Software Design Document

# Airport take-off time slot simulation in Python.

Beteab Gebreyesus

10/05/2018

# Introduction

Airport is a busy place with vast numbers of people passing through, which in turn requires efficient processes to make it seamless. Lots of resources are mobilized according to schedules to enable this.

We can build programs that can simulate the request and delivery of services at the airports based on the events happening at a predetermined rate. By simulating/generating requests for resources we can simulate the process of servicing those requests.

## Purpose

**Description of the Problem**

As planes taxi and takeoff, they request resources (gates, ground operations) to enable them. The request for the resources must be managed according to priorities and safety requirements. When planes are getting ready to take-off they request access to taxi in preparation for take-off from the runway.

The program we build will tackle the problem of taxiing planes that request resources. There will be priority queues set up which will keep schedule of planes taking off. The program will receive a document listing all planes that made a request and request details. The queue will empty out per time requests and priority values.

The program

Overview:

This project will implement a simple airport take-off time slot scheduler. Plane submit requests to take off at a certain time and tell the air traffic controller how long they will need the runway for. This program will process these requests and assign each plane a takeoff time. It will keep track of all the planes waiting to take off, print out the status at each time interval and at the end print out the actual time each plane was on the runway.

Design:

The program will be written in Python. The program will take in input from the user in the form of a text file (.txt) or comma separated value file (.csv). The input file should be in the following format:

ID, Submission Time, Requested Start, Requested Duration

An example would be:

# Design

The program will keep track of the information needed to schedule the airstrip resources. program will request

***Identifier;***

***Submission time;***

***Time slot requested;***

***Length of time requested;***

***Actual start time;***

***Actual end time from a plane;***

The program will simulate a queue of airplanes waiting before they can take off. There will be methods that will do the following functions

- Create a priority Queue that will store place Identifier in a queue

- Print out the status of the queue as time moves along.

- Populate the priority queue by generating planes of all types thru rand()..

- Be able to read requests document and populate the queue

- print out a listing of the actual take off times of all planes

Ex. Input file could be from.txt or .csv file containing the various data fields: Output of our read

ID, Submission Time, Requested Start, Requested Duration  
 Delta 160, 0, 0, 4  
 UAL 120, 0, 5, 4  
 Delta 6, 2, 3, 6