AIR TRAFFIC CONTROL SYSTEM

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Introduction:

An air traffic controller takes care of assigning runaways for incoming and departing flights in an airport and much more. In this project we plan to automate the task of assigning runways to flights depending on their direction of travel. The pilot inputs the direction of travel, the system calculates the suitable runway (out of two available) and informs the pilot which runway to land on, or wait if the runways are occupied.
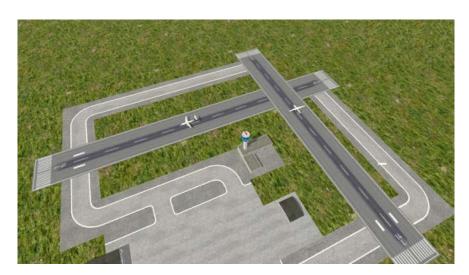

Figure: Representation of the runways

Input and Output Description:

The input will be a four-bit integer out of which 2 bits represent the direction of the incoming flight and the remaining two bits is a system generated input which represents the availability of runways.

The output is a two-bit integer value which tells the pilot to either land or wait. If the landing signal is given to the pilot, the two bits would represent which runway to land on. If the wait signal is given, after the waiting time, input is requested again.

Assumptions and Shortcomings:

1. We assume sequential requests from flights, i.e. our system can't handle two requests at once.
2. Unidirectional input from pilot.
3. Landing and take-off period is assumed to be constant.

Project Requirements:

Circuit will be designed with the help of the following components:

1. Basic logic gates
2. Flip flops – used as a register
3. Counter – used as a timer

References:

1. https://en.wikipedia.org/wiki/Air_traffic_controller
2. http://www.fpga4student.com/2016/11/verilog-code-for-traffic-light-system.html
3. https://docs.google.com/spreadsheets/d/1nWOrUS084dqDRtsNSTjziffPfU0w-5Fvno5n2Op79Fk/edit#gid=1966360075