```
/*
*******************************************************************************
FILENAME        ohmslaw_ver4.cpp

Encoding        UTF-8

DESCRIPTION     Calculate Voltage, Resistance, Current.

FUNCTIONS       Uses "Call by reference".

NOTES           Menu language - English

Compiler        g++ 9.3.0 amd64 running @ Ubuntu 20.04 LTS

Lang dialect    ISO C++14 (g++ by default uses option '-std=gnu++14')

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CHANGES

REF NO  VERSION     DATE (YYMMDD)   WHO DETAIL
-------------------------------------------------------------------------------
        1           2020-11-04      LK  Start date
        2           2020-11-05      LK  Uses more general functions
        3           2020-11-06      LK  Modify error handling "water proof"
        4           2020-11-07      LK  Change to using "call by reference"
*******************************************************************************
*/

#include <iostream>
#include <string>
#include <sstream>
#include <climits>
using namespace std;

void checkInput(string quantity, double& uriVariable);
void showResultat(string quantity, double& uriVariable1, double& uriVariable2);

//Struct for U=R*I
struct ohmsLaw {
    double voltage;
    double current;
    double resistance;
};

int main() {
    char chooseRunagain;
    do {
        string selectCalc; //Use a string for error handling
        char selectedUri;
        ohmsLaw uri;
        cout << "\nOhm's law U=R*I" << endl;
        cout << "===============" << endl;
        cout << "Select the quantity to be calculated:" << endl;
        cout << "Voltage (u), Resistance (r), Current (i), or Quit (q)? ";
        getline(cin, selectCalc); //Read string for error handling
        stringstream(selectCalc) >> selectedUri; //Only use first character
        selectedUri = tolower(selectedUri);

        if (selectedUri == 'u') {
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```
63              checkInput("Current (A)", uri.current);
64              checkInput("Resistance (\u2126)", uri.resistance);
65              showResultat("Voltage", uri.current, uri.resistance);
66          }
67          else if (selectedUri == 'r') {
68              checkInput("Voltage (V)", uri.voltage);
69              checkInput("Current (A)", uri.current);
70              showResultat("Resistance", uri.voltage, uri.current);
71          }
72          else if (selectedUri == 'i') {
73              checkInput("Voltage (V)", uri.voltage);
74              checkInput("Resistance (\u2126)", uri.resistance);
75              showResultat("Current", uri.voltage, uri.resistance);
76          }
77          else if (selectedUri == 'q') {
78              chooseRunagain = 'n';
79          }
80          else {
81              cout << "\nSorry, wrong menu selection!\n";
82          }
83      } while (chooseRunagain != 'n');
84      return 0;
85  }
86
87  //Function for input control with error handling
88  void checkInput(string quantity, double& uriVariable) {
89      do {
90          string testString;
91          cout << quantity << "? ";
92          getline (cin, testString);
93          stringstream(testString) >> uriVariable;
94          if (uriVariable == 0) {
95              cout << "Please check the entry. Try again! " << endl;
96          }
97      }
98      while (uriVariable == 0);
99  }
100
101 //Function for output of result
102 void showResultat(string quantity, double& uriVariable1, double& uriVariable2) {
103     if (quantity == "Voltage") {
104         cout << "\nFormula: U=R*I" << endl;
105         cout << "Known: Current " << uriVariable1 << " A * Resistance "
106          << uriVariable2 << " \u2126 " << endl;
107         cout << "Result: " << quantity << " = " << uriVariable1 * uriVariable2
108          << " V" << endl;
109     }
110     else if (quantity == "Resistance") {
111         cout << "\nFormula: R=U/I" << endl;
112         cout << "Known: Voltage " << uriVariable1 << " V / Current "
113          << uriVariable2 << " A " << endl;
114         cout << "Result: " << quantity << " = " << uriVariable1 / uriVariable2
115          << " \u2126 " << endl;
116     }
117     else if (quantity == "Current") {
118         cout << "\nFormula: I=U/R" << endl;
119         cout << "Known: Voltage " << uriVariable1 << " V / Resistance "
120          << uriVariable2 << " \u2126 " << endl;
121         cout << "Result: " << quantity << " = " << uriVariable1 / uriVariable2
122          << " A" << endl;
123     }
124 }
```