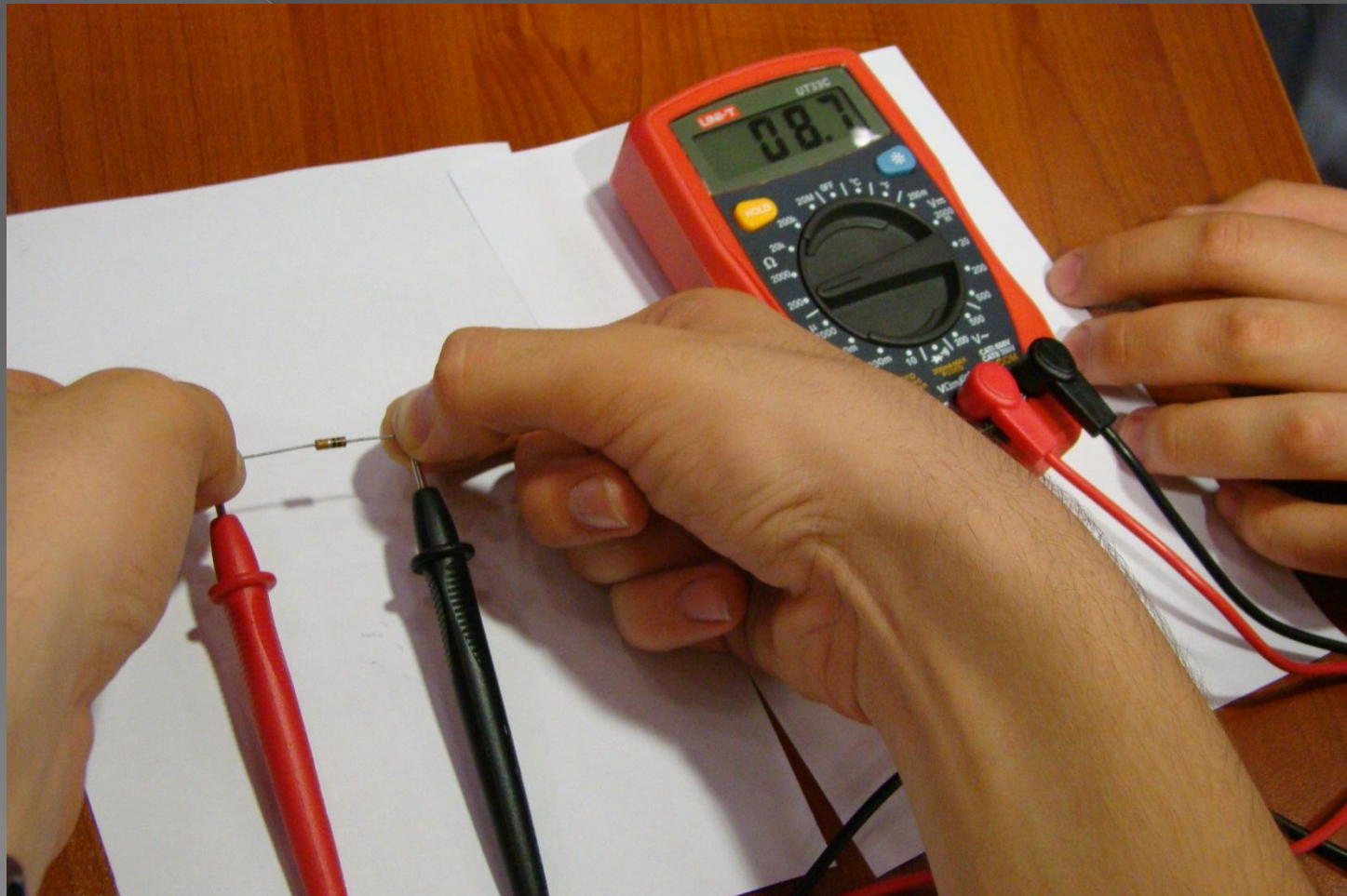
Realization



Our solution checking



Reasons of errors



Conclusion

- ◉ We understand the rules of connection.
- ◉ We derived a theory solution.
- ◉ We realized it and got enough accuracy.

Thanks for your attention!

The report is over.