Text of exercise #3

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Laboratory #3 – System and device programming – A.Y. 2018-19

Write a C program using `Pthreads` that sorts the content of a binary file including a sequence of integer numbers. Implement a threaded quicksort program where the recursive calls to `quicksort` are replaced by threads activations, i.e. sorting is done, in parallel, in different regions of the file. Use `mmap` to map the file as a vector in memory.

If the difference between the right and left indexes is less than a value `size`, given as an argument of the command line, sorting is performed by the standard quicksort algorithm.

This is a sequential recursive implementation of the quicksort algorithm.

```
void quicksort (int v[], int left, int right) {
    int i, j, x, tmp;

    if (left >= right) return;

    x = v[left];
    i = left - 1;
    j = right + 1;

    while (i < j) {
        while (v[--j] > x);
        while (v[++i] < x);
        if (i < j)
            swap (i,j);
    }

    quicksort (v, left, j);
    quicksort (v, j + 1, right);
}

void swap(int i, int j) {
    int tmp;

    tmp = v[i];
    v[i] = v[j];
    v[j] = tmp;
}
```