Sorting demonstration

Group 15

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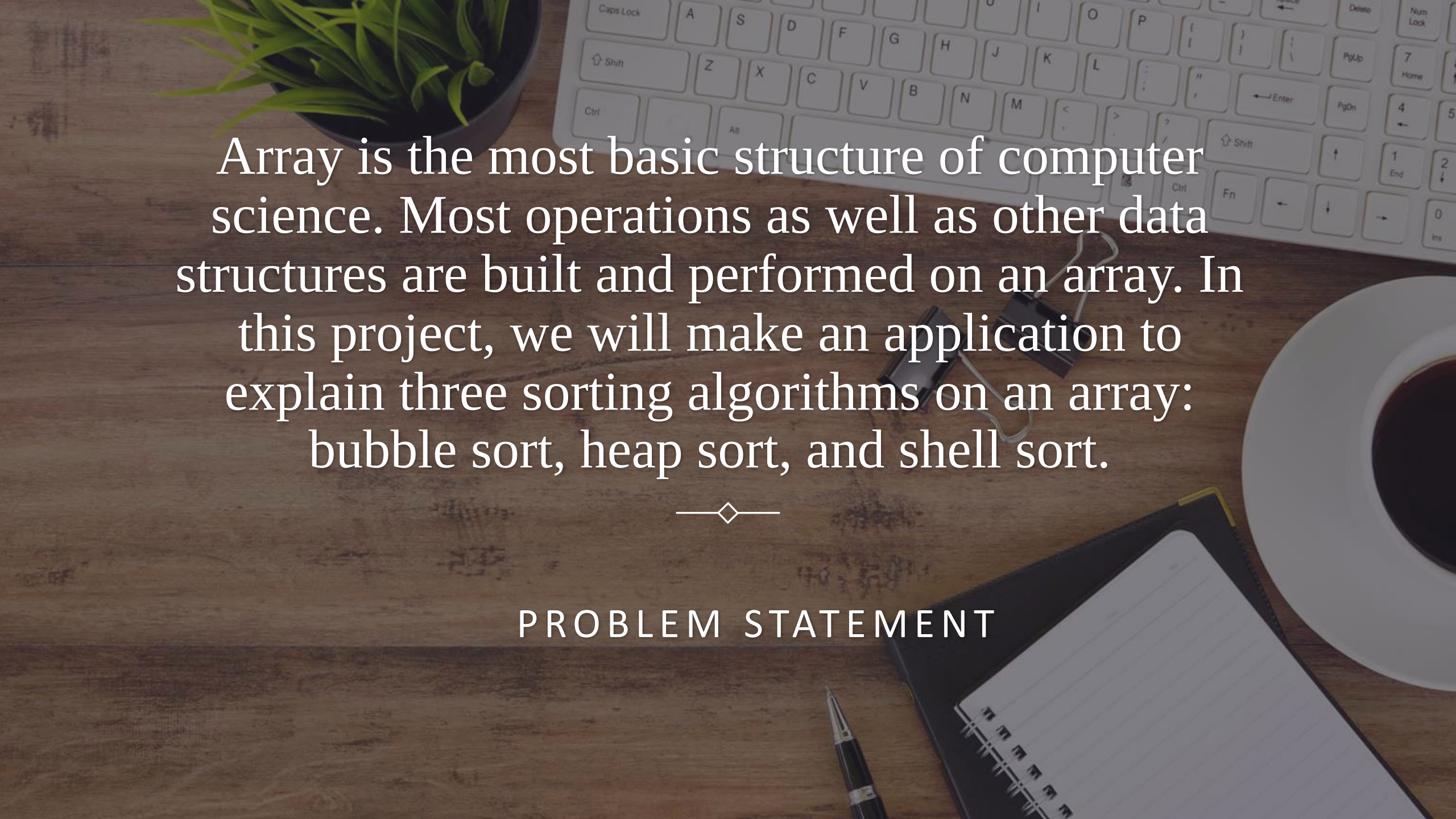
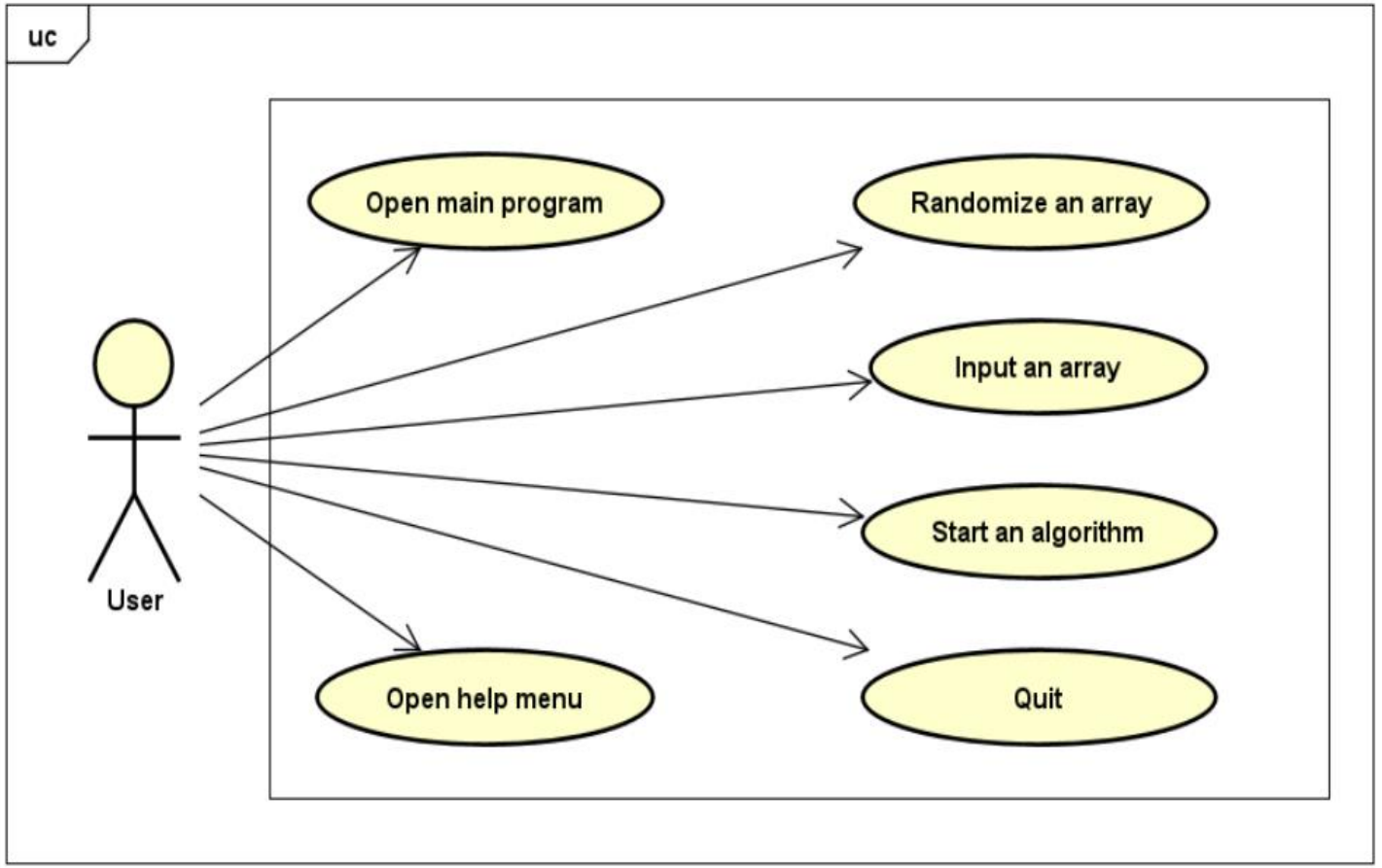
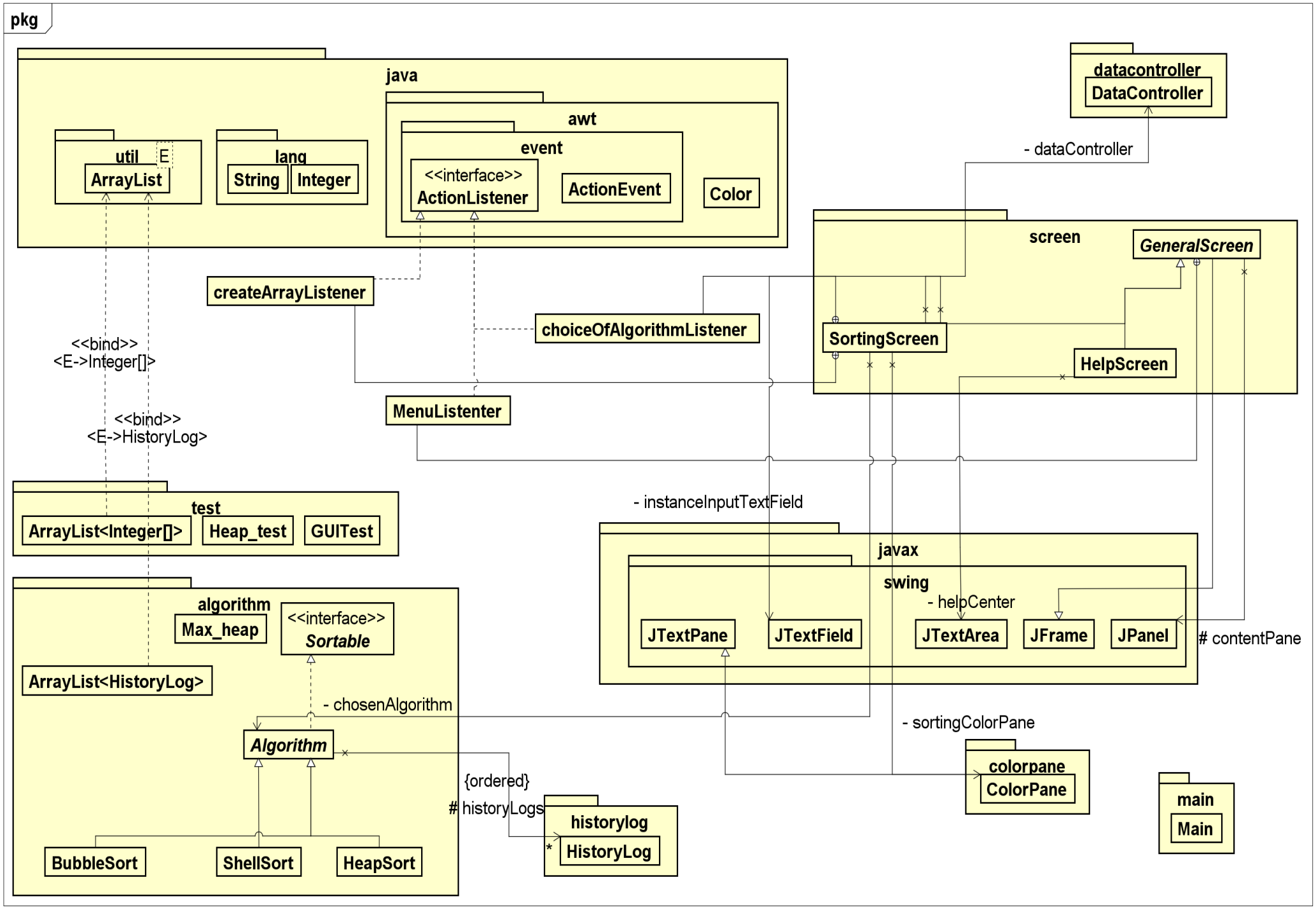


Array is the most basic structure of computer science. Most operations as well as other data structures are built and performed on an array. In this project, we will make an application to explain three sorting algorithms on an array: bubble sort, heap sort, and shell sort.

PROBLEM STATEMENT

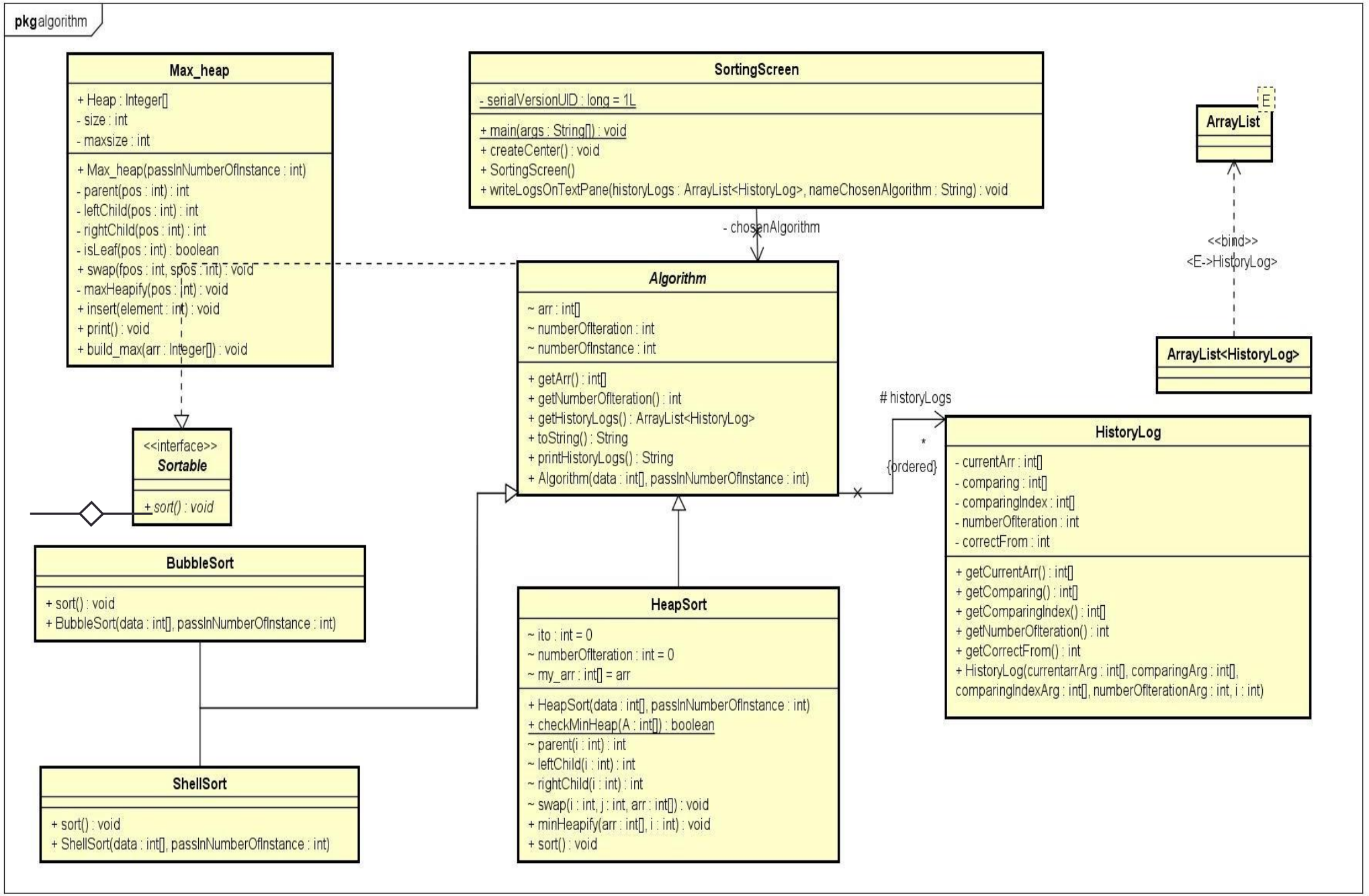
USECASE DIAGRAM

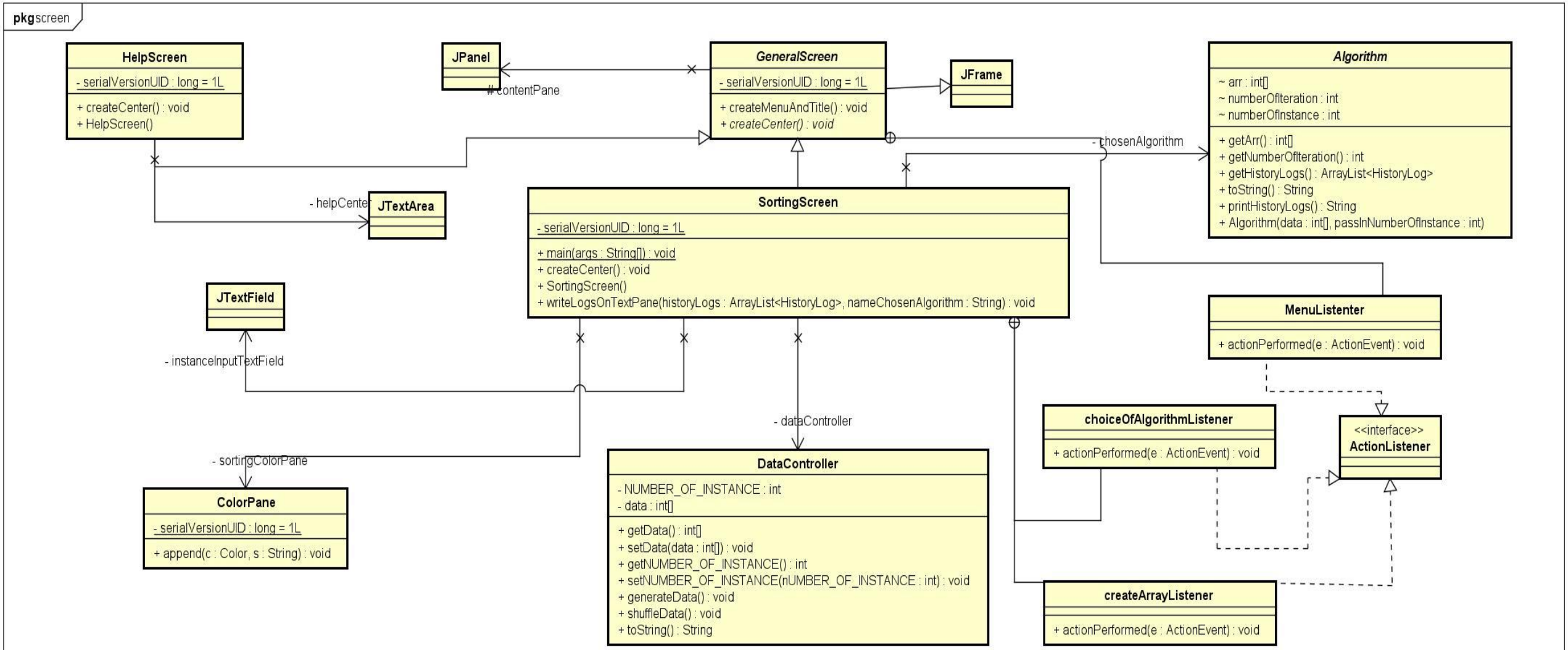




GENERAL CLASS DIAGRAM

DIAGRAMS FOR PACKAGE ALGORITHMS





Diagrams for package screen

- algorithm: Include all the sorting algorithms for the system to use and for the users to demonstrate.

- colorpane: Include a JTextPane with a method to append colored text.

- datacontroller: Include a class that manipulate and control our array.

- historylog: Include a class that will record changes inside Algorithm.sort() method

- screen: Include all the screens in the application for the user to interact.

- test: test the GUI and heapsort

- main: Include the main() method for the program to run.

Explanation of each package

Polymorphism

- Each sort() method of all 3 algorithms has its own sorting process
- An abstract method createCenter() (Abstraction) for the child classes to use and a subclass MenuListener that implements ActionListener interface.
- HelpScreen and SortingScreen has its own process of createCenter() method.

Encapsulation

- Attribute ‘arr’ and ‘numberOfIteration’ can be accessed through get method.
- Attribute data and NUMBER_OF_INSTANCE can be accessed and modified through get and set method.
- All attributes in HistoryLog are private attributes and can only be accessed through get method.

Inheritance

BubbleSort, HeapSort, ShellSort inherit from class Algorithm (Inheritance) and implement Sortable interface.

HelpScreen and SortingScreen inherit GeneralScreen (Inheritance)

GeneralScreen is an abstract class (Abstraction) that inherits JFrame class from Java Swing (Inheritance).

ColorPane class inherits JTextPane class from Java Swing (Inheritance).

Demo video

https://husteduvn-my.sharepoint.com/:v:/g/personal/manh_ntx200385_sis_hust_edu_vn/EVvTJEAp5bZNumfG0cItZR8BNviyXSpxAc7h5_D6RQ0Okw?e=00b1iq