Logan Airport Simulation

COMP.2040 – Computing IV

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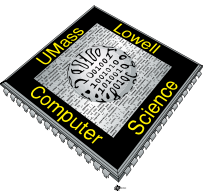
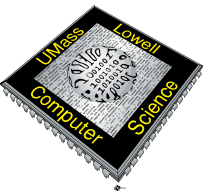


Logan Airport Runway Diagram

Figure 1

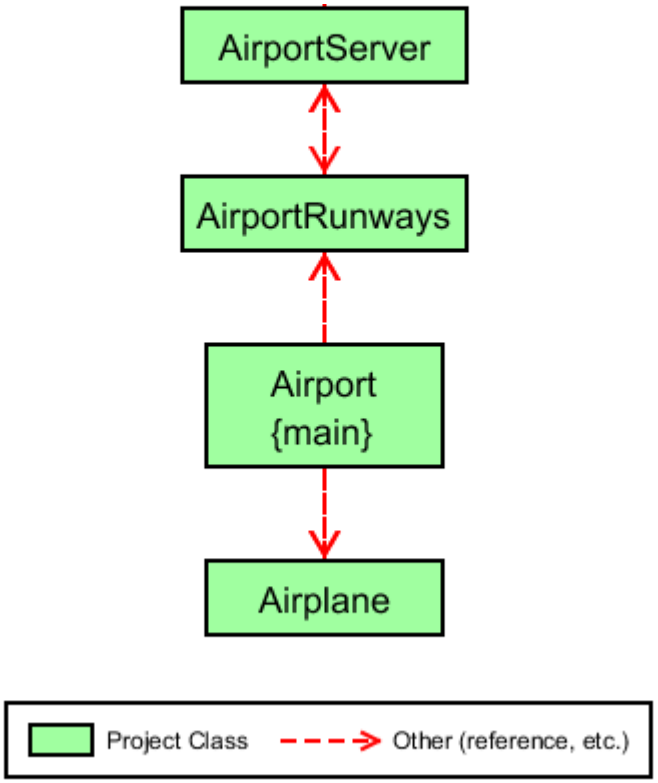
Rules

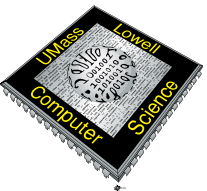
1. Our airport simulation uses six runways labeled 4L, 4R, 9, 14, 15L, & 15R*
   - Runway 4L may be used simultaneously with 4R
   - Runway 9 may be used simultaneously with 15L
   - Runway 14 may be used simultaneously with any other runway
   - Runway 15L may be used simultaneously with 15R
   - Runway 9 may **not** be used simultaneously with 4R or 15R
   - Runways 15L or 15R may **not** be used simultaneously with 4L or 4R
   - Only one airplane at a time may occupy a given runway
   - Due to restrictions of Air Traffic Control, only six requests for landing may be active simultaneously
2. Seven airplanes are continuously attempting to land at the airport
   - Each airplane requests a randomly selected runway on which to land
   - The simulator determines whether a given landing request can be fulfilled, based on the usage of the requested runway and other runways
     - If any of the restrictions listed in Rule 1 would be violated, the airplane must "go into a holding pattern" (sleep) until the restriction(s) are lifted
   - Once permission to land on the selected runway is granted, the airplane is assumed to land immediately, but will occupy the runway for a random amount of time while taxiing
   - Shortly after the airplane leaves the runway, that airplane magically is in the air again ☺, and requests another landing
3. You must add mutex locks and condition variables to the `AirportServer` code in order to enforce synchronization and mutual exclusion on the use of the runways and Air Traffic Control
   - The simulation must permit simultaneous use of runways whenever allowed by Rules 1 and 2



*Note: All traffic is assumed to arrive from the south or from the west. Thus, runways 22L, 22R, 27, 32, 33L, and 33R are not used in this simulation.

UML Diagram


AirportServer
AirportRunways
Airport
{main}
Airplane
Project Class
Other (reference, etc.)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