Dechen Thakuri

Project 1: Selecting Sort(C++)

Due : 02/17/2024

```
************************************ IV. main (...) ************************************
step 0: inFile←open input file via argv [1]
outFile←open output file via argv [2]
        deBugFile←open deBugFile via argv [3] // i.e., ofstream deBugFile.open (argv [3])

step 1: count←-countData (inFile, deBugFile)
        deBugFile←“In main () count =” write count.
        // i.e., deBugFile << “In main () count=” << count << \n
step 2: dataAry←dynamically allocate, size of count. // i.e., dataAry = new int [count]
step 3: close inFile
step 4: inFile←open input file via argv [1] // re-open inFile
step 5: loadData (inFile, dataAry, count, deBugFile)
step 6: outFile←** printing data of before sorting. **”
        printDataAry (dataAry, count, outFile, deBugFile)
step 7: selectionSort (dataAry, count, deBugFile)
step 8: outFile← ** Printing data after sorting. ***”
printDataAry (dataAry, count, outFile, deBugFile)
step 9: close all files
************************************
```

Source Code:

```
#include <iostream>
#include <fstream>
using namespace std;

class Sort{
private:
   int count;
   int* dataAry;
public:
   Sort() {
      count = 0;
      dataAry = nullptr;
   }

   int countData(ifstream& inFile, ofstream& deBugFile){
      deBugFile << "Entering countData ()"  << endl;
      count = 0;
      int data;
      while (inFile >> data) {
         count++;
      }
      deBugFile << "leaving countData count=" << count << endl;
      return count;
   }


   void loadData(ifstream& inFile, int* dataAry, int count, ofstream& deBugFile){
      deBugFile << "Entering loadData ()" << endl;
      int index = 0;
      int data;
      while (index < count && inFile >> data) {
         dataAry[index] = data;
         index++;
      }
      deBugFile  << "leaving loadData" << endl;


   }
   void selectionSort(int* dataAry, int count, ofstream& deBugFile){
      deBugFile << "Entering selectionSort()";
      int minVal, minIndex, tmp;
      for (int i = 0; i < count-1; i++) {
```

```
            minVal = dataAry[i];
            minIndex = i;
            for (int j = i + 1; j < count; j++){
               if(dataAry[j] < minVal){
                  minIndex = j;
                  minVal = dataAry[j];
               }
            }
            if (minIndex != i){
               tmp = dataAry[i];
               dataAry[i] =  dataAry[minIndex];
               dataAry[minIndex] = tmp;
            }
            deBugFile << "** In selectionSort printing dataAry i = " << i << " minIndex= " << minIndex
<< endl;
               printDataAry(dataAry, count, deBugFile, deBugFile);
         }
         deBugFile << "leaving selectionSort()" << endl;
      }


      void printDataAry(int* dataAry, int count, ofstream& fileOut, ofstream& deBugFile){
         deBugFile << "Entering printDataAry ()" << endl;
         int index = 0;
         while (index < count){
            fileOut << dataAry[index] << endl;
            index++;
         }
         deBugFile << "leaving printDataAry ()"<< endl;
      }

};



int main(int argc, char* argv[]){
   ifstream inFile(argv[1]);
   ofstream outFile(argv[2]);
   ofstream deBugFile(argv[3]);

   Sort sorter;
   int count = sorter.countData(inFile, deBugFile);
   deBugFile << "In main () count = " << count<< endl;
   int* dataAry = new int[count];
```

```
    inFile.close();
    inFile.open(argv[1]);
    sorter.loadData(inFile, dataAry, count, deBugFile);
    outFile << "*** Printing Data of before sorting ***" << endl;
    sorter.printDataAry(dataAry, count, outFile, deBugFile);
    sorter.selectionSort(dataAry, count,deBugFile);
    outFile << "*** Printing Data after sorting ***" << endl;
    sorter.printDataAry(dataAry, count, outFile, deBugFile);

    inFile.close();
    outFile.close();
    deBugFile.close();

    return 0;

}
```

outFile for data1

*** Printing Data of before sorting ***
8
99
12
33
14
45
213
23
72
*** Printing Data after sorting ***
8
12
14
23
33
45
72
99
213

deBugFile for data1

```
Entering countData ()
leaving countData count=9
In main () count = 9
Entering loadData ()
leaving loadData
Entering printDataAry ()
leaving printDataAry ()
Entering selectionSort()** In selectionSort printing dataAry i = 0 minIndex= 0
Entering printDataAry ()
8
99
12
33
14
45
213
23
72
leaving printDataAry ()
** In selectionSort printing dataAry i = 1 minIndex= 2
Entering printDataAry ()
8
12
99
33
14
45
213
23
72
leaving printDataAry ()
** In selectionSort printing dataAry i = 2 minIndex= 4
Entering printDataAry ()
8
12
14
33
99
45
213
23
72
```

```
leaving printDataAry ()
** In selectionSort printing dataAry i = 3 minIndex= 7
Entering printDataAry ()
8
12
14
23
99
45
213
33
72
leaving printDataAry ()
** In selectionSort printing dataAry i = 4 minIndex= 7
Entering printDataAry ()
8
12
14
23
33
45
213
99
72
leaving printDataAry ()
** In selectionSort printing dataAry i = 5 minIndex= 5
Entering printDataAry ()
8
12
14
23
33
45
213
99
72
leaving printDataAry ()
** In selectionSort printing dataAry i = 6 minIndex= 8
Entering printDataAry ()
8
12
14
23
33
```

45
72
99
213
leaving printDataAry ()
** In selectionSort printing dataAry i = 7 minIndex= 7
Entering printDataAry ()
8
12
14
23
33
45
72
99
213
leaving printDataAry ()
leaving selectionSort()
Entering printDataAry ()
leaving printDataAry ()

outFile for data2

*** Printing Data of before sorting ***
8
99
12
33
14
45
13
23
72
14
7
18
36
51
58
66
89
8
99
12

```
33
14
45
13
23
72
14
7
18
36
51
58
66
89
*** Printing Data after sorting ***
7
7
8
8
12
12
13
13
14
14
14
14
18
18
23
23
33
33
36
36
45
45
51
51
58
58
66
66
72
```

72
89
89
99
99

deBugFile for data2

Entering countData ()
leaving countData count=34
In main () count = 34
Entering loadData ()
leaving loadData
Entering printDataAry ()
leaving printDataAry ()
Entering selectionSort()** In selectionSort printing dataAry i = 0 minIndex= 10
Entering printDataAry ()
7
99
12
33
14
45
13
23
72
14
8
18

```
36
51
58
66
89
8
99
12
33
14
45
13
23
72
14
7
18
36
51
58
66
89
leaving printDataAry ()
** In selectionSort printing dataAry i = 1 minIndex= 27
Entering printDataAry ()
7
7
12
33
14
45
13
23
72
14
8
18
36
51
58
66
89
8
99
```

```
12
33
14
45
13
23
72
14
99
18
36
51
58
66
89
leaving printDataAry ()
** In selectionSort printing dataAry i = 2 minIndex= 10
Entering printDataAry ()
7
7
8
33
14
45
13
23
72
14
12
18
36
51
58
66
89
8
99
12
33
14
45
13
23
72
```

```
14
99
18
36
51
58
66
89
leaving printDataAry ()
** In selectionSort printing dataAry i = 3 minIndex= 17
Entering printDataAry ()
7
7
8
8
14
45
13
23
72
14
12
18
36
51
58
66
89
33
99
12
33
14
45
13
23
72
14
99
18
36
51
58
66
```

```
89
leaving printDataAry ()
** In selectionSort printing dataAry i = 4 minIndex= 10
Entering printDataAry ()
7
7
8
8
12
45
13
23
72
14
14
18
36
51
58
66
89
33
99
12
33
14
45
13
23
72
14
99
18
36
51
58
66
89
leaving printDataAry ()
** In selectionSort printing dataAry i = 5 minIndex= 19
Entering printDataAry ()
7
7
8
```

```
8
12
12
13
23
72
14
14
18
36
51
58
66
89
33
99
45
33
14
45
13
23
72
14
99
18
36
51
58
66
89
leaving printDataAry ()
** In selectionSort printing dataAry i = 6 minIndex= 6
Entering printDataAry ()
7
7
8
8
12
12
13
23
72
14
```

```
14
18
36
51
58
66
89
33
99
45
33
14
45
13
23
72
14
99
18
36
51
58
66
89
leaving printDataAry ()
** In selectionSort printing dataAry i = 7 minIndex= 23
Entering printDataAry ()
7
7
8
8
12
12
13
13
72
14
14
18
36
51
58
66
89
```

```
33
99
45
33
14
45
23
23
72
14
99
18
36
51
58
66
89
leaving printDataAry ()
** In selectionSort printing dataAry i = 8 minIndex= 9
Entering printDataAry ()
7
7
8
8
12
12
13
13
14
72
14
18
36
51
58
66
89
33
99
45
33
14
45
23
```

```
23
72
14
99
18
36
51
58
66
89
leaving printDataAry ()
** In selectionSort printing dataAry i = 9 minIndex= 10
Entering printDataAry ()
7
7
8
8
12
12
13
13
14
14
72
18
36
51
58
66
89
33
99
45
33
14
45
23
23
72
14
99
18
36
51
```

```
58
66
89
leaving printDataAry ()
** In selectionSort printing dataAry i = 10 minIndex= 21
Entering printDataAry ()
7
7
8
8
12
12
13
13
14
14
14
18
36
51
58
66
89
33
99
45
33
72
45
23
23
72
14
99
18
36
51
58
66
89
leaving printDataAry ()
** In selectionSort printing dataAry i = 11 minIndex= 26
Entering printDataAry ()
7
```

```
7
8
8
12
12
13
13
14
14
14
14
36
51
58
66
89
33
99
45
33
72
45
23
23
72
18
99
18
36
51
58
66
89
leaving printDataAry ()
** In selectionSort printing dataAry i = 12 minIndex= 26
Entering printDataAry ()
7
7
8
8
12
12
13
13
```

```
14
14
14
14
18
51
58
66
89
33
99
45
33
72
45
23
23
72
36
99
18
36
51
58
66
89
leaving printDataAry ()
** In selectionSort printing dataAry i = 13 minIndex= 28
Entering printDataAry ()
7
7
8
8
12
12
13
13
14
14
14
14
18
18
58
```

```
66
89
33
99
45
33
72
45
23
23
72
36
99
51
36
51
58
66
89
leaving printDataAry ()
** In selectionSort printing dataAry i = 14 minIndex= 23
Entering printDataAry ()
7
7
8
8
12
12
13
13
14
14
14
14
18
18
23
66
89
33
99
45
33
72
```

```
45
58
23
72
36
99
51
36
51
58
66
89
leaving printDataAry ()
** In selectionSort printing dataAry i = 15 minIndex= 24
Entering printDataAry ()
7
7
8
8
12
12
13
13
14
14
14
14
18
18
23
23
89
33
99
45
33
72
45
58
66
72
36
99
51
```

```
36
51
58
66
89
leaving printDataAry ()
** In selectionSort printing dataAry i = 16 minIndex= 17
Entering printDataAry ()
7
7
8
8
12
12
13
13
14
14
14
14
18
18
23
23
33
89
99
45
33
72
45
58
66
72
36
99
51
36
51
58
66
89
leaving printDataAry ()
** In selectionSort printing dataAry i = 17 minIndex= 20
```

```
Entering printDataAry ()
7
7
8
8
12
12
13
13
14
14
14
14
18
18
23
23
33
33
99
45
89
72
45
58
66
72
36
99
51
36
51
58
66
89
leaving printDataAry ()
** In selectionSort printing dataAry i = 18 minIndex= 26
Entering printDataAry ()
7
7
8
8
12
12
```

```
13
13
14
14
14
14
18
18
23
23
33
33
36
45
89
72
45
58
66
72
99
99
51
36
51
58
66
89
leaving printDataAry ()
** In selectionSort printing dataAry i = 19 minIndex= 29
Entering printDataAry ()
7
7
8
8
12
12
13
13
14
14
14
14
14
18
```

```
18
23
23
33
33
36
36
89
72
45
58
66
72
99
99
51
45
51
58
66
89
leaving printDataAry ()
** In selectionSort printing dataAry i = 20 minIndex= 22
Entering printDataAry ()
7
7
8
8
12
12
13
13
14
14
14
14
18
18
23
23
33
33
36
36
```

```
45
72
89
58
66
72
99
99
51
45
51
58
66
89
leaving printDataAry ()
** In selectionSort printing dataAry i = 21 minIndex= 29
Entering printDataAry ()
7
7
8
8
12
12
13
13
14
14
14
14
18
18
23
23
33
33
36
36
45
45
89
58
66
72
99
```

```
99
51
72
51
58
66
89
leaving printDataAry ()
** In selectionSort printing dataAry i = 22 minIndex= 28
Entering printDataAry ()
7
7
8
8
12
12
13
13
14
14
14
14
18
18
23
23
33
33
36
36
45
45
51
58
66
72
99
99
89
72
51
58
66
89
```

```
leaving printDataAry ()
** In selectionSort printing dataAry i = 23 minIndex= 30
Entering printDataAry ()
7
7
8
8
12
12
13
13
14
14
14
14
18
18
23
23
33
33
36
36
45
45
51
51
66
72
99
99
89
72
58
58
66
89
leaving printDataAry ()
** In selectionSort printing dataAry i = 24 minIndex= 30
Entering printDataAry ()
7
7
8
8
```

12
12
13
13
14
14
14
14
18
18
23
23
33
33
36
36
45
45
51
51
58
72
99
99
89
72
66
58
66
89
leaving printDataAry ()
** In selectionSort printing dataAry i = 25 minIndex= 31
Entering printDataAry ()
7
7
8
8
12
12
13
13
14
14
14

```
14
18
18
23
23
33
33
36
36
45
45
51
51
58
58
99
99
89
72
66
72
66
89
leaving printDataAry ()
** In selectionSort printing dataAry i = 26 minIndex= 30
Entering printDataAry ()
7
7
8
8
12
12
13
13
14
14
14
14
18
18
23
23
33
33
```

```
36
36
45
45
51
51
58
58
66
99
89
72
99
72
66
89
leaving printDataAry ()
** In selectionSort printing dataAry i = 27 minIndex= 32
Entering printDataAry ()
7
7
8
8
12
12
13
13
14
14
14
14
18
18
23
23
33
33
36
36
45
45
51
51
58
```

```
58
66
66
89
72
99
72
99
89
leaving printDataAry ()
** In selectionSort printing dataAry i = 28 minIndex= 29
Entering printDataAry ()
7
7
8
8
12
12
13
13
14
14
14
14
18
18
23
23
33
33
36
36
45
45
51
51
58
58
66
66
72
89
99
72
```

```
99
89
leaving printDataAry ()
** In selectionSort printing dataAry i = 29 minIndex= 31
Entering printDataAry ()
7
7
8
8
12
12
13
13
14
14
14
14
18
18
23
23
33
33
36
36
45
45
51
51
58
58
66
66
72
72
99
89
99
89
leaving printDataAry ()
** In selectionSort printing dataAry i = 30 minIndex= 31
Entering printDataAry ()
7
7
```

8
8
12
12
13
13
14
14
14
14
18
18
23
23
33
33
36
36
45
45
51
51
58
58
66
66
72
72
89
99
99
89
leaving printDataAry ()
** In selectionSort printing dataAry i = 31 minIndex= 33
Entering printDataAry ()
7
7
8
8
12
12
13
13
14

```
14
14
14
18
18
23
23
33
33
36
36
45
45
51
51
58
58
66
66
72
72
89
89
99
99
leaving printDataAry ()
** In selectionSort printing dataAry i = 32 minIndex= 32
Entering printDataAry ()
7
7
8
8
12
12
13
13
14
14
14
14
18
18
23
23
```

```
33
33
36
36
45
45
51
51
58
58
66
66
72
72
89
89
99
99
leaving printDataAry ()
leaving selectionSort()
Entering printDataAry ()
leaving printDataAry ()
```