

Homework lecture 1

Sort

1. Given a list of integer numbers: 2, 1, 10, 6, 3, 8, 7, 13, 20. Draw the steps to sort (ascending sort) the list by following methods:

- Selection sort

Buoc 1: min value: 1; index: 0

Array: 1 2 10 6 3 8 7 13 20

Buoc 2: min value: 3; index: 1

Array: 1 2 10 6 3 8 7 13 20

Buoc 3: min value: 3; index: 2

Array: 1 2 3 6 10 8 7 13 20

Buoc 4: min value: 7; index: 3

Array: 1 2 3 6 10 8 7 13 20

Buoc 5: min value: 7; index: 4

Array: 1 2 3 6 7 8 10 13 20

Buoc 6: min value: 10; index: 5

Array: 1 2 3 6 7 8 10 13 20

Buoc 7: min value: 13; index: 6

Array: 1 2 3 6 7 8 10 13 20

Buoc 8: min value: 20; index: 7

Array: 1 2 3 6 7 8 10 13 20

Done: 1 2 3 6 7 8 10 13 20

Buoc 1: Insect num: 1

Array: 1 2 10 6 3 8 7 13 20

Buoc 2: Insect num: 10

Array: 1 2 10 6 3 8 7 13 20

Buoc 3: Insect num: 6

Array: 1 2 6 10 3 8 7 13 20

Buoc 4: Insect num: 3

Array: 1 2 3 6 10 8 7 13 20

Buoc 5: Insect num: 8

Array: 1 2 3 6 8 10 7 13 20

Buoc 6: Insect num: 7

Array: 1 2 3 6 7 8 10 13 20

Buoc 7: Insect num: 13

Array: 1 2 3 6 7 8 10 13 20

Done: 1 2 3 6 7 8 10 13 20

- Bubble sort

Buoc: 1: swap 1 & 2

Array: 1 2 10 6 3 8 7 13 20

Buoc: 2: swap 6 & 10

Array: 1 2 6 10 3 8 7 13 20

Buoc: 3: swap 3 & 6

Array: 1 2 3 10 6 8 7 13 20

Buoc: 4: swap 6 & 10

Array: 1 2 3 6 10 8 7 13 20

Buoc: 5: swap 8 & 10

Array: 1 2 3 6 8 10 7 13 20

Buoc: 6: swap 7 & 8

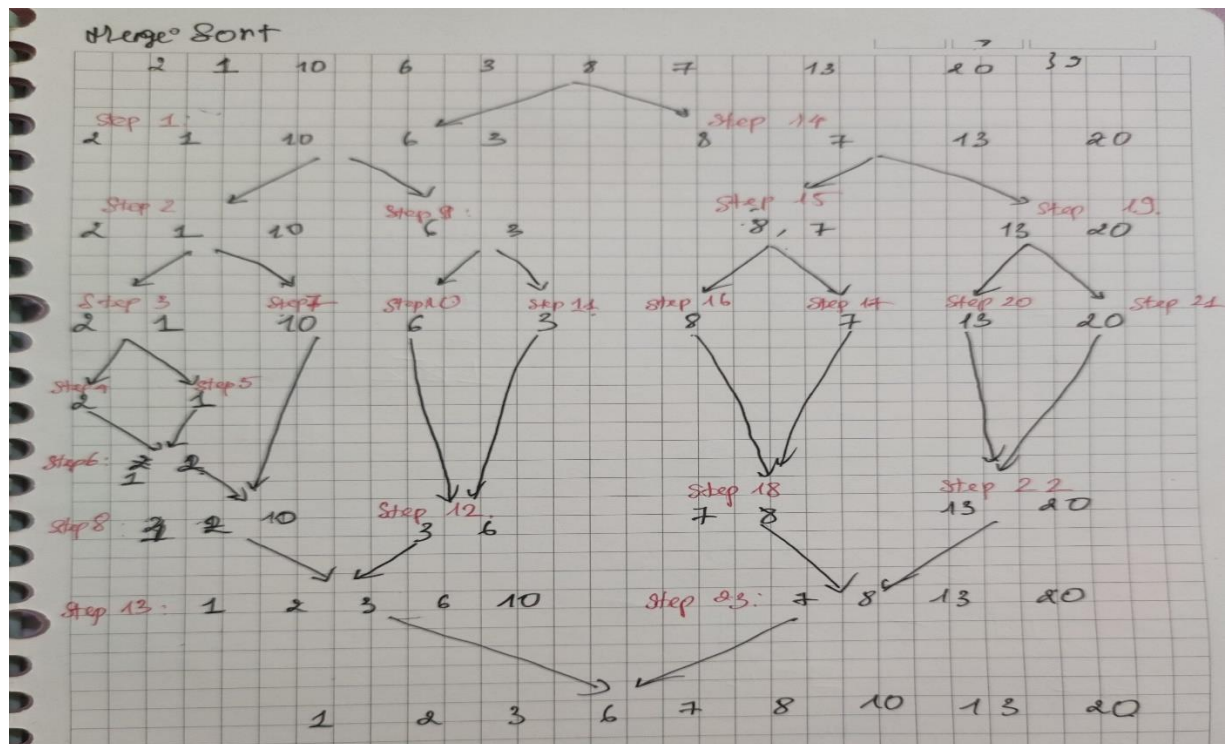
Array: 1 2 3 6 7 10 8 13 20

Buoc: 7: swap 8 & 10

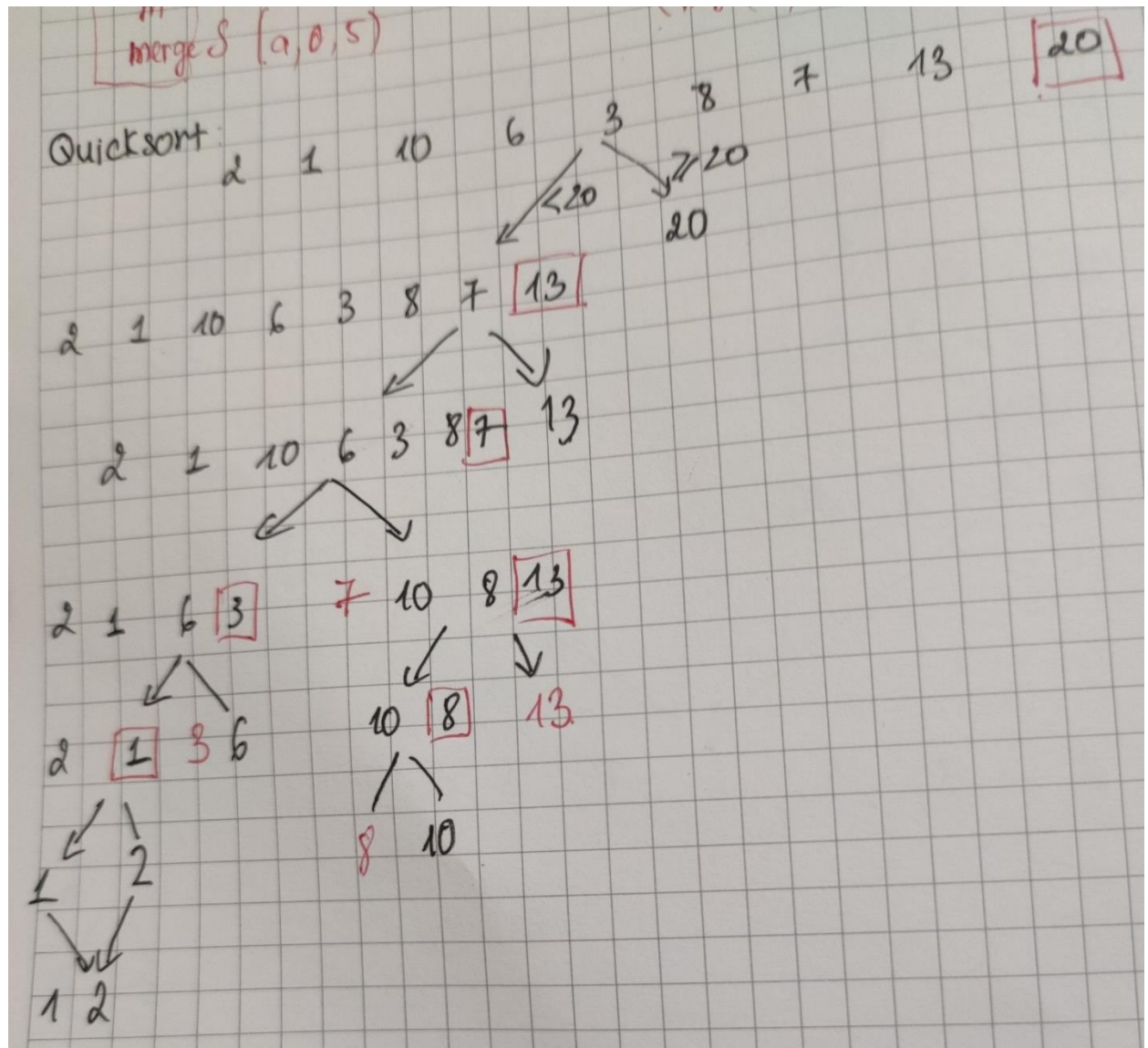
Array: 1 2 3 6 7 8 10 13 20

Done: 1 2 3 6 7 8 10 13 20

- Merge sort



- Quick sort



- Heap sort
- Radix sort

2	1	10	6	3	8	7	13	20
10	20	1	2	3	13	6	7	8
1	2	3	6	7	8	10	13	20

2. Same question for these lists:

- 1, 2, 3, 4, 5, 6, 7, 8, 9, 10

Selection sort:

Buoc 1: min value: 2; index: 0
Array: 1 2 3 4 5 6 7 8 9 10
Buoc 2: min value: 3; index: 1
Array: 1 2 3 4 5 6 7 8 9 10
Buoc 3: min value: 4; index: 2
Array: 1 2 3 4 5 6 7 8 9 10
Buoc 4: min value: 5; index: 3
Array: 1 2 3 4 5 6 7 8 9 10
Buoc 5: min value: 6; index: 4
Array: 1 2 3 4 5 6 7 8 9 10
Buoc 6: min value: 7; index: 5
Array: 1 2 3 4 5 6 7 8 9 10
Buoc 7: min value: 8; index: 6
Array: 1 2 3 4 5 6 7 8 9 10
Buoc 8: min value: 9; index: 7
Array: 1 2 3 4 5 6 7 8 9 10
Buoc 9: min value: 10; index: 8
Array: 1 2 3 4 5 6 7 8 9 10
Done: 1 2 3 4 5 6 7 8 9 10

Insertion sort:

Buoc 1: Insect num: 2
Array: 1 2 3 4 5 6 7 8 9 10
Buoc 2: Insect num: 3
Array: 1 2 3 4 5 6 7 8 9 10
Buoc 3: Insect num: 4
Array: 1 2 3 4 5 6 7 8 9 10
Buoc 4: Insect num: 5
Array: 1 2 3 4 5 6 7 8 9 10
Buoc 5: Insect num: 6
Array: 1 2 3 4 5 6 7 8 9 10
Buoc 6: Insect num: 7
Array: 1 2 3 4 5 6 7 8 9 10
Buoc 7: Insect num: 8

Array: 1 2 3 4 5 6 7 8 9 10

Buoc 8: Insect num: 9

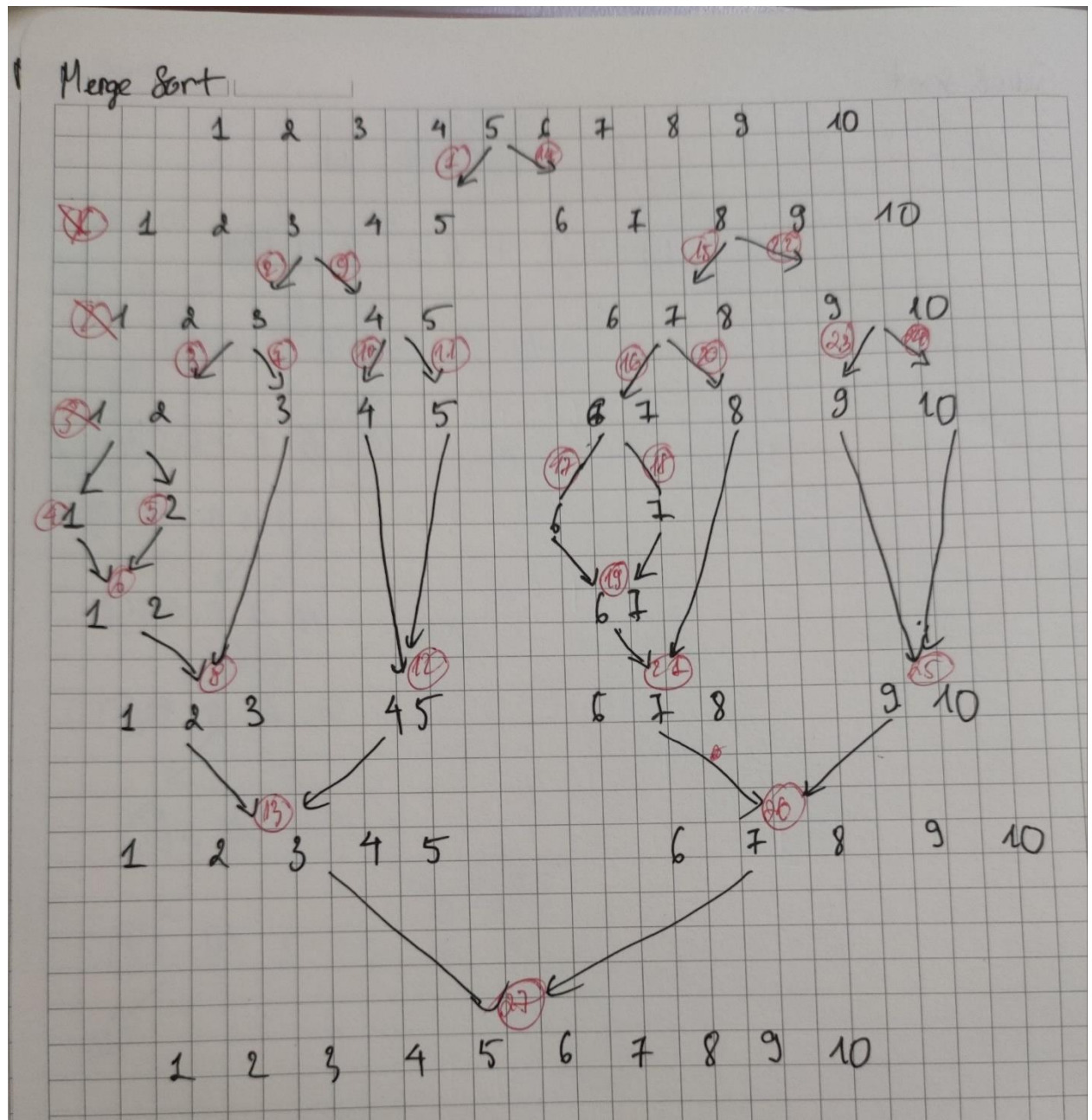
Array: 1 2 3 4 5 6 7 8 9 10

Done: 1 2 3 4 5 6 7 8 9 10

Bubble sort:

Done: 1 2 3 4 5 6 7 8 9 10

MergeSort:



QuickSort:

Buoc 3: min value: 3; index: 2
Array: 1 2 3 7 6 5 4 8 9 10
Buoc 4: min value: 4; index: 3
Array: 1 2 3 4 6 5 7 8 9 10
Buoc 5: min value: 5; index: 4
Array: 1 2 3 4 5 6 7 8 9 10
Buoc 6: min value: 7; index: 5
Array: 1 2 3 4 5 6 7 8 9 10
Buoc 7: min value: 8; index: 6
Array: 1 2 3 4 5 6 7 8 9 10
Buoc 8: min value: 9; index: 7
Array: 1 2 3 4 5 6 7 8 9 10
Buoc 9: min value: 10; index: 8
Array: 1 2 3 4 5 6 7 8 9 10
Done: 1 2 3 4 5 6 7 8 9 10

Insection sort:

Buoc 1: Insect num: 9
Array: 9 10 8 7 6 5 4 3 2 1
Buoc 2: Insect num: 8
Array: 8 9 10 7 6 5 4 3 2 1
Buoc 3: Insect num: 7
Array: 7 8 9 10 6 5 4 3 2 1
Buoc 4: Insect num: 6
Array: 6 7 8 9 10 5 4 3 2 1
Buoc 5: Insect num: 5
Array: 5 6 7 8 9 10 4 3 2 1
Buoc 6: Insect num: 4
Array: 4 5 6 7 8 9 10 3 2 1
Buoc 7: Insect num: 3
Array: 3 4 5 6 7 8 9 10 2 1
Buoc 8: Insect num: 2
Array: 2 3 4 5 6 7 8 9 10 1
Buoc 8: Insect num: 1
Array: 1 2 3 4 5 6 7 8 9 10

Done:1 2 3 4 5 6 7 8 9 10

Bubble sort:

Buoc: 1: swap 9 & 10
Array: 9 10 8 7 6 5 4 3 2 1

Buoc: 2: swap 8 & 9
Array: 8 10 9 7 6 5 4 3 2 1

Buoc: 3: swap 7 & 8
Array: 7 10 9 8 6 5 4 3 2 1

Buoc: 4: swap 6 & 7
Array: 6 10 9 8 7 5 4 3 2 1

Buoc: 5: swap 5 & 6
Array: 5 10 9 8 7 6 4 3 2 1

Buoc: 6: swap 4 & 5
Array: 4 10 9 8 7 6 5 3 2 1

Buoc: 7: swap 3 & 4
Array: 3 10 9 8 7 6 5 4 2 1

Buoc: 8: swap 2 & 3
Array: 2 10 9 8 7 6 5 4 3 1

Buoc: 9: swap 1 & 2
Array: 1 10 9 8 7 6 5 4 3 2

Buoc: 10: swap 9 & 10
Array: 1 9 10 8 7 6 5 4 3 2

Buoc: 11: swap 8 & 9
Array: 1 8 10 9 7 6 5 4 3 2

Buoc: 12: swap 7 & 8
Array: 1 7 10 9 8 6 5 4 3 2

Buoc: 13: swap 6 & 7
Array: 1 6 10 9 8 7 5 4 3 2

Buoc: 14: swap 5 & 6
Array: 1 5 10 9 8 7 6 4 3 2

Buoc: 15: swap 4 & 5
Array: 1 4 10 9 8 7 6 5 3 2

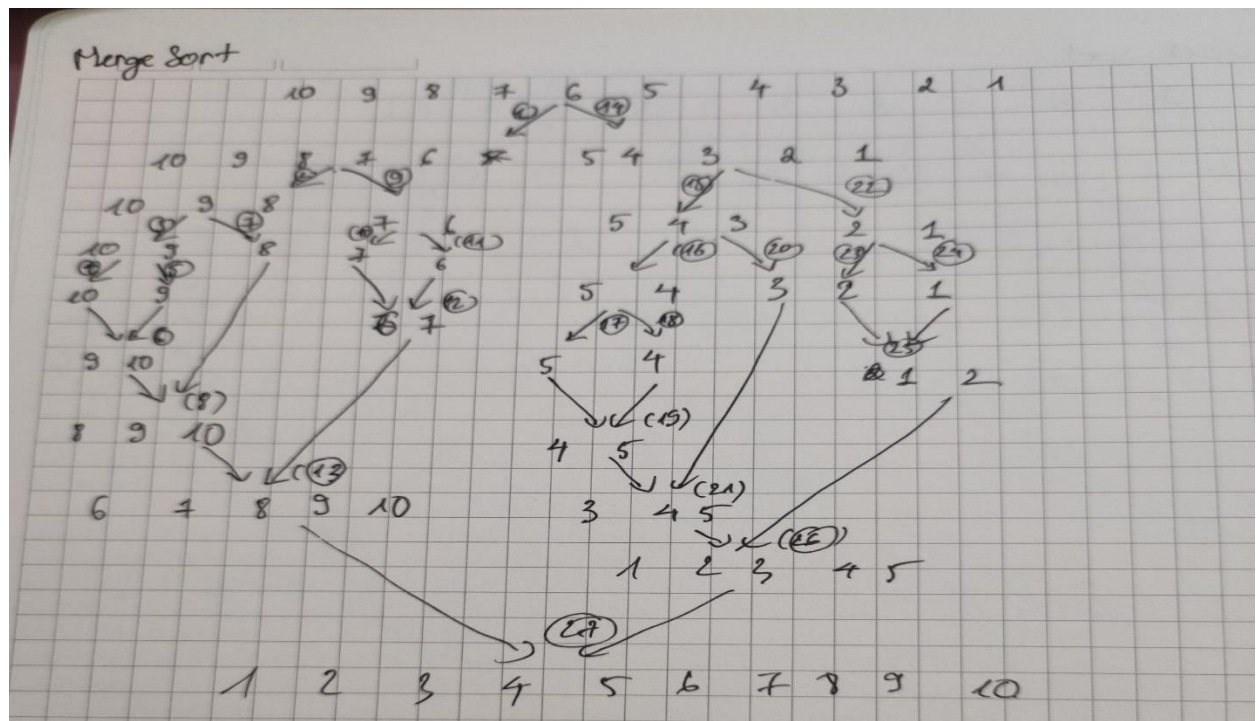
Buoc: 16: swap 3 & 4
Array: 1 3 10 9 8 7 6 5 4 2

Buoc: 17: swap 2 & 3
Array: 1 2 10 9 8 7 6 5 4 3

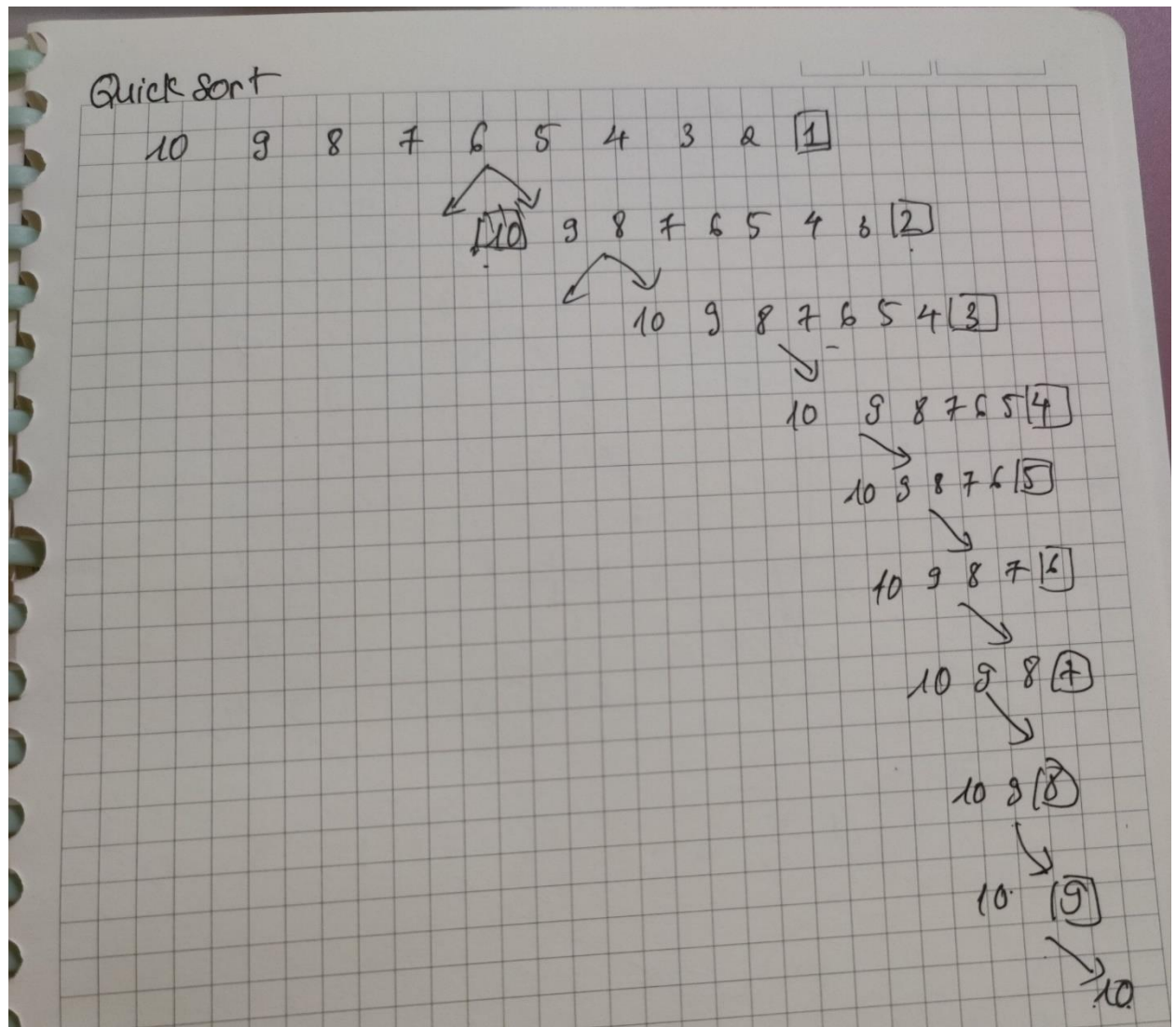
Buoc: 18: swap 9 & 10

Array: 1 2 9 10 8 7 6 5 4 3
Buoc: 19: swap 8 & 9
Array: 1 2 8 10 9 7 6 5 4 3
Buoc: 20: swap 7 & 8
Array: 1 2 7 10 9 8 6 5 4 3
Buoc: 21: swap 6 & 7
Array: 1 2 6 10 9 8 7 5 4 3
Buoc: 22: swap 5 & 6
Array: 1 2 5 10 9 8 7 6 4 3
Buoc: 23: swap 4 & 5
Array: 1 2 4 10 9 8 7 6 5 3
Buoc: 24: swap 3 & 4
Array: 1 2 3 10 9 8 7 6 5 4
Buoc: 25: swap 9 & 10
Array: 1 2 3 9 10 8 7 6 5 4
Buoc: 26: swap 8 & 9
Array: 1 2 3 8 10 9 7 6 5 4
Buoc: 27: swap 7 & 8
Array: 1 2 3 7 10 9 8 6 5 4
Buoc: 28: swap 6 & 7
Array: 1 2 3 6 10 9 8 7 5 4
Buoc: 29: swap 5 & 6
Array: 1 2 3 5 10 9 8 7 6 4
Buoc: 30: swap 4 & 5
Array: 1 2 3 4 10 9 8 7 6 5
Buoc: 31: swap 9 & 10
Array: 1 2 3 4 9 10 8 7 6 5
Buoc: 32: swap 8 & 9
Array: 1 2 3 4 8 10 9 7 6 5
Buoc: 33: swap 7 & 8
Array: 1 2 3 4 7 10 9 8 6 5
Buoc: 34: swap 6 & 7
Array: 1 2 3 4 6 10 9 8 7 5
Buoc: 35: swap 5 & 6
Array: 1 2 3 4 5 10 9 8 7 6
Buoc: 36: swap 9 & 10

Array: 1 2 3 4 5 9 10 8 7 6
 Buoc: 37: swap 8 & 9
 Array: 1 2 3 4 5 8 10 9 7 6
 Buoc: 38: swap 7 & 8
 Array: 1 2 3 4 5 7 10 9 8 6
 Buoc: 39: swap 6 & 7
 Array: 1 2 3 4 5 6 10 9 8 7
 Buoc: 40: swap 9 & 10
 Array: 1 2 3 4 5 6 9 10 8 7
 Buoc: 41: swap 8 & 9
 Array: 1 2 3 4 5 6 8 10 9 7
 Buoc: 42: swap 7 & 8
 Array: 1 2 3 4 5 6 7 10 9 8
 Buoc: 43: swap 9 & 10
 Array: 1 2 3 4 5 6 7 9 10 8
 Buoc: 44: swap 8 & 9
 Array: 1 2 3 4 5 6 7 8 10 9
 Buoc: 45: swap 9 & 10
 Array: 1 2 3 4 5 6 7 8 9 10
 Done: 1 2 3 4 5 6 7 8 9 10
 MergeSort:



QuickSort:



- 9, 10, 1, 2, 3, 4, 5, 6, 7, 8

Selection sort:

Buoc 1: min value: 1; index: 0

Array: 1 10 9 2 3 4 5 6 7 8

Buoc 2: min value: 2; index: 1

Array: 1 2 9 10 3 4 5 6 7 8

Buoc 3: min value: 3; index: 2

Array: 1 2 3 10 9 4 5 6 7 8

Buoc 4: min value: 4; index: 3

Array: 1 2 3 4 9 10 5 6 7 8

Buoc 5: min value: 5; index: 4
Array: 1 2 3 4 5 10 9 6 7 8
Buoc 6: min value: 6; index: 5
Array: 1 2 3 4 5 6 9 10 7 8
Buoc 7: min value: 7; index: 6
Array: 1 2 3 4 5 6 7 10 9 8
Buoc 8: min value: 8; index: 7
Array: 1 2 3 4 5 6 7 8 9 10
Buoc 9: min value: 10; index: 8
Array: 1 2 3 4 5 6 7 8 9 10
Done: 1 2 3 4 5 6 7 8 9 10

Insection sort:

Buoc 1: Insect num: 10
Array: 9 10 1 2 3 4 5 6 7 8
Buoc 2: Insect num: 1
Array: 1 9 10 2 3 4 5 6 7 8
Buoc 3: Insect num: 2
Array: 1 2 9 10 3 4 5 6 7 8
Buoc 4: Insect num: 3
Array: 1 2 3 9 10 4 5 6 7 8
Buoc 5: Insect num: 4
Array: 1 2 3 4 9 10 5 6 7 8
Buoc 6: Insect num: 5
Array: 1 2 3 4 5 9 10 6 7 8
Buoc 7: Insect num: 6
Array: 1 2 3 4 5 6 9 10 7 8
Buoc 8: Insect num: 7
Array: 1 2 3 4 5 6 7 9 10 8
Done: 1 2 3 4 5 6 7 9 10 8

Bubble sort:

Buoc: 1: swap 1 & 9
Array: 1 10 9 2 3 4 5 6 7 8
Buoc: 2: swap 9 & 10
Array: 1 9 10 2 3 4 5 6 7 8
Buoc: 3: swap 2 & 9
Array: 1 2 10 9 3 4 5 6 7 8

Buoc: 4: swap 9 & 10
Array: 1 2 9 10 3 4 5 6 7 8

Buoc: 5: swap 3 & 9
Array: 1 2 3 10 9 4 5 6 7 8

Buoc: 6: swap 9 & 10
Array: 1 2 3 9 10 4 5 6 7 8

Buoc: 7: swap 4 & 9
Array: 1 2 3 4 10 9 5 6 7 8

Buoc: 8: swap 9 & 10
Array: 1 2 3 4 9 10 5 6 7 8

Buoc: 9: swap 5 & 9
Array: 1 2 3 4 5 10 9 6 7 8

Buoc: 10: swap 9 & 10
Array: 1 2 3 4 5 9 10 6 7 8

Buoc: 11: swap 6 & 9
Array: 1 2 3 4 5 6 10 9 7 8

Buoc: 12: swap 9 & 10
Array: 1 2 3 4 5 6 9 10 7 8

Buoc: 13: swap 7 & 9
Array: 1 2 3 4 5 6 7 10 9 8

Buoc: 14: swap 9 & 10
Array: 1 2 3 4 5 6 7 9 10 8

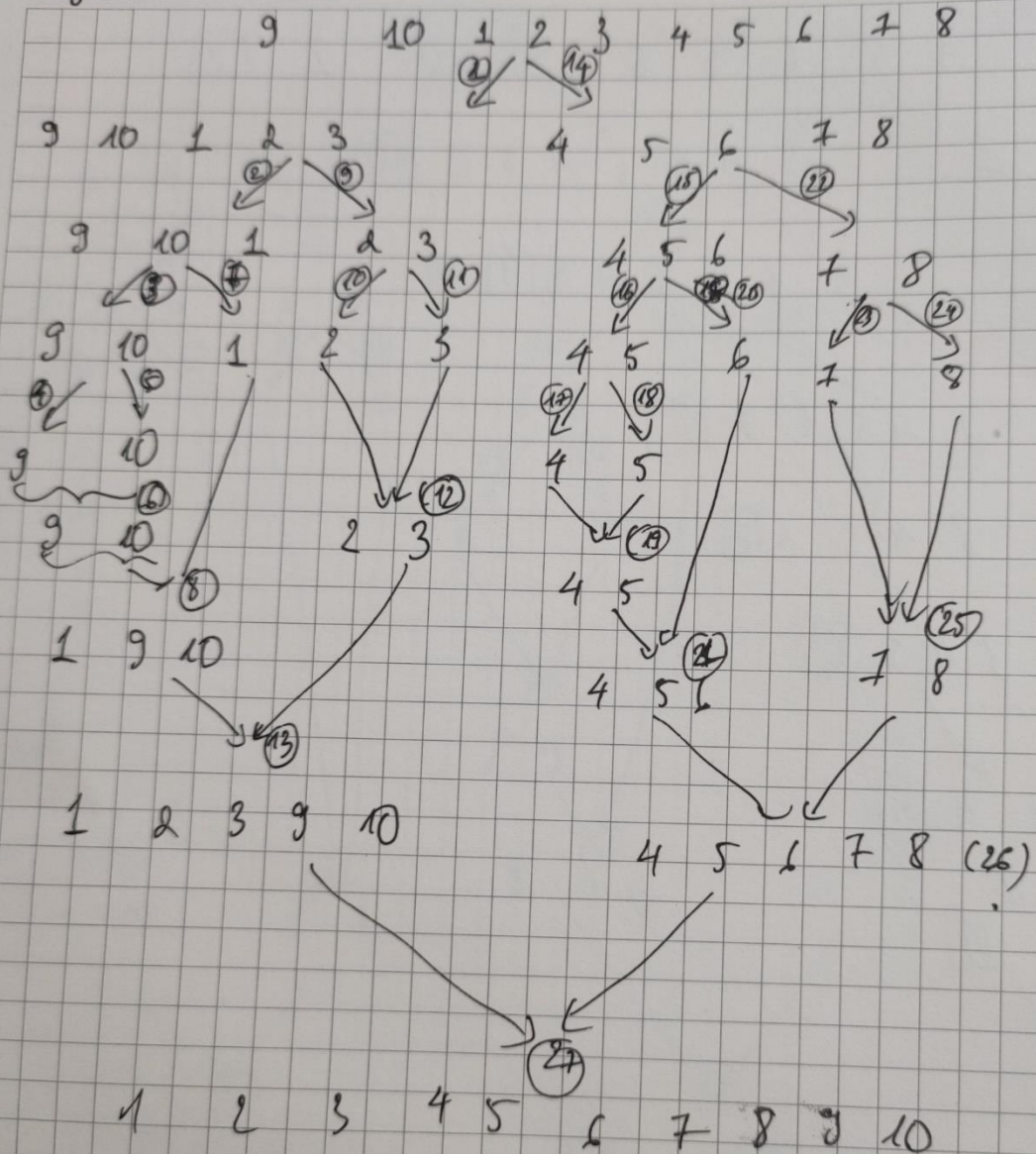
Buoc: 15: swap 8 & 9
Array: 1 2 3 4 5 6 7 8 10 9

Buoc: 16: swap 9 & 10
Array: 1 2 3 4 5 6 7 8 9 10

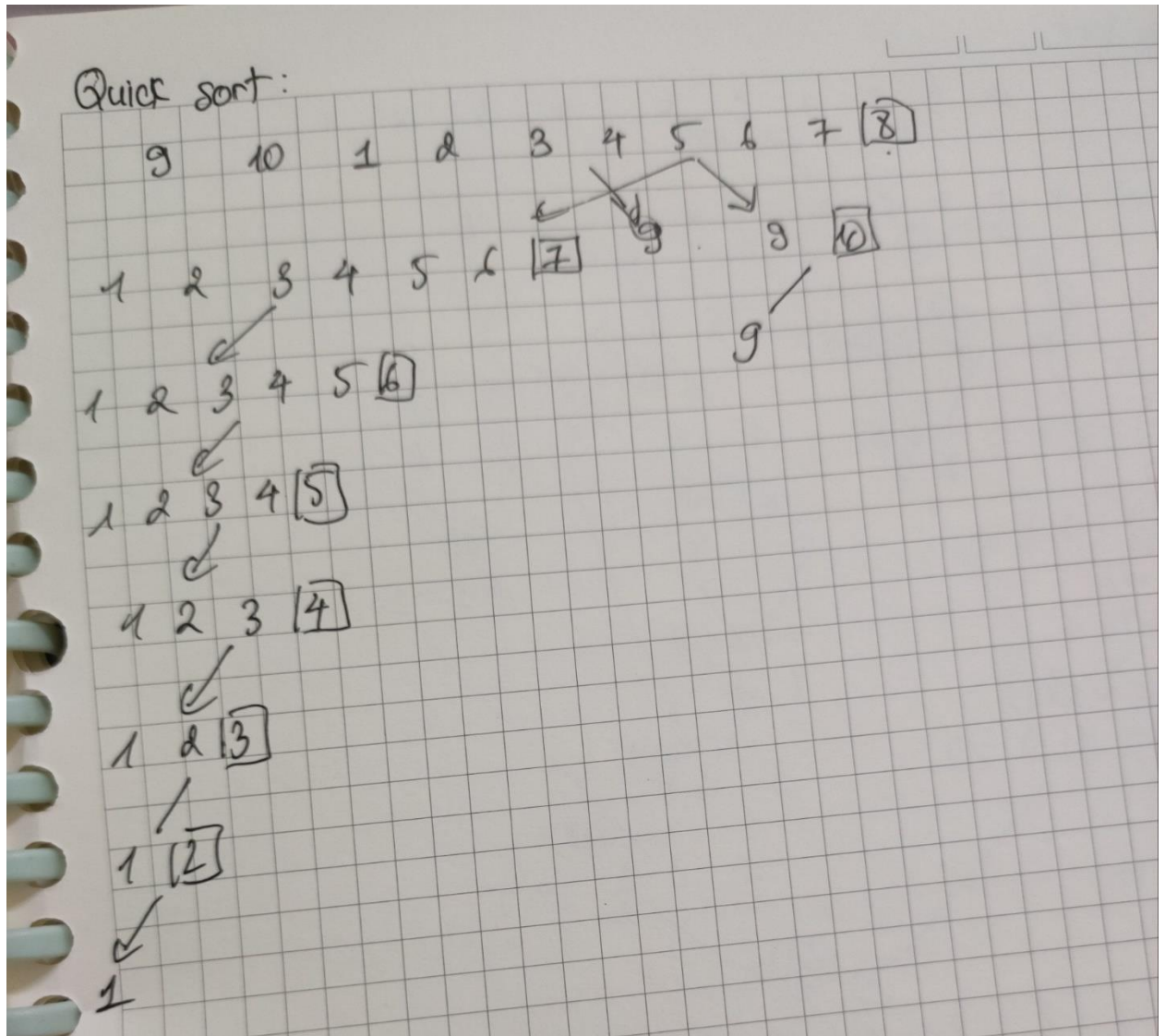
Done: 1 2 3 4 5 6 7 8 9 10

MergeSort:

Merge Sort



QuickSort:



- 3, 4, 5, 6, 7, 8, 9, 10, 1, 2

Selection sort:

Buoc 1: min value: 1; index: 0

Array: 1 4 5 6 7 8 9 10 3 2

Buoc 2: min value: 2; index: 1

Array: 1 2 5 6 7 8 9 10 3 4

Buoc 3: min value: 3; index: 2

Array: 1 2 3 6 7 8 9 10 5 4

Buoc 4: min value: 4; index: 3

Array: 1 2 3 4 7 8 9 10 5 6

Buoc 5: min value: 5; index: 4
Array: 1 2 3 4 5 8 9 10 7 6
Buoc 6: min value: 6; index: 5
Array: 1 2 3 4 5 6 9 10 7 8
Buoc 7: min value: 7; index: 6
Array: 1 2 3 4 5 6 7 10 9 8
Buoc 8: min value: 8; index: 7
Array: 1 2 3 4 5 6 7 8 9 10
Buoc 9: min value: 10; index: 8
Array: 1 2 3 4 5 6 7 8 9 10
Done: 1 2 3 4 5 6 7 8 9 10

Insection sort:

Buoc 1: Insect num: 4
Array: 3 4 5 6 7 8 9 10 1 2
Buoc 2: Insect num: 5
Array: 3 4 5 6 7 8 9 10 1 2
Buoc 3: Insect num: 6
Array: 3 4 5 6 7 8 9 10 1 2
Buoc 4: Insect num: 7
Array: 3 4 5 6 7 8 9 10 1 2
Buoc 5: Insect num: 8
Array: 3 4 5 6 7 8 9 10 1 2
Buoc 6: Insect num: 9
Array: 3 4 5 6 7 8 9 10 1 2
Buoc 7: Insect num: 10
Array: 3 4 5 6 7 8 9 10 1 2
Buoc 8: Insect num: 1
Array: 1 3 4 5 6 7 8 9 10 2
Done: 1 3 4 5 6 7 8 9 10 2

Bubble sort:

Buoc: 1: swap 1 & 3
Array: 1 4 5 6 7 8 9 10 3 2
Buoc: 2: swap 3 & 4
Array: 1 3 5 6 7 8 9 10 4 2
Buoc: 3: swap 2 & 3
Array: 1 2 5 6 7 8 9 10 4 3

Buoc: 4: swap 4 & 5
Array: 1 2 4 6 7 8 9 10 5 3

Buoc: 5: swap 3 & 4
Array: 1 2 3 6 7 8 9 10 5 4

Buoc: 6: swap 5 & 6
Array: 1 2 3 5 7 8 9 10 6 4

Buoc: 7: swap 4 & 5
Array: 1 2 3 4 7 8 9 10 6 5

Buoc: 8: swap 6 & 7
Array: 1 2 3 4 6 8 9 10 7 5

Buoc: 9: swap 5 & 6
Array: 1 2 3 4 5 8 9 10 7 6

Buoc: 10: swap 7 & 8
Array: 1 2 3 4 5 7 9 10 8 6

Buoc: 11: swap 6 & 7
Array: 1 2 3 4 5 6 9 10 8 7

Buoc: 12: swap 8 & 9
Array: 1 2 3 4 5 6 8 10 9 7

Buoc: 13: swap 7 & 8
Array: 1 2 3 4 5 6 7 10 9 8

Buoc: 14: swap 9 & 10
Array: 1 2 3 4 5 6 7 9 10 8

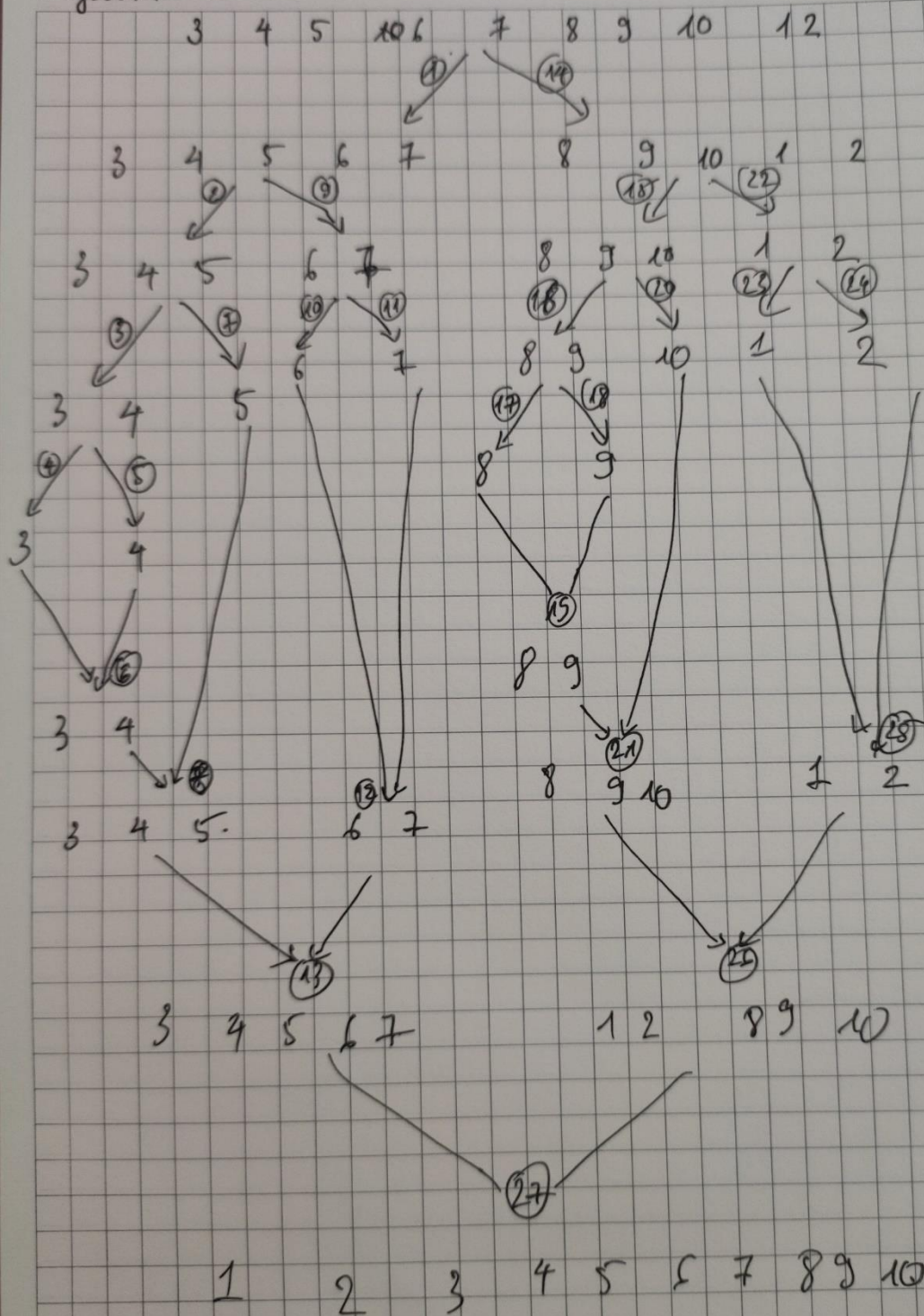
Buoc: 15: swap 8 & 9
Array: 1 2 3 4 5 6 7 8 10 9

Buoc: 16: swap 9 & 10
Array: 1 2 3 4 5 6 7 8 9 10

Done: 1 2 3 4 5 6 7 8 9 10

MergeSort

Merge Sort



QuickSort:

Quick sort

3 4 5 6 7 8 9 10 1 [2]

1 3 4 5 6 7 8 9 [10]

3 4 5 6 7 8 [9] 10

3 4 5 6 7 [8]

3 4 5 6 [7]

3 4 5 [6]

3 4 [5]

3 [4]

3

3. Write a program to sort (ascending sort) the list by following methods:

- Selection sort
- Insertion sort
- Bubble sort
- Merge sort
- Quick sort
- Heap sort
- Radix sort