

# Practical content



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# Requirements

- **Course schedule:**

- Students will work in pairs, with a total of 24 class hours. The last 3 class hours will be reserved for presentations.

- **Project description:**

- There are 4 projects in total, all related to evolutionary computation algorithms, and each group of students will select one project.
  - Each project consists of three parts: basic algorithm implementation in Python, advanced algorithm architecture improvement in Python, and file operations in Linux related to the algorithm. Each part accounts for 25% of the total score, while the project report and presentation account for the remaining 25%.

# Requirements

- **Materials:**

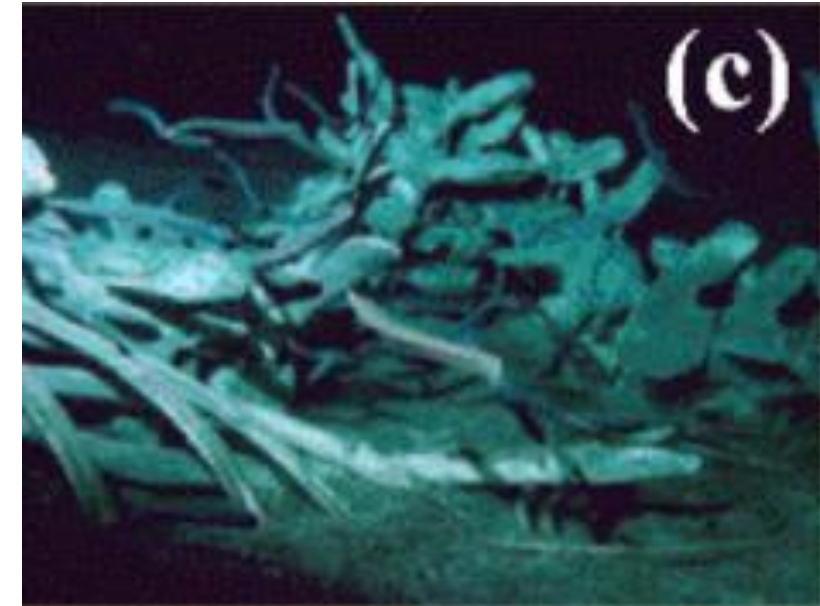
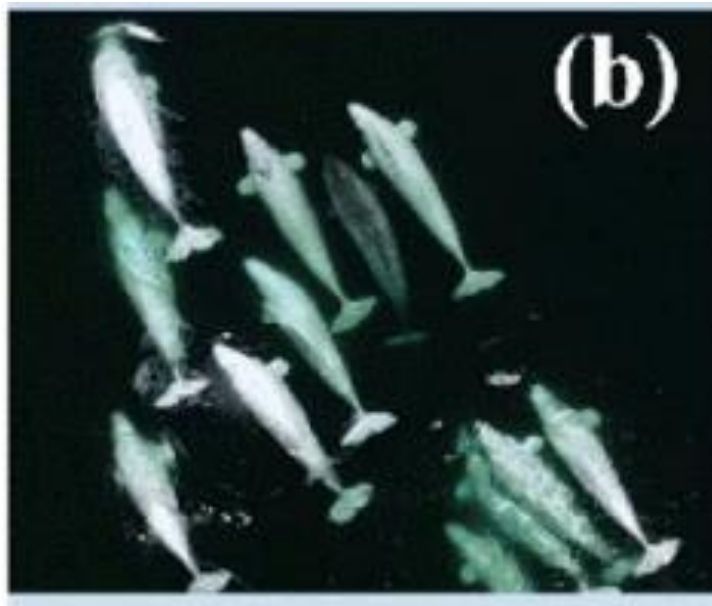
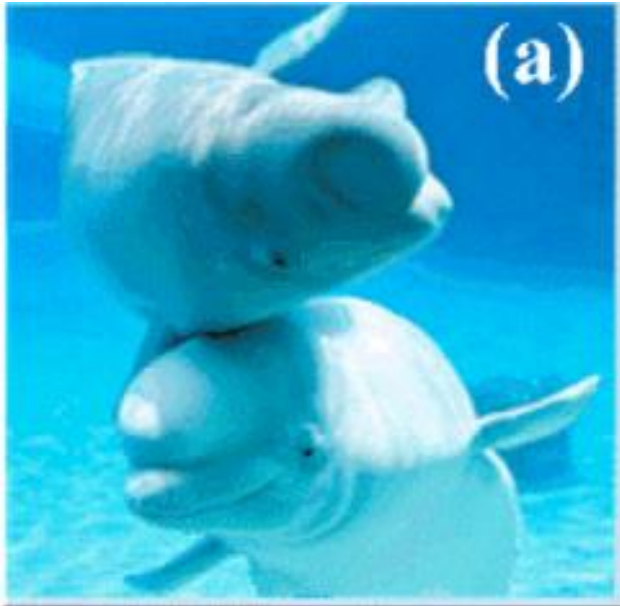
- The research paper corresponding to the algorithm, the MATLAB source code for the algorithm, and the MATLAB source code for the test functions.

- **Project requirements:**

- Write the Python code for the specified algorithm as the main program.
- Write the Python code for the test functions.
- In the main program, call the test functions to obtain the experimental results.
- The experimental results include the mean and variance of the algorithm running 20 times for different test functions, which are given in the form of tables.

# Project 1——Beluga whale optimization

- A novel swarm-based metaheuristic algorithm inspired from the behaviors of beluga whales, called beluga whale optimization (BWO), is presented to solve optimization problem. Three phases of exploration, exploitation and whale fall are established in BWO, corresponding to the behaviors of pair swim, prey, and whale fall, respectively.





# Project 2——Crested Porcupine Optimizer

- A novel nature-inspired meta-heuristic known as Crested Porcupine Optimizer (CPO) is proposed for accurately optimizing various optimization problems. From least aggressive to most aggressive, the crowned porcupine uses four distinct protective mechanisms: sight, sound, odor, and physical attack.



# Project 3——Dandelion Optimizer

- Dandelion Optimizer simulates the process of dandelion seed long-distance flight relying on wind, which is divided into three stages: the rising stage, the descending stage, and the landing stage.





# Project 4——Mountain Gazelle Optimizer

- The Mountain Gazelle Optimizer (MGO), a novel meta-heuristic algorithm inspired by the social life and hierarchy of wild mountain gazelles, is suggested in this paper. In this algorithm, gazelles' hierarchical and social life is formulated mathematically and used to develop an optimization algorithm.



# Presentation Requirements

- **Research background**
- **Algorithm introduction**
- **Code introduction**
- **Experimental result**
- **Note:** The text size in the slide cannot be less than 20 (except code).



# Experimental reporting Requirements

- **Experiment name:** The implementation of Beluga whale optimization in Python.
- Experimental content and experimental results should be as detailed as possible.
- The code cannot take screenshots and needs to be copied into the report with indentation.
- In the section of Conclusions, everyone should give the problems and solutions encountered in the experiment process, experience, opinions and suggestions.