

The objective of this lab is to:

Understand and practice virtual functions, virtual destructors and polymorphism.

Instructions!

1. Please follow the dress code before coming to the lab. Keep your student identity cards with you.
2. This is an individual lab, you are strictly **NOT** allowed to discuss your solutions with your fellow colleagues, even not allowed asking how is he/she is doing, it may result in negative marking. You can **ONLY** discuss with your TAs or with me.
1. Strictly follow good coding conventions (commenting, meaningful variable and functions names, properly indented and modular code).
2. Save your work frequently. Make a habit of pressing **CTRL+S** after every line of code you write.

Task 01:

[10 Marks]

Design a Ship class that has the following members:

- A member variable for the name of the ship (a string)
- A member variable for the year that the ship was built (a string)
- A constructor and appropriate accessors and mutators
- A virtual print function that displays the ship's name and the year it was built.

Design a **CruiseShip** class that is derived from the Ship class. The CruiseShip class should have the following members:

- A member variable for the maximum number of passengers (an int)
- A constructor and appropriate accessors and mutators
- A print function that overrides the print function in the base class. The

CruiseShip class's print function should display only the ship's name and the maximum number of passengers.

Design a **CargoShip** class that is derived from the Ship class. The CargoShip class should have the following members:

- A member variable for the cargo capacity in tonnage (an int).
- A constructor and appropriate accessors and mutators.
- A print function that overrides the print function in the base class. The CargoShip class's print function should display only the ship's name and the ship's cargo capacity.

Design another class named **BattleShip** that is derived from the Ship class. The BattleShip class should have the following members:

- A member variable for the total number of missiles (an int).
- Appropriate constructors, accessors and mutators.
- A print function that overrides the print function in the base class. The BattleShip class's print function should display only the ship's name and the missiles' capacity.

Demonstrate the classes in a program that has an array of Ship pointers. The array elements should be initialized with the addresses of dynamically allocated Ship CruiseShip, and CargoShip objects (Ask user which ships he/she wants to create). The program should then step through the array, calling each object's print function.

Task 02: Prepare your own lab task

[10 Marks]

You have to create your own lab task. Think of a situation/task where you feel virtual destructor is unavoidable. Write the detailed description of task (i.e. they way your lab tasks are written e.g. see task 01). Then implement the task and get evaluated.