TP 2 - Problem 12 - I

```cpp
#include <iostream>

#define SHOW(arg) std::cout << "Macro SHOW “" #arg "”: " << (arg) << '\n';

void sort(int a[], int n, int (*compare)(int, int)) {
  // Put the minimum in the first place, then the remaining minimum in the
  // second place, etc.
  for (int i{}; i < n; ++i) {
    // For now, set the min to a[i] and the index of the min to i.
    int min{a[i]};
    int min_index{i};
    // Find the min from i to n.
    for (int j{i + 1}; j < n; ++j)
      // If the element is less than the min, update the min and the index
      // of the min.
      if ((*compare)(a[j], min))
        min = a[j], min_index = j;
    // Swap the two elements if necessary.
    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
```