INC 141
Computer Programming

Lab 14

Sorting

Learning Outcomes (Lab 14)

- Implement basic sorting algorithm

Find Minimum

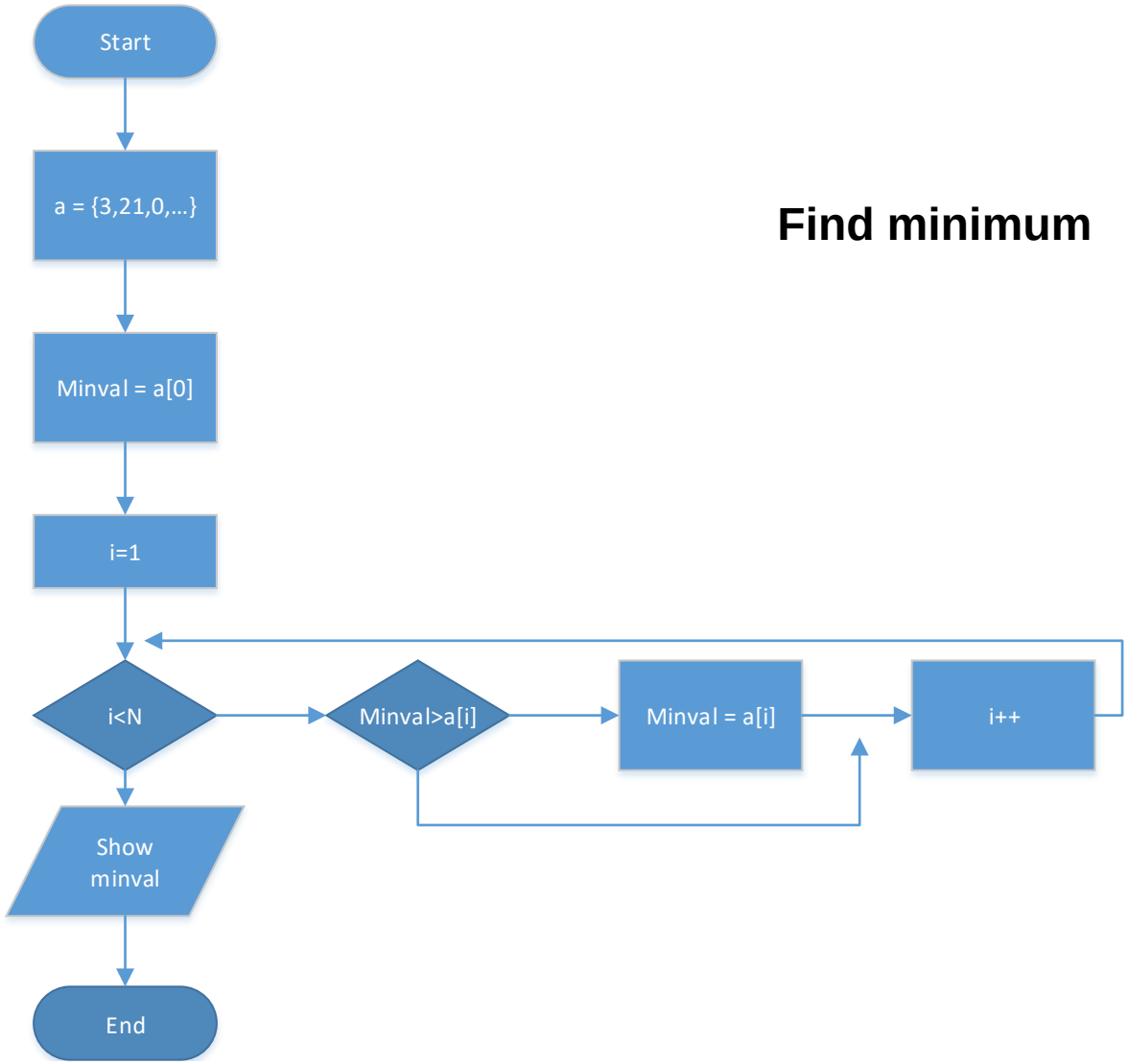
Constant N = 8

```
#include <stdio.h>
#define N 8

main() {
    double a[N] = {3, 21, 0, -3, 34, -14, 45, 18};
    double minval;
    int i;

    minval = a[0];
    for(i= 1; i < N; i++) {
        if(a[i] < minval) {
            minval = a[i];
        }
    }
    printf("The minimum value of the array is %f\n", minval);

}
```

Task 1 (Group)

Write a flowchart of the “find minimum” program.

Find minimum



Task 2 (Group)

Modify the flowchart so that it prints out the value of the minimum number and its position.

e.g.

3, 21, 0, -3, 34, -14, 45, 18

Minimum value = -14
Position = 5

Note: The program will be used again in Task 3

Task 3 (upload to LEB2)

Write a C program that print out the value of the minimum number and its position.

e.g.

3, 21, 0, -3, 34, -14, 45, 18

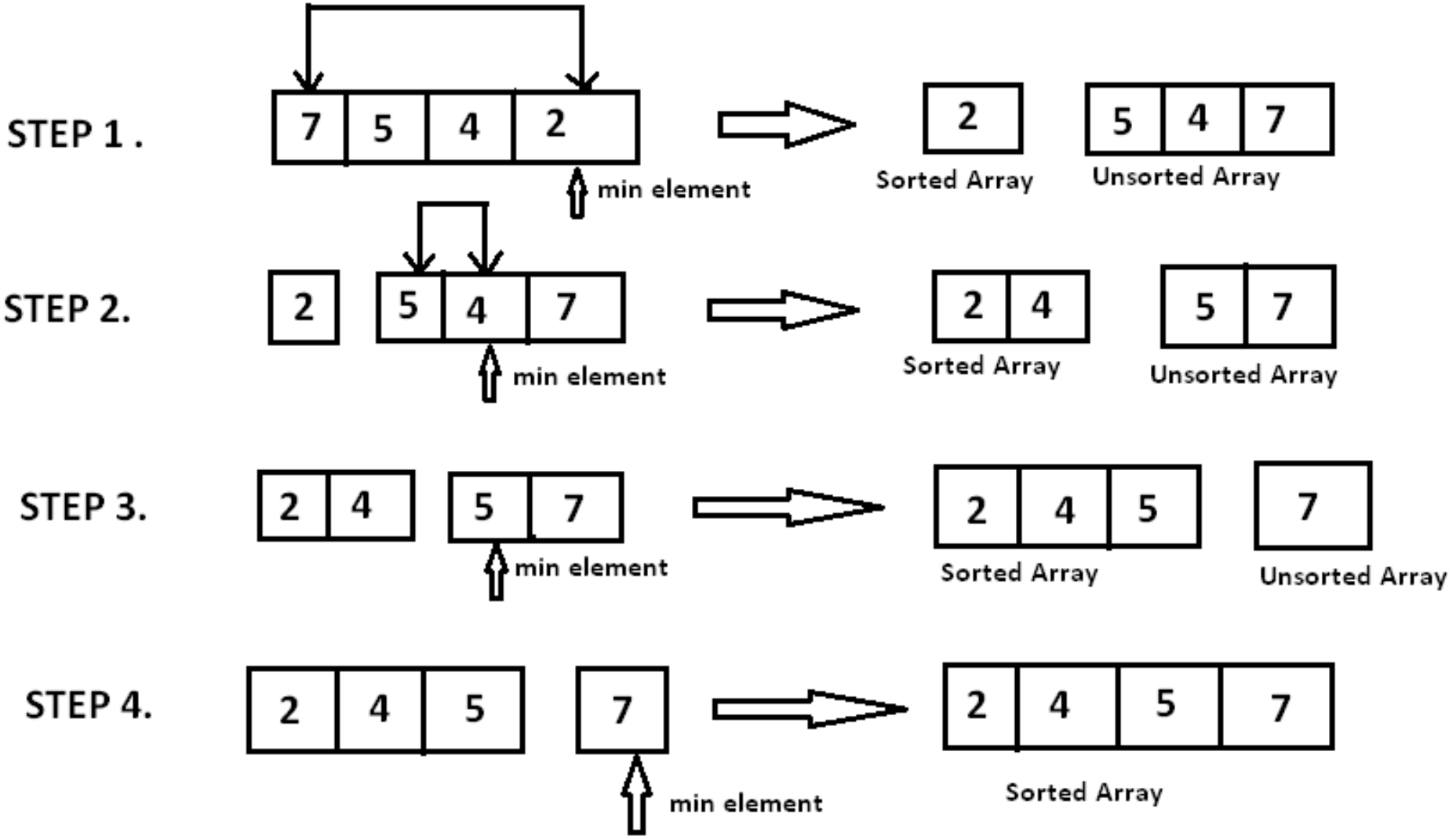
Minimum value = -14
Position = 5

Note: The program will be used again in Task 4

Selection Sort

Repeat

- **Find the minimum of data from counter position to the end**
- **Swap it with the number indexed by a counter**
- **Increase counter by 1**



Selection sort

Task 4 (upload to LEB2)

Write a flowchart/program that sort the numbers from low to high in the array using selection sort and print them out in the correct order.

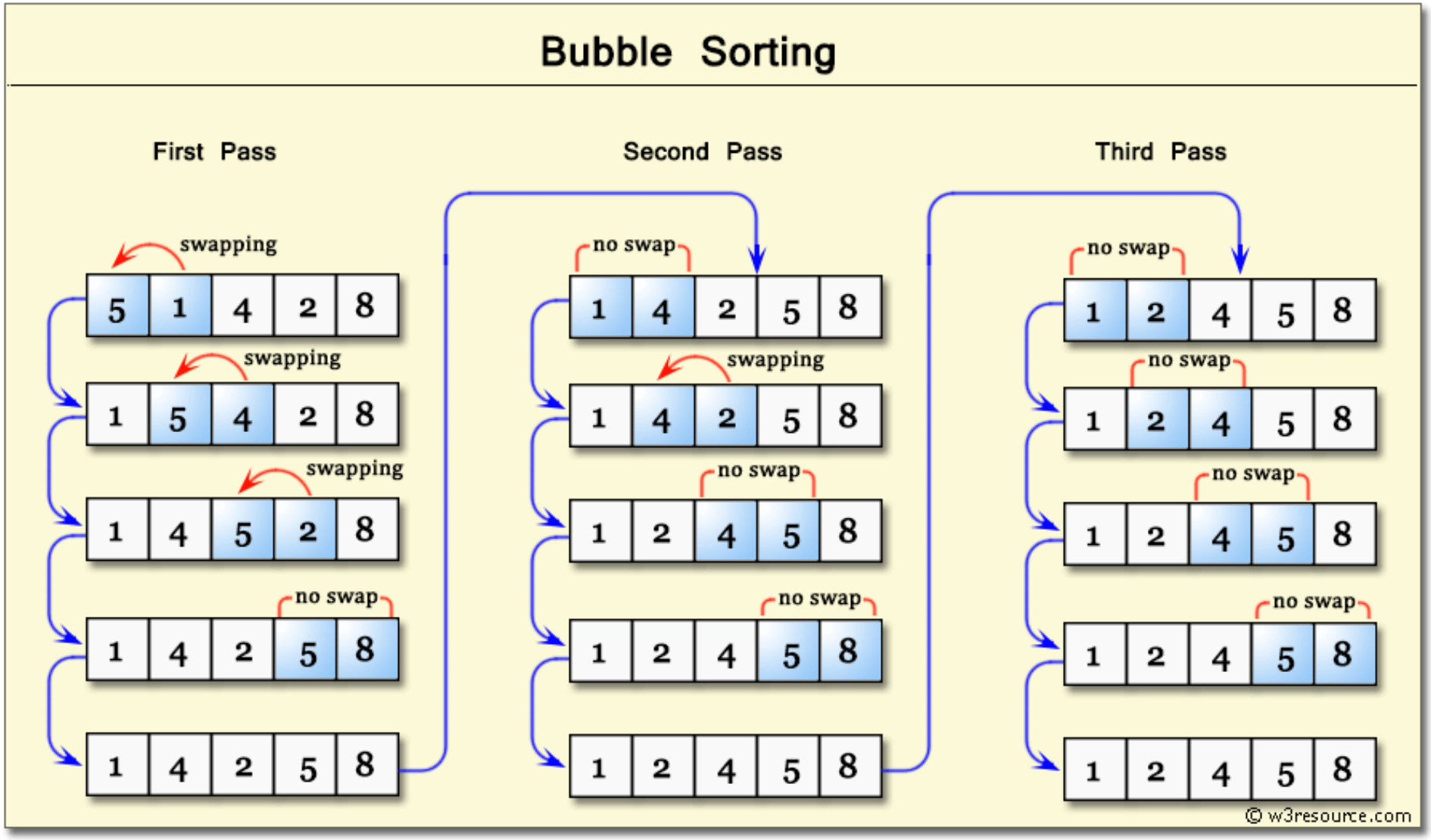
Group = flowchart
Individual = C code

Hint: You need nested loops.
Search Youtube on explanation of how to do.

Extra Task

Write a flowchart/program that sort the numbers from low to high in an array using bubble sort and print them out in the correct order.

Look at Youtube,
search “cs50 bubble sort”
to see how it works.


Bubble Sorting
First Pass
Second Pass
Third Pass
swapping
swapping
swapping
no swap
5 1 4 2 8
1 5 4 2 8
1 4 5 2 8
1 4 2 5 8
1 4 2 5 8
no swap
swapping
no swap
no swap
1 4 2 5 8
1 2 4 5 8
1 2 4 5 8
1 2 4 5 8
1 2 4 5 8
no swap
no swap
no swap
no swap
1 2 4 5 8
1 2 4 5 8
1 2 4 5 8
1 2 4 5 8
1 2 4 5 8
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