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1 // Justin Dang Student ID: 1148267
2 /*
3 Allows the user to enter a set numbber of integers, floats, and chars.
4
5 The program then finds the smallest and second smallest, prints those values.
6
7 Arrays are then sorted and printed out along with the smallest and seconds  ↗
   smallest values
8
9 The arrays are each saved to a text file along with the smallest and second  ↗
   smallest values
10
11 The data is then retrieved and reprinted onto the console.
12 */
13
14 #include <iostream>
15 #include <fstream>
16 using namespace std;
17
18
19 template <typename T>
20 void EnterArray(T a[], char s[], const int n, int x = 1) {
21     switch (x) {
22     case 1: {
23         cout << n << " integers are required to be put in. Press enter after each  ↗
           number" << endl;
24         for (int i = 0; i < n; i++) {
25             cout << "Please enter " << n - i << " more: ";
26             cin >> a[i];
27         }
28         cin.ignore(n, '\n');
29         break;
30     }
31     case 2: {
32         cout << n << " floats are required to be put in. Press enter after each  ↗
           number" << endl;
33
34         for (int i = 0; i < n; i++) {
35             cout << "Please enter " << n - i << " more: ";
36             cin >> a[i];
37         }
38         cin.ignore(n, '\n');
39         break;
40     }
41     case 3: {
42         cout << "Please enter a string of length 5: ";
43         cin.getline(s, n);
44         break;
45     }
46     default: cout << "Error with switch statement input."; break;
47     }
48 }
```

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49
50 template <typename T>
51 void PrintSmall(T a[], T &sVar, T &sVar2, const int n, int x = 1) {
52     sVar = a[0];
53     switch (x) {
54     case 1: {
55         for (int x = 0; x < n; x++) {
56             if (sVar > a[x]) {
57                 sVar2 = sVar;
58                 sVar = a[x];
59             }
60             else if (sVar == a[0])
61                 sVar2 = a[1];
62         }
63         for (int x = 0; x < n; x++) {
64             if ((sVar2 > a[x]) && (a[x] > sVar))
65                 sVar2 = a[x];
66         }
67         break;
68     }
69     case 2: {
70         for (int x = 0; x < n - 1; x++) {
71             if (sVar > a[x]) {
72                 sVar2 = sVar;
73                 sVar = a[x];
74             }
75             else if (sVar == a[0])
76                 sVar2 = a[1];
77         }
78         for (int x = 0; x < n; x++) {
79             if ((sVar2 > a[x]) && (a[x] > sVar))
80                 sVar2 = a[x];
81         }
82         break;
83     }
84     default: cout << "Error with switch statement input."; break;
85 }
86 cout << "\n\n" << "The smallest variable in the array was " << sVar << ". The ↗
      second smallest variable was " <<
      sVar2 << endl;
87 }
88
89
90 template <typename T>
91 void SortArray(T a[], const int n) {
92     T temp;
93     for (int i = 0; i < n; i++) {
94         for (int x = 0; x < n; x++) {
95             if (a[i] > a[x]) {
96                 temp = a[x];
97                 a[x] = a[i];
98                 a[i] = temp;
99             }
100         }
101     }
102 }
```

```
100     }
101 }
102 }
103
104 template <typename T>
105 void SaveF(T a[], char s[], T sVar, T sVar2, const int n, int x = 1) {
106     ofstream outfile;
107     switch (x) {
108     case 1: {
109         ofstream outfile("c:\\Users\\Justin Dang\\Desktop\\C++\\integer.txt",
110             ios::out);
111         outfile << sVar << ' ' << sVar2 << endl;
112         for (int i = 0; i < n; i++) {
113             outfile << a[i] << ' ';
114         }
115         cout << endl;
116         outfile.close();
117         break;
118     case 2: {
119         ofstream outfile("C:\\Users\\Justin Dang\\Desktop\\C++\\float.txt",
120             ios::out);
121         outfile << sVar << ' ' << sVar2 << endl;
122         for (int i = 0; i < n; i++) {
123             outfile << a[i] << ' ';
124         }
125         cout << endl;
126         outfile.close();
127         break;
128     case 3: {
129         ofstream outfile("C:\\Users\\Justin Dang\\Desktop\\C++\\char.txt",
130             ios::out);
131         outfile << s << endl;
132         outfile << sVar << ' ' << sVar2 << endl;
133         outfile.close();
134         break;
135     default: {
136         ofstream outfile("C:\\Users\\Justin Dang\\Desktop\\C++\\integer.txt",
137             ios::out);
138         cout << "Error with switch statement input.";
139         break;
140     }
141 }
142
143 template <typename T>
144 void RetrieveF(T a[], char s[], T &sVar, T &sVar2, const int n, int x = 1) {
145     switch (x) {
146     case 1: {
147         ifstream infile("c:\\Users\\Justin Dang\\Desktop\\C++\\integer.txt",
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        ios::in);
148     infile >> sVar >> sVar2;
149     for (int i = 0; i < n; i++)
150         infile >> a[i];
151     infile.ignore(n, '\n');
152     infile.close();
153     break;
154 }
155 case 2: {
156     ifstream infile("c:\\Users\\Justin Dang\\Desktop\\C++\\float.txt",
157         ios::in);
158     infile >> sVar >> sVar2;
159     for (int i = 0; i < n; i++)
160         infile >> a[i];
161     infile.ignore(n, '\n');
162     infile.close();
163     break;
164 }
165 case 3: {
166     ifstream infile("c:\\Users\\Justin Dang\\Desktop\\C++\\char.txt",
167         ios::in);
168     infile.getline(s, n);
169     infile >> sVar >> sVar2;
170     infile.close();
171     break;
172 }
173 default: {
174     cout << "Error with switch statement input.";
175     break;
176 }
177 }
178 int main() {
179     const int n1 = 5, n2 = 7, n3 = 6;
180     int a[n1], sInt = 0, sInt2 = 0;
181     float b[n2], sFloat = 0.0, sFloat2 = 0.0;
182     char c[n3], sChar = ' ', sChar2 = ' ';
183
184     EnterArray(a, c, n1, 1);
185     PrintSmall(a, sInt, sInt2, n1);
186
187     EnterArray(b, c, n2, 2);
188     PrintSmall(b, sFloat, sFloat2, n2);
189
190     EnterArray(c, c, n3, 3);
191     PrintSmall(c, sChar, sChar2, n3, 2);
192
193     SortArray(a, n1);
194     SortArray(b, n2);
195     SortArray(c, n3);
196 }
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```
197     cout << "Array data without retrieving from text file:" << endl;
198     cout << sInt << ' ' << sInt2 << endl;
199     for (int i = 0; i < n1; i++) {
200         cout << a[i] << ' ';
201     }
202     cout << endl << sFloat << ' ' << sFloat2 << endl;
203     for (int i = 0; i < n2; i++) {
204         cout << b[i] << ' ';
205     }
206     cout << endl << sChar << ' ' << sChar2;
207     cout << endl << c;
208
209     SaveF(a, c, sInt, sInt2, n1, 1);
210     SaveF(b, c, sFloat, sFloat2, n2, 2);
211     SaveF(c, c, sChar, sChar2, n3, 3);
212
213     cout << endl << "Array data after retrieving from text files:" << endl;
214
215     RetrieveF(a, c, sInt, sInt2, n1, 1);
216     RetrieveF(b, c, sFloat, sFloat2, n2, 2);
217     RetrieveF(c, c, sChar, sChar2, n3, 3);
218
219     cout << sInt << ' ' << sInt2 << endl;
220     for (int i = 0; i < n1; i++) {
221         cout << a[i] << ' ';
222     }
223     cout << endl << sFloat << ' ' << sFloat2 << endl;
224     for (int i = 0; i < n2; i++) {
225         cout << b[i] << ' ';
226     }
227     cout << endl << sChar << ' ' << sChar2;
228     cout << endl << c;
229
230     cin.ignore();
231     return 0;
232 }
233 /*
234 5 integers are required to be put in. Press enter after each number
235 Please enter 5 more: 5
236 Please enter 4 more: 1
237 Please enter 3 more: 4
238 Please enter 2 more: 2
239 Please enter 1 more: 3
240
241
242 The smallest variable in the array was 1. The second smallest variable was 2
243 7 floats are required to be put in. Press enter after each number
244 Please enter 7 more: 7.7
245 Please enter 6 more: 1.1
246 Please enter 5 more: 6.6
247 Please enter 4 more: 2.2
248 Please enter 3 more: 5.5
```

```
249 Please enter 2 more: 3.3
250 Please enter 1 more: 4.4
251
252
253 The smallest variable in the array was 1.1. The second smallest variable was 2.2
254 Please enter a string of length 5: HELLO
255
256
257 The smallest variable in the array was E. The second smallest variable was H
258 Array data without retrieving from text file:
259 1 2
260 5 4 3 2 1
261 1.1 2.2
262 7.7 6.6 5.5 4.4 3.3 2.2 1.1
263 E H
264 OLLHE
265
266
267 Array data after retrieving from text files:
268 1 2
269 5 4 3 2 1
270 1.1 2.2
271 7.7 6.6 5.5 4.4 3.3 2.2 1.1
272 E H
273 OLLHE
274 */
```