

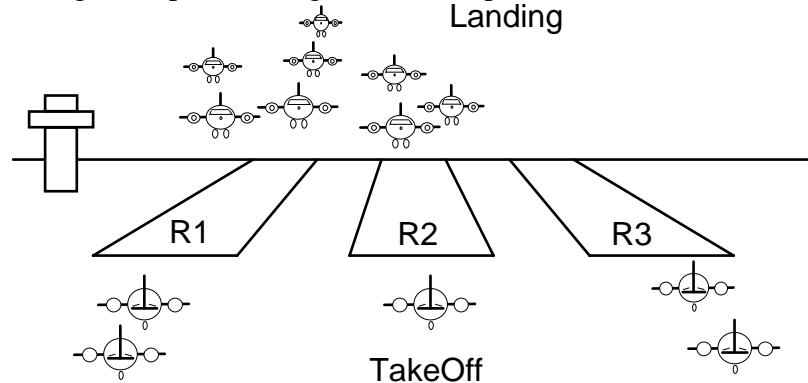
# BTP 210

## Project #2

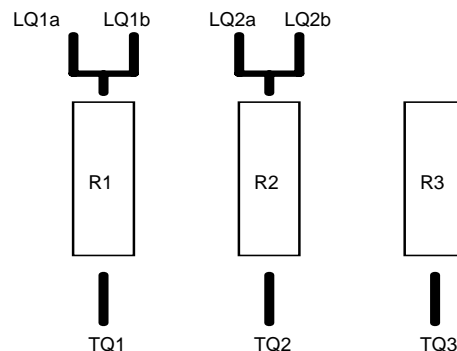
### "AIRPORT SIMULATION"

#### 1)The Problem:

It is about simulating an airport landing and takeoff pattern.



There are 3 runways, R1, R2 and R3. For R1 and R2 there are four landing holding patterns LQ1a, LQ1b, LQ2a, LQ2b (two queues for each.) Arriving planes for landing will enter one of those queues which should be kept as close in size as possible.



When a plane enters LQxx it is assigned an **integer id number** and an integer giving the number of time units the plane can remain in the air because of low fuel level.

There is also a queue for takeoffs for each of the three runways TQ1, TQ2, TQ3. Planes arriving to TQx are also assigned an **integer id number**. TQx queues should be kept approximately the same size.

You will run your simulation for time slots. In each time slot events may occur. Each time slot counts as one time unit. At each time slot **0-3 planes** may arrive to landing queues **LQxx** or takeoff queues **TQx**.

In a time slot a runway can handle only one takeoff or landing. **Landing planes** are disposed, like the planes that takeoff, so we **don't consider the fact that they should takeoff in the future**.

R3 is used only for takeoff. However R3 may be used for landing if a plane in the air runs out of fuel.

If there are more than one plane out of fuel, other runways may be used immediately by those. At each time slot only 3 planes can be serviced. If a plane out of fuel can not land, it crashes.

To distinguish landing planes from planes which takeoff, assign odd id numbers for planes arriving at LQxx and even arriving to TQx. Try to design your algorithm so that neither TQx nor LQxx grow excessively. However arriving planes are always placed at the end of the queues. **Never reorder queues.**

**The input** might be read from file or generated by using random number generator of your compiler. It should contain the following information:

- *The number of planes arriving at takeoff queues. [0..3]*
- *The number of planes arriving at landing queues. [0..3]*
- *Units of flying time left for planes arriving in landing queues. [1..20],[1..20],[1..20]*

**Your output** should clearly indicate following information, which you produce periodically:

- *The contents of each queue, (# of planes, ID's etc.)*
- *The average takeoff waiting time, (For planes which already took off, not in the queue)*
- *The average landing waiting time, (For planes which already landed, not in the queue)*
- *The average flying time remaining on landing,*
- *The number of planes landing without fuel reserve,*

## **2) Material to Submit**

- a) Software Design Document
- b) The program listing properly commented and indented and A 3.5'' demo diskette :  
April 6, 2002.