

Tutorial 2

2.1 Checkers

We consider a checkers game over a 10 by 10 checkerboard with 8 men and a king. The positions of men and the king are given in a file in the format you will define (it may depend on the data structure you choose). The king can move over diagonals on which he is, forward and backward. He chose a direction, go over the man he wants to capture and go to any free square behind him, then he can target a new man to do a multiple capture. This is called a flying king. The choices of direction and of positioning for the king allows a lot of possibilities. And the rules of checkers states that you have to play the move that allows you to take the most enemy men. What is the maximum number of men that we can capture with a king ?

- Adapt the algorithm from the TP1 (for the queen and pawns problem) to the rules of checkers without the multiple capture.
- Modify the capture function to take into account a possible multiple capture. You may add other functions and you have to use recursivity. To see the details of the rules : <https://en.wikipedia.org/wiki/Checkers>

2.2 Lists

Using a linked list of integer values, gives an algorithm to :

- print elements of the lists
- add an element at the end of the list
- search a value and return the number of occurrences in the list
- remove an element whose value is given as a parameter
- add an element at the right place inside a sorted list
- search for an element in a sorted list
- remove an element in a sorted list

2.3 Merge sort

The merge sort is a recursive sorting algorithm :

1. If the array has only one element, it is already sorted.
2. Otherwise, separate the array into two approximately equal parts.
3. Recursively sort the two parts with the merge sort algorithm.
4. Merge the two sorted arrays into one sorted array.