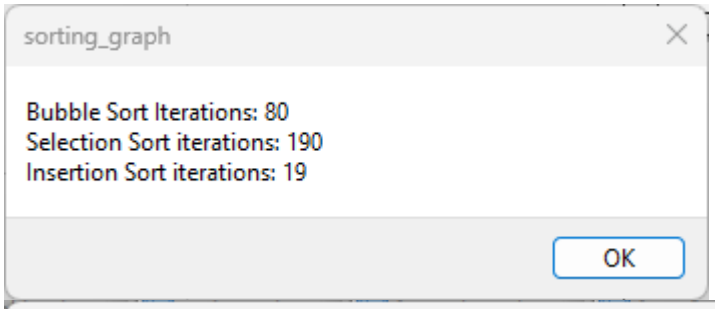
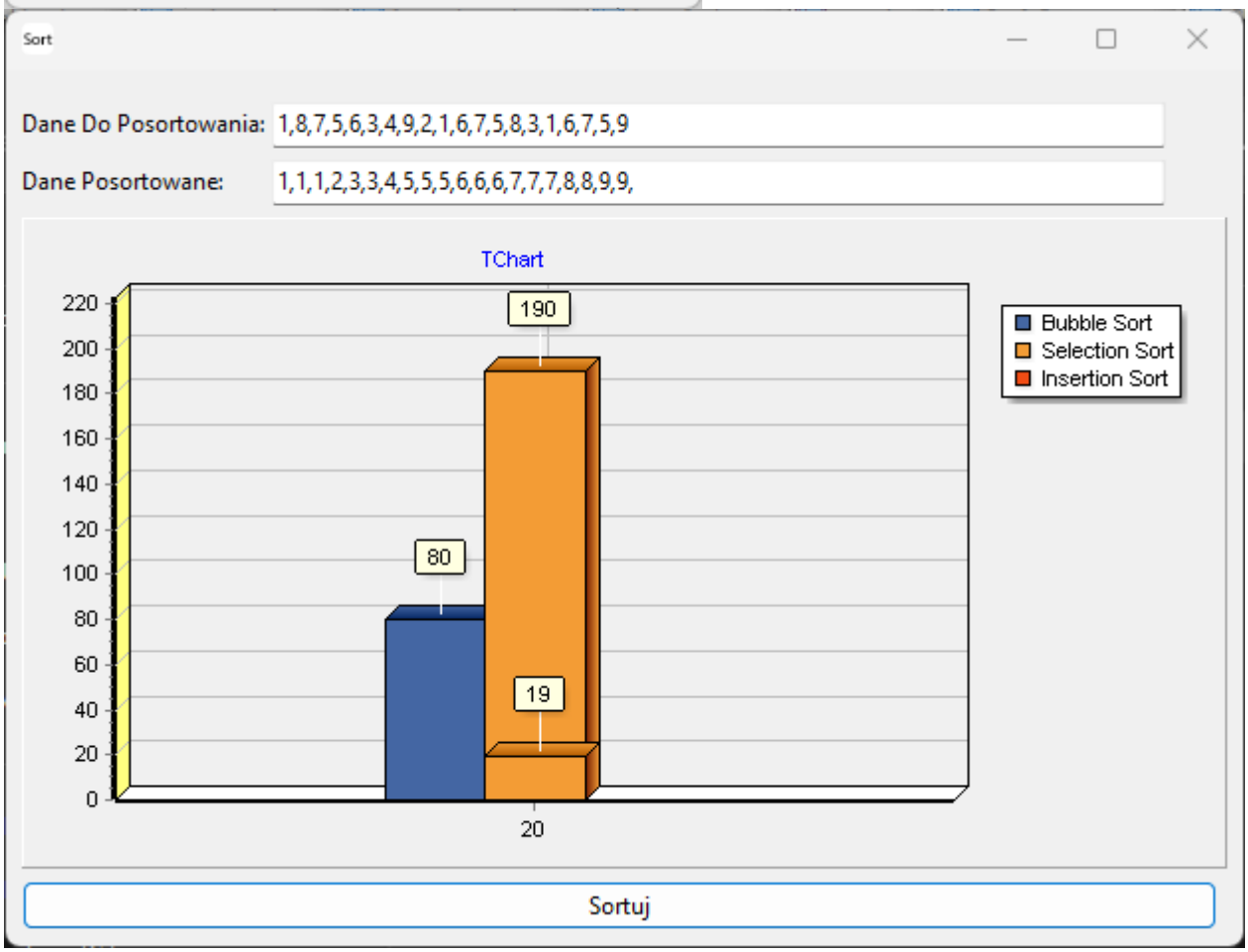
C++: Porównanie wydajności sortowań





pliki:

- sorting_graphs.zip

kod:

main.cpp

```
//---------------------------------------------------------------------------
------

#include <vcl.h>
#pragma hdrstop

#include "Unit2.h"
#include <string>
```

```
//---------------------------------------------------------------------------
------
#pragma package(smart_init)
#pragma resource "*.dfm"
TForm2 *Form2;
//---------------------------------------------------------------------------
------
__fastcall TForm2::TForm2(TComponent* Owner)
    : TForm(Owner)
{
    //AllocConsole();
    //freopen("CONIN$", "r", stdin);
    //freopen("CONOUT$", "w", stdout);
    //freopen("CONOUT$", "w", stderr);
}
//---------------------------------------------------------------------------
------
int iterationsBubble;

int* bubbleSort(int arr[], int size) {
    iterationsBubble = 0;

    for (int i = 0; i < size; ++i) {
        for (int j = 0; j < size - i; ++j) {
            if (arr[j] > arr[j + 1]) {
                // Swap elements if they are in the wrong order
                int temp = arr[j];
                arr[j] = arr[j + 1];
                arr[j + 1] = temp;
                iterationsBubble++;
            }
        }
    }

    //ShowMessage("Bubble Sort Iterations: " +
IntToStr(iterationsBubble));

    return arr; // Return the sorted array
}

int iterationsSelection;

int* selectionSort(int arr[], int size) {
    iterationsSelection = 0;
    for (int i = 0; i < size - 1; ++i) {
        int minIndex = i;

        // Find the index of the minimum element in the unsorted part
of the array
        for (int j = i + 1; j < size; ++j) {
            if (arr[j] < arr[minIndex]) {
```

```
                minIndex = j;
            }
            iterationsSelection ++;
        }

        // Swap the found minimum element with the first element
        int temp = arr[i];
        arr[i] = arr[minIndex];
        arr[minIndex] = temp;
    }

    return arr; // Return the sorted array
}

int iterationsInsertion;

int* insertionSort(int arr[], int size) {
    iterationsInsertion = 0;
    for (int i = 1; i < size; ++i) {
        int key = arr[i];
        int j = i - 1;

        // Move elements greater than key to
        //one position ahead of their current position
        while (j >= 0 && arr[j] > key) {
            arr[j + 1] = arr[j];
            j = j - 1;

        }

        arr[j + 1] = key;
        iterationsInsertion++;
    }

    return arr; // Return the sorted array
}

/*
    String intArrayToString(int arr[], int size) {
        String result = "";

        for (int i = 0; i < size; ++i) {
            if (i > 0) {
                result += ",";
            }
            result += IntToStr(arr[i]);
        }

        return result;
    }
*/
```

```
void __fastcall TForm2::SortButtonClick(TObject *Sender)
{
    String strData = DataTextBox->Text;
    std::cout << AnsiString(strData).c_str() << std::endl;

    int counter = 0;

    for (int i = 1; i <= strData.Length(); i++) {
        if (strData[i] == ',') {
            counter++;
        }
    }

    std::cout << AnsiString(counter+1).c_str() << std::endl;

    // Dynamically allocate memory for intDataArray
    int* intDataArray = new int[counter + 1];

    // Initialize the array elements to avoid garbage values
    for (int i = 0; i <= counter; ++i) {
        intDataArray[i] = 0;  // You can use any default value here
    }

    int numElement = 0;
    String element = "";
    int x = 0;
    for (int i = 1; i <= strData.Length(); i++) {
        x = i;
        if (strData[i] == ',') {
            numElement++;
            intDataArray[numElement] = StrToInt(element);

            std::cout << AnsiString("element:"+element).c_str() <<
std::endl;
            element = ""; // Reset element for the next iteration
        }
        else if (i == strData.Length()) {
            element += strData[i];
            numElement++;
            intDataArray[numElement] = StrToInt(element);

            std::cout << AnsiString("element:"+element).c_str() <<
std::endl;
            element = ""; // Reset element for the next iteration
        } else {
            element += strData[i];
        }
    }

    int arraySize = counter + 1;
```

```
    int* sortedArray = bubbleSort(intDataArray, arraySize);
    SortedDataTextBox->Text = "";
    for (int i = 1; i <= arraySize; i++) {
        SortedDataTextBox->Text += IntToStr(sortedArray[i]);
        SortedDataTextBox->Text += ",";
    }

    selectionSort(intDataArray, arraySize);
    insertionSort(intDataArray, arraySize);
    ShowMessage("Bubble Sort Iterations: " + IntToStr(iterationsBubble)
    + "\nSelection Sort iterations: "+IntToStr(iterationsSelection)+
     "\nInsertion Sort iterations: "+IntToStr(iterationsInsertion));

    Series1->AddXY(arraySize,iterationsBubble);
    Series2->AddXY(arraySize,iterationsSelection);
    Series2->AddXY(arraySize,iterationsInsertion);

    //String arrayString = intArrayToString(sortedString, arraySize);

    //SortedDataTextBox->Text = arrayString;

    // Don't forget to release the dynamically allocated memory
    delete[] intDataArray;
}
//---------------------------------------------------------------------------
------
```