8. Four resistors (10 points) — *Jaan Kalda and Eero Uustalu. Tools:* four almost identical resistors (of resistance slightly more than **4k**) labelled with letters A–D and the set number, multimeter, voltage source with adjustable output voltage, wires. **Do not use the ammeter function of the multimeter**; if you still do use, and burn the multimeter, you will not be given another multimeter. The multimeter has a four-digit display, but the first digit can be only 0, 1, 2 or 3. When the multimeter is used as ohmmeter, the uncertainty is 1.0% of the reading plus 4 times the smallest digit value. When the multimeter is used as voltmeter, the uncertainty is 0.6% of the reading plus 4 times the smallest digit value.

i) *(2 points)* Write down your set number. Determine the average resistance $\bar{r}$ of the four resistors as precisely as possible and state the uncertainty. Draw the circuit you used.

ii) *(2 points)* Determine the harmonic average resistance $\langle r \rangle$ of the four resistors as precisely as possible (harmonic average is the reciprocal of the average of reciprocals) and state the uncertainty. Draw the circuit you used.

iii) *(1 point)* Arrange the resistors A, B, C and D in increasing order of resistances. Draw the circuit you used.

iv) *(5 points)* Determine $r_A - \bar{r}$, $r_B - \bar{r}$, $r_C - \bar{r}$, and $r_D - \bar{r}$ as precisely as possible and state the uncertainty (r_A, r_B, r_C, and r_D denote the resistances of the respective resistors). Draw the circuit you used.