

AIR TRAFFIC CONTROL (ATC) SIMULATOR

ABSTRACT:->

We are going to implement an Air Traffic Control Simulator in which we need to make sure that each and every Air Plane that is present in the airspace of that particular Airport get allocated with a runway and the plane who need an immediate landing due to some emergency issue would get allocated with an emergency Runway.

CLASS DIAGRAM:->

So, we'll have two class through which we'll make multiple objects and the data flow will be done through these objects of their respective class.

1st CLASS

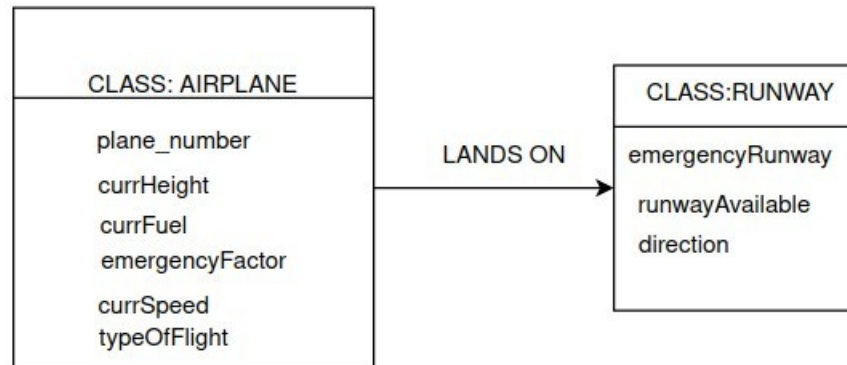
The first class will be of air-plane class. It will contain 7 important variables. Actually it will contain a lot more function as well as variable but these 7 variable will be the important deciding factor that where the data will flow.

- i. PlaneNumber
- ii. currHeight
- iii. currFuel
- iv. emrgencyFactor
- v. currSpeed
- vi. timeOfFlight
- vii. unavoidableLanding

2nd CLASS

The 2nd class will be of Runway class. It will also contain many variable and functions but the important variables are 3 in count

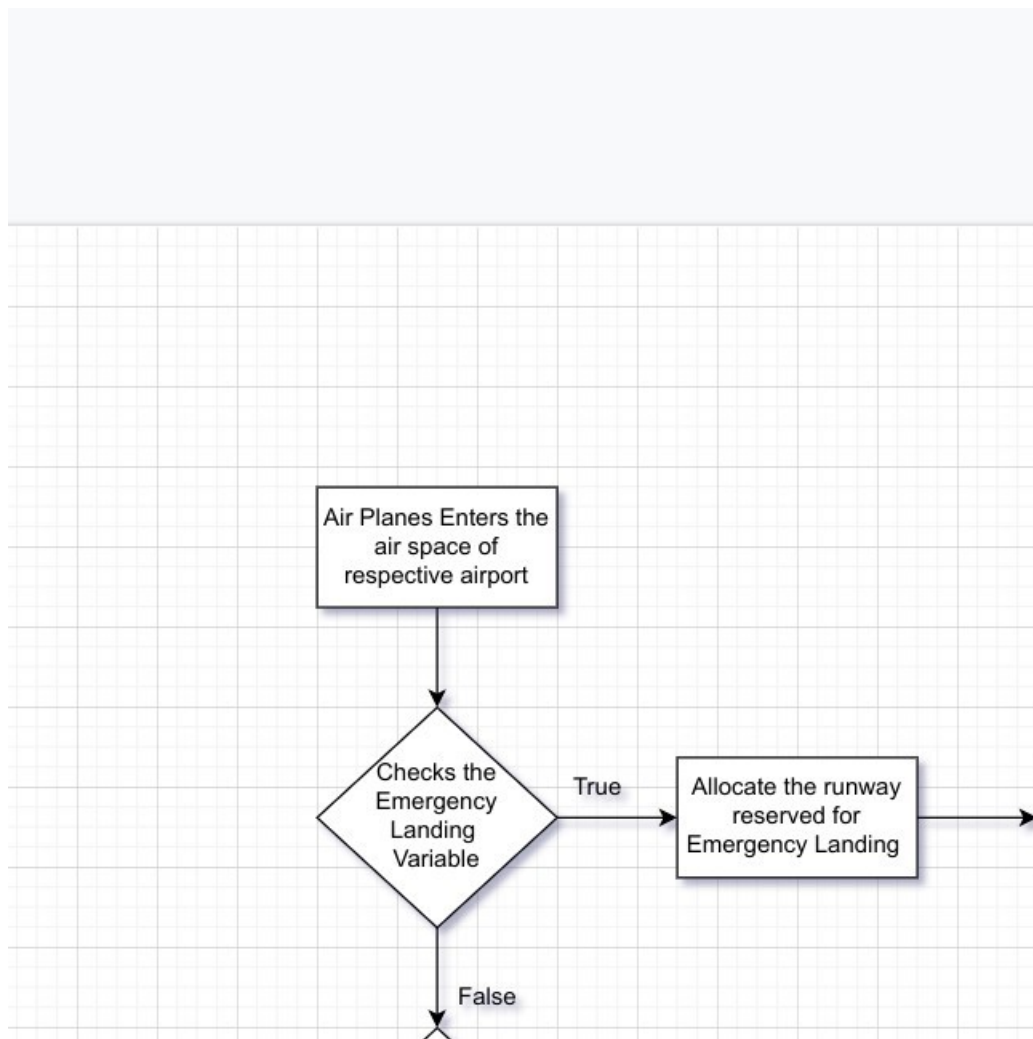
- I. emergencyRunway
- II. runwayAvailable
- III. direction



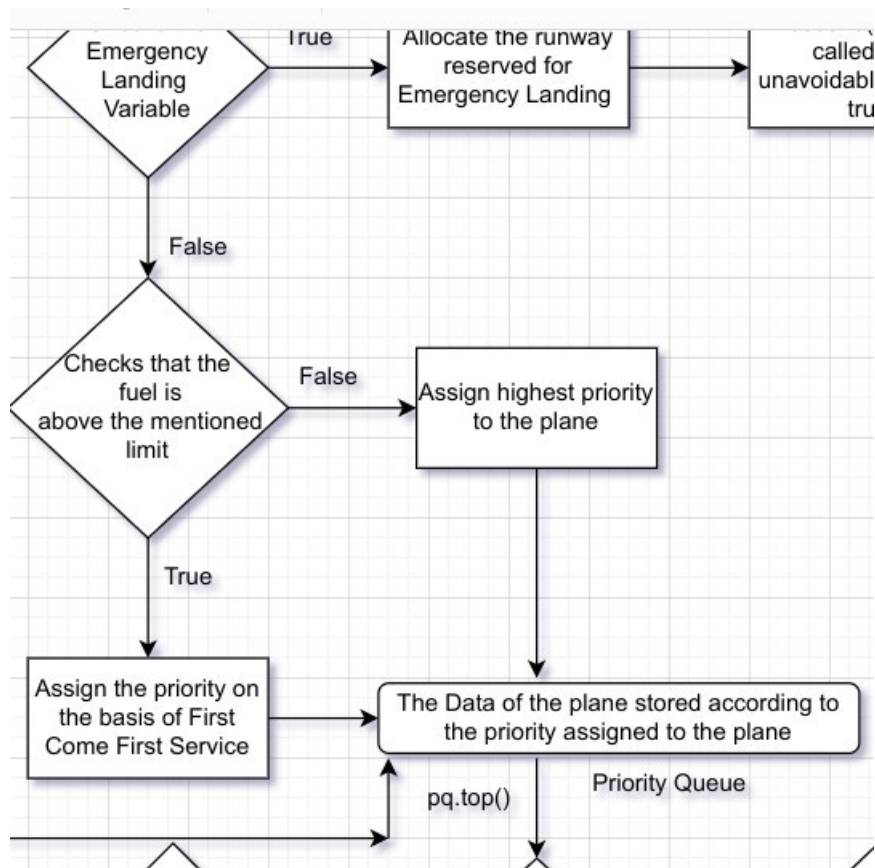
- So when user(student) enters the data on the user interface(UI) it will get stored as an object in the database.
- We will also have an option of choosing how many runways are available on the airport. Suppose we enter 4, then 4 objects of runway will be created with default values of the parameters

HOW THINGS WILL WORK BEHIND THE SCENE:->

- When user entered the data the object has been created and time of entering of data has been recorded by the "timeOfFlight" variable.
- This will act as the PRIORITY FACTOR in normal cases.
- Before making the plane objects entering the PRIORITY QUEUE we'll check the emergencyFactor of the object and if it is true then we'll allocate that particular object whose emergencyRunway is true.
- So here the runway is allocated for the plane which required Emergency Landing

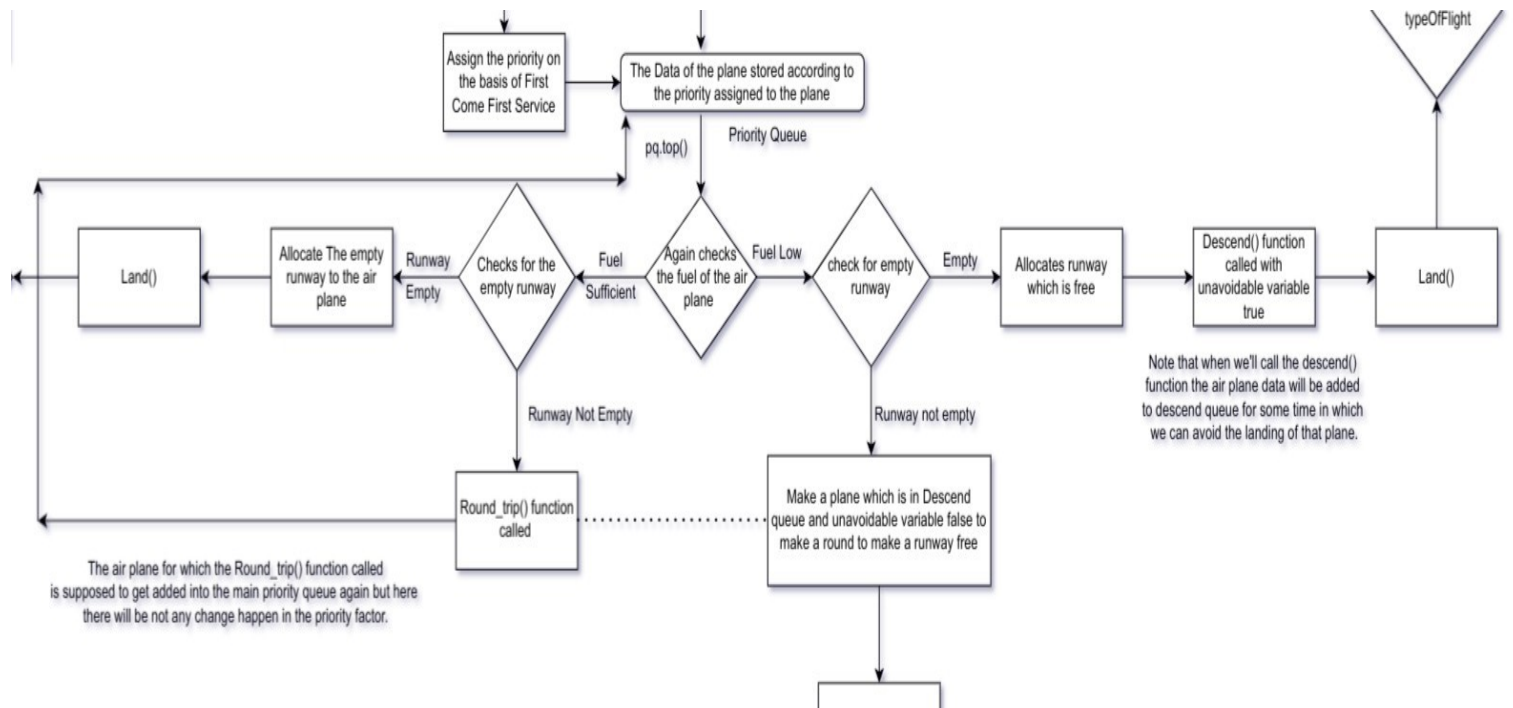


- So all the plane whose emergencyFactor is False will get their fuelValue checked. If the fuel value is above certain limit then the PRIORITY VALUE will be set on the basis of First Come First Service(FCFS) otherwise the PRIORITY FACTOR value will be set as highest.
- Then all the plane object that has been created will enter the Priority Queue and get scheduled.
- We are confirm that inside the Priority queue we have 2 types of plane, One whose fuel is low and another's fuel is sufficient.

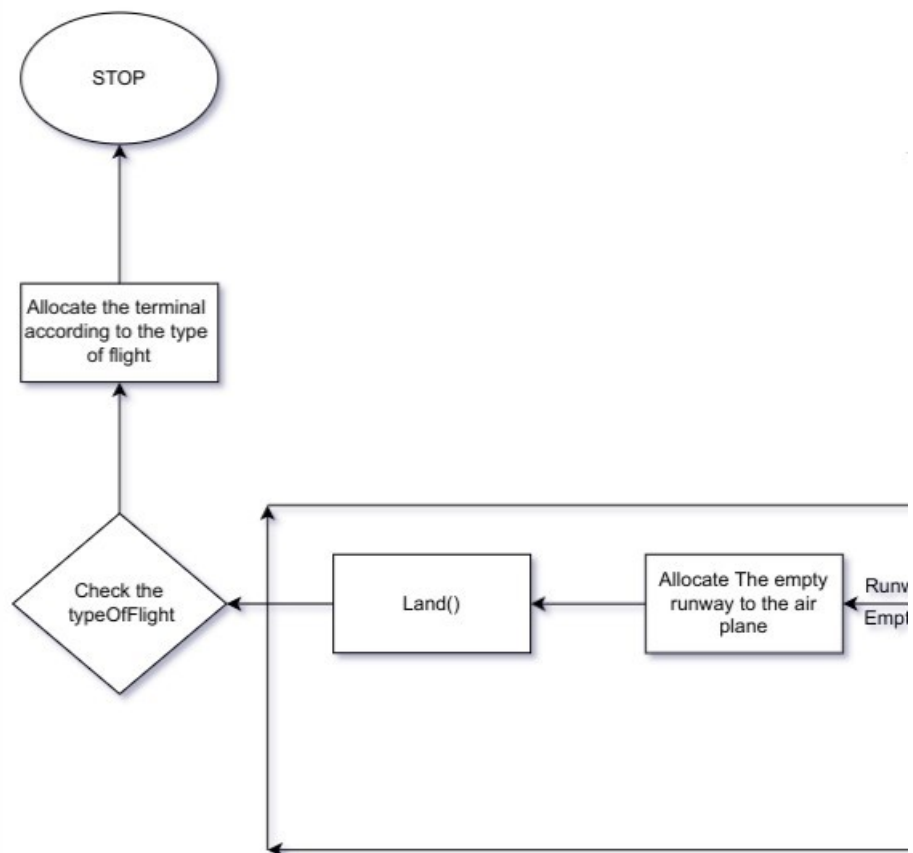


- Now we'll check that the plane whose fuel is insufficient or sufficient, if we got the plane's fuel insufficient, we'll immediately try to schedule if the runway is empty.
- If the runway is not empty then we make one of the plane from the Descend Queue whose unavoidable variable are False and have least priority factor value to make a round trip.
- If the fuel is sufficient and runway is empty then we'll allocate that empty runway to the plane and allow it to DESCEND.
- And if the runway is not empty then we'll make the plane to make a round trip of the airport.

NOTE THAT ONCE THE PRIORITY FACTOR IS ASSIGNED TO THE PLANE IT CAN'T BE CHANGED OR UPDATED.



- Descend Queue is nothing but a Priority Queue in which the plane stays there for a limited amount of time from where the Landing of a plane can be avoided and make that plane go for a round Trip.
- If any emergency plane comes and our Runway specifically reserved for emergency landing is not free then we'll make the plane with lowest priority and unavoidable variable false from the descend queue to abort the landing and make a round trip.
- The airPlane which is going for the RoundTrip is supposed to enter the MAIN PRIORITY QUEUE again after some interval of time with updated fuel but the PRIORITY FACTOR will remain same.
- After Landing, we'll check the type of flight and allocate the terminal and then destroy the flight object.



The air plane for which the Round_trip() function called is supposed to get added into the main priority queue again but here there will be not any change happen in the priority factor.

- After checking the type of air plane, the terminal will be allocated and thereafter we'll change the status to "SUCCESSFULLY LANDED"

