

Data Structures and Programming

System Definitions

A software subsystem of an air-traffic control system is defined to manage a queue of aircraft (AC) in an airport. The aircraft queue is managed by a process which responds to three types of requests:

- **system boot** used to start the system.
- **enqueue aircraft** used to insert a new AC into the system.
- **dequeue aircraft** used to remove an AC from the system.
- **Display queue** used to display the AC queue.
- **Shutdown** used to shutdown the system.

AC's have the following properties:

- AC type: **Passenger or Cargo**
- AC size: **Small or Large**

The process which manages the queue of AC's satisfies the following:

- There is no limit on the number of AC's it can manage
- **Dequeue aircraft** requests result in selection of one AC for removal such that:
 1. Passenger AC's have removal precedence over Cargo AC's
 2. Large AC's of a given type have removal precedence over Small AC's of the same type.

The system should save the class object(AC queue) using **java.io.Serializable** interface. Once the system is booting up. It should get the same queue back as it has before shutting-down.

System Implementation.

1. Ac.class which stores the information about the Aircraft.
2. AcManager manages the priority queue of Aircraft and also saves the object using serializable interface and restore it once system boots-up. This class has been implemented on Singleton design pattern.
3. AcConst keeps the constant value, which can be used in different modules.
4. AcSize is enum which define the size of an Aircraft
5. AcType is enum which define the type of an Aircraft
6. AcUtility keeps static method which can be used inplace.
7. PriorityComparator which can be used to decide the priority of the given Acs.
8. AirTrafficControlConsole This class controls all the operation and request given by the user. This class has the main() method which is entry point for this application. This class display various options on console and takes the input from the user.