

TP 2 - Problem 12 - I

```
1  #include <iostream>
2
3  #define SHOW(arg) std::cout << "Macro SHOW "" #arg """: " << (arg) << '\n';
4
5  void sort(int a[], int n, int (*compare)(int, int)) {
6      // Put the minimum in the first place, then the remaining minimum in the
7      // second place, etc.
8      for (int i{}; i < n; ++i) {
9          // For now, set the min to a[i] and the index of the min to i.
10         int min{a[i]};
11         int min_index{i};
12         // Find the min from i to n.
13         for (int j{i + 1}; j < n; ++j)
14             // If the element is less than the min, update the min and the index
15             // of the min.
16             if ((*compare)(a[j], min))
17                 min = a[j], min_index = j;
18         // Swap the two elements if necessary.
19         if ((min_index != i) && (a[i] != a[min_index])) {
```

TP 2 - Problem 12 - II

```
20     int const tmp{a[i]};
21     a[i] = a[min_index];
22     a[min_index] = tmp;
23 }
24 }
25 }
26
27 // Returns 1 on true and 0 on false.
28 int less(int i, int j) { return i < j; }
29 int greater(int i, int j) { return i > j; }
30
31 int main() {
32     int a[]{3, 2, 1};
33     int constexpr n_a{sizeof a / sizeof a[0]};
34     // Sort in ascending order.
35     sort(a, n_a, less);
36     SHOW(a[0])
37     SHOW(a[1])
38     SHOW(a[2])
39     // Sort in descending order.
```

TP 2 - Problem 12 - III

```
40     sort(a, n_a, greater);
41     SHOW(a[0])
42     SHOW(a[1])
43     SHOW(a[2])
44     return 0;
45 }
```

Output:

```
1  Macro SHOW "a[0]": 1
2  Macro SHOW "a[1]": 2
3  Macro SHOW "a[2]": 3
4  Macro SHOW "a[0]": 3
5  Macro SHOW "a[1]": 2
6  Macro SHOW "a[2]": 1
```