Information System -Time Management PBL

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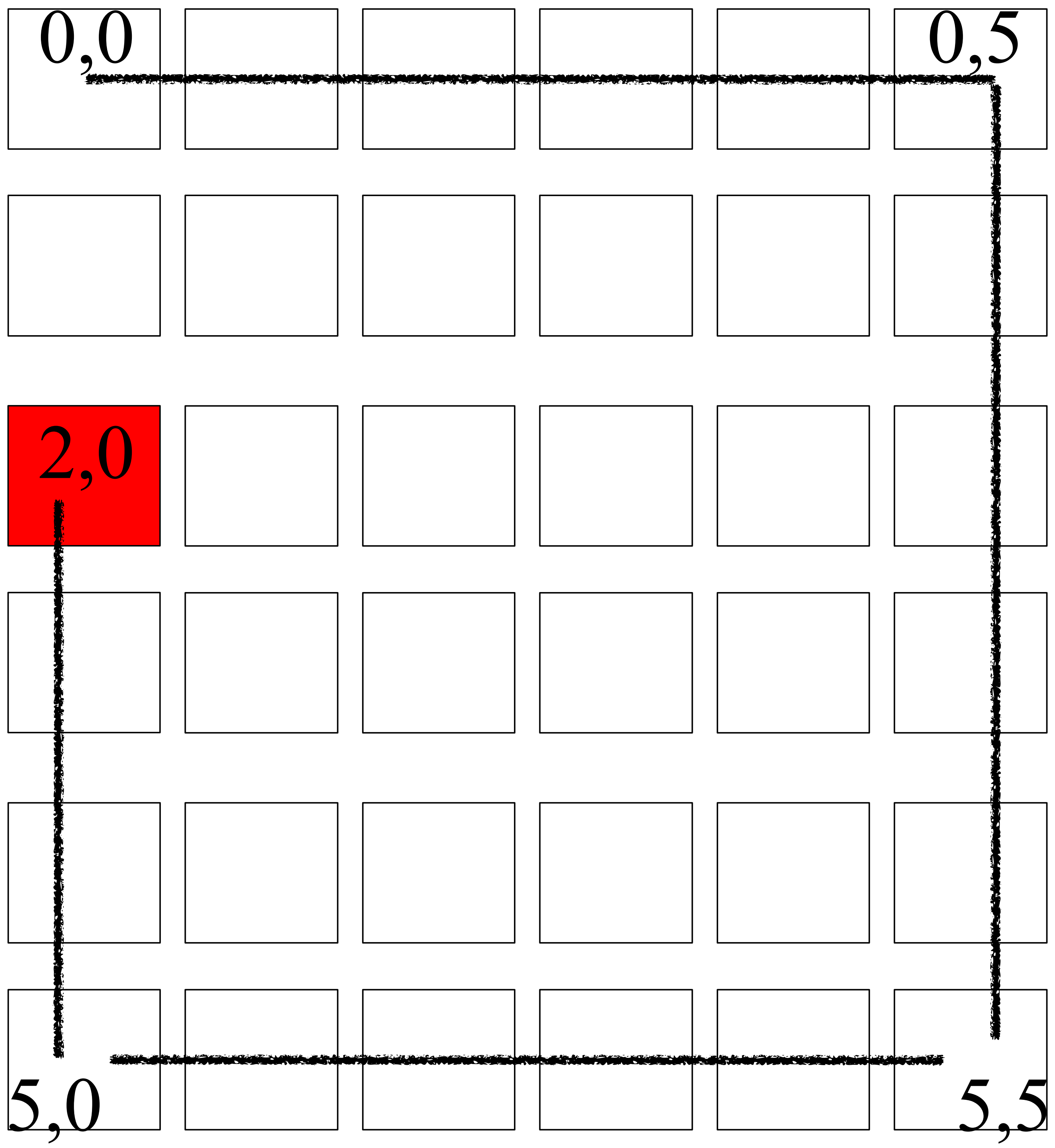
http://jpaulgibson.synology.me/~jpaulgibson/TSP/Teaching/CSC4104/CSC4104-InformationSystem-TimeManagementPBL.pdf

TASK 1 - Robot Spiral Walker



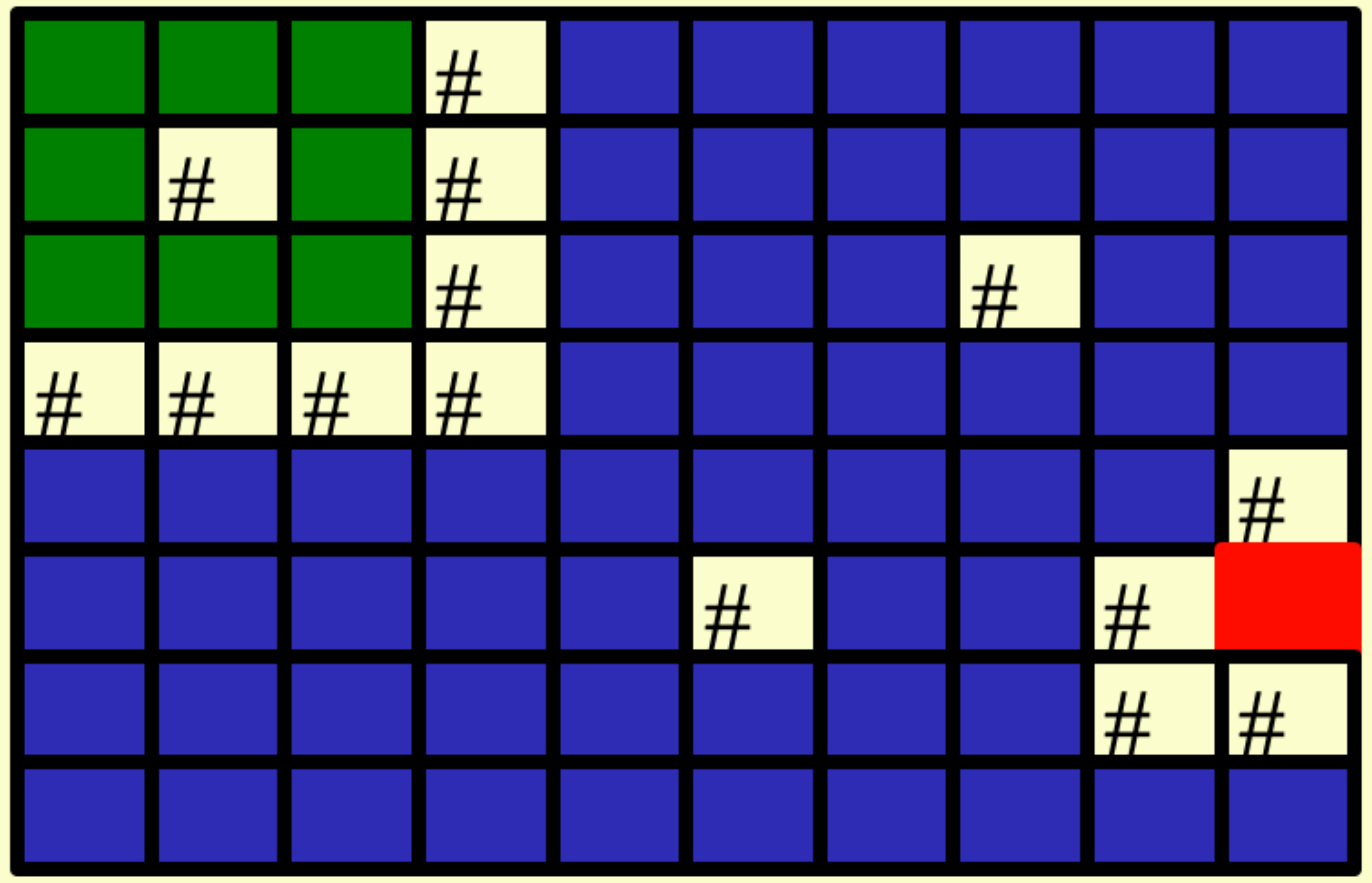
Given any square grid of specified integer size,

Calculate the x,y co-ordinates of the robot after it has walked *half way* around the grid following a spiral walk, starting at 0,0 and moving clockwise.

In the example the function
Calculates
f(6) = (2,0)

TASK 2 - Robot Wall Partitions

The Robot Problem: A first requirements specification



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In a 2-dimensional grid/plane (`N x M`) there are either walls or spaces.

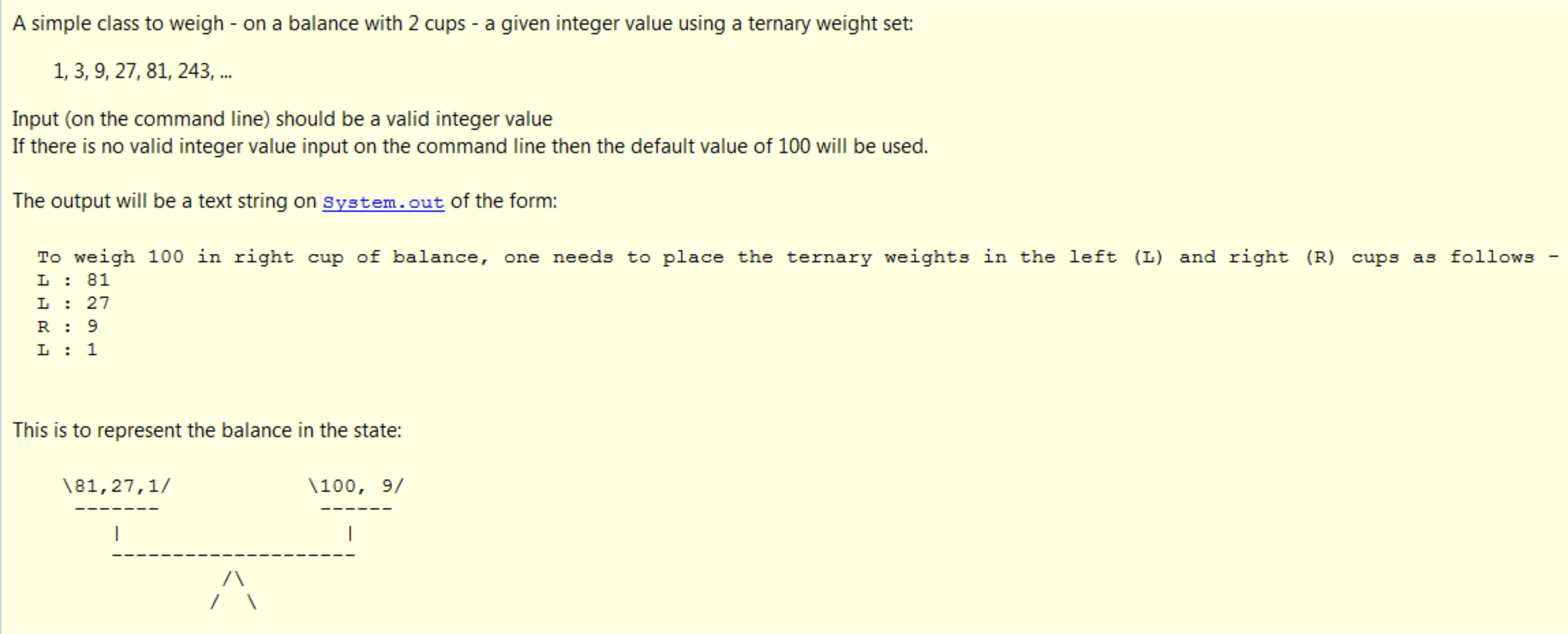
We represent the walls as '# ' in the diagram (with spaces coloured into different partitions). A key part of your design is the data structure you use to implement this.

In such a grid we can place robots who can move ***horizontally and vertically*** but cannot move on top of a wall.

Functional Requirement 1 - You need to calculate the minimum number of robots that are needed in order to be able to visit all spaces in any given grid (of walls and spaces), ie the number of partitions.

In the example above, there are 3 partitions and so we need 3 robots.

TASK 3 - The Ternary Weight



A simple class to weigh - on a balance with 2 cups - a given integer value using a ternary weight set:

1, 3, 9, 27, 81, 243, ...

Input (on the command line) should be a valid integer value
If there is no valid integer value input on the command line then the default value of 100 will be used.

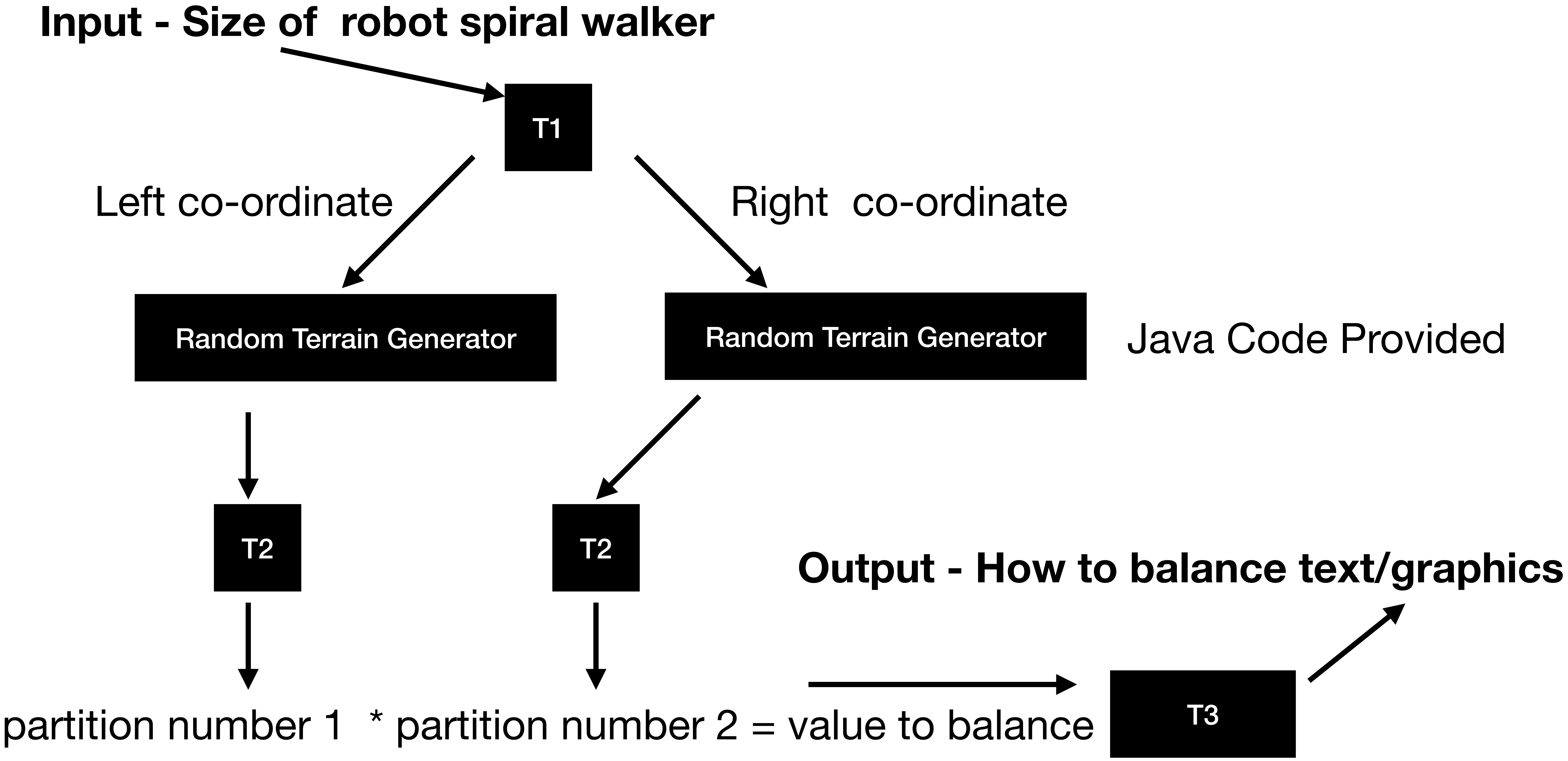
The output will be a text string on `System.out` of the form:

```
To weigh 100 in right cup of balance, one needs to place the ternary weights in the left (L) and right (R) cups as follows -
L : 81
L : 27
R : 9
L : 1
```

This is to represent the balance in the state:

```
  \81,27,1/           \100, 9/
   -------             ------
      |                  |
      --------------------
               /\
              /  \
```

The System Architecture


Input - Size of robot spiral walker
T1
Left co-ordinate
Right co-ordinate
Random Terrain Generator
Random Terrain Generator
Java Code Provided
T2
T2
Output - How to balance text/graphics
partition number 1 * partition number 2 = value to balance
T3

PBL : time management

Estimate the total amount of time (person hours) to deliver a working implementation of the system previously described

For your team, produce a task graph, and Gantt chart, to plan how to complete the work ASAP

Schedule work to be done during the remainder of this PBL session

What can your team deliver in the remaining time? You can join with another team if you want to make more progress. The whole class can work together if they like!

As the work progresses, update your estimates as the need requires

At the end of the day, deliver ‘something that works correctly’ to Paul