**A.** Consider the following problem:

An airline intends to extend its air fleet by purchasing three types of aircrafts. The available budget is 5000 units. The three types have the following features:

a. costs 100 units, has a range of 6.000 km and the collision avoidance system range is 30 km;
b. costs 60 units, has a range of 4.200 km and the collision avoidance system range is 48 km;
c. costs 50 units, has a range of 2.800 km and the collision avoidance system range is 32 km;

Compute how many aircrafts from each type should be purchased such that

- the budget is not exceeded
- the mean flight range is maximized
- the mean of the collision avoidance system range is at least 40 km.

**Note**. If the number of planes of each type is denoted as a, b and c, then the average autonomy is $\frac{6000 \cdot a+4200 \cdot b+2800 \cdot c}{a+b+c}$ and the average collision avoidance system range is $\frac{30 \cdot a+48 \cdot b+32 \cdot c}{a+b+c}$.

**Task 1**. Solve the problem using the backtracking method (implement it in Python).

**Task 2**. Design an EA to solve the problem.

**B.** Consider the N-queens problem.

**Task 3**. Imagine a representation in the solution space, define a way to find the neighbors of the of a point and solve the problem using the hillclimbing method (implement it in Python).