Julio Cesar Lopez 20161113 - 1A

1.- Alice patrols the boundaries of the environment. Give your algorithm for this patrol.
Your Algorithm should allow your robot to move freely and avoid other Robots, boundaries or objects

a.- Alice will start located on the left corner in the top.

b.- Alice will start to move from left to right (West to East) with constant speed until the most right point arrive some pixels before the border of the window, in this case the window will be of width 500 pixel and height 500 pixel. 'x' is variable and 'y' doesn't have change

c.- Once one of the points of Alice is equal or higher than width - 10 the Triangle will stop and turn right 90°.

d.- Next Alice will start to move until 10 pixels before the lowest wall. this movement is from north to south. 'x' is constant and 'y' will increase its value constantly equivalent to the value of speed until one of Alice's vertices is higher than or equal to height (500).

e.- When Alice arrive to the lowest right corner will Turn 90° to right and will start to move from right to left in the lowest border with constant speed decreasing the value of 'x' and 'y' won't have change until one of Alice's Points is Lower than or equal to 10.

f.- then Alice will stop and turn right again.
~~until~~

g.- Alice will move from south to North with 'x' constant and 'y' decreasing until 'y' points of Alice (Any point of Alice) is Lower than or equal to zero.

h.- After this Alice will stop and Turn right to Continues with the patrol movement.

2. Explain the maths involved for this movement (it should include at least two Transformations).

Mainly we will use Transformations to determinate the change of position of Alice from one side to other (borders), to make the whole spin in each corner and to change orientation.

Basically we will use Translations and Rotational Symmetry.

Translations to move from one border to another.

For Example:

Alice is located with the following coordinates

A (40,20); B (10,10); C (10,30)

We will use Translation to move from east to west, the right border is equal to 500.

(40,20) => 40+450, 20+0 => (490, 20)

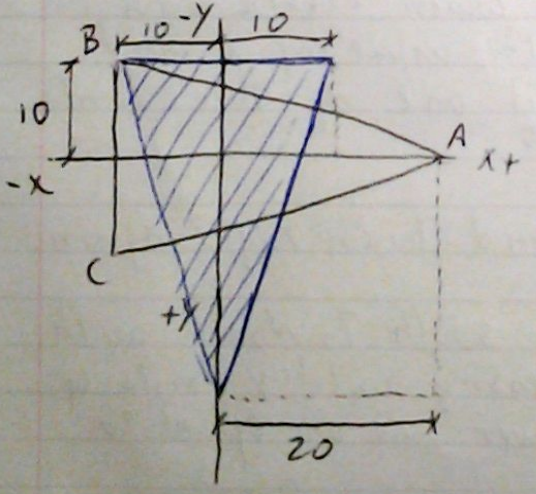
(10,10) => 10+450, 10+0 => (460, 10)

(10,30) => 10+450, 30+0 => (460, 10)

$T_{450,0}$

To Turn Alice we will use Rotational Symmetry in the following way.

To Turn 90 degrees clock wise, taking as rotational point the centroid of the triangle



x y

A (20,0) => A_R (0,20) => (y, x)

B (-10,-10) => B_R (10,-10) => (-y, +)

C (-10,10) => C_R (-10,-10 => (y, -x)

In every corner we will use Rotational Symmetry and from one wall to another Translation.

3_ Bob. Random Walk.

a.. Bob will start in the middle taking a random orientation with a constant speed until any point of bob is higher or equal to width or height, or lower than or equal to 0 (zero) for values in x or y.

b.. Once bob reach that values he will stop, goes backward and take a new orientation until reach that values again.

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