LAB 1-DETAILS

g(n)-Cost Function

This is the function where which calculates the distance travelled by the athlete from the source point. The calculation of the cost function is done pixel by pixel and then used in calculating the cost of that pixel.

h(n)-Heuristic Function

This is the function which calculates the heuristic value for a pixel. The value of this function is calculated using 3 factors in consideration:

- Distance from the final point
- Elevation of the current pixel
- Maximum speed of the terrain

The program processes the image based on the season and stores all the whole image into an array for easy access of the colour of the pixels, this is done as it will take less time for finding path. Each pixel is traversed and its colour is stored in a dictionary. The entire program takes about a minute to execute due to the pre-processing of the image as the PIL is slow. The actual path finding finishes in less than 1 second.

SEASONS:

Summer:

In this season the speed of the different terrains are set as shown in the below table and then the best route is found. For making the path visible the path colour has been changed to red.

Terrain	Colour	Terrain Speed(Lowest value means slow)
Open land	#F89412 (248,148,18)	10
Rough meadow	#FFC000 (255,192,0)	2
Easy movement forest	#FFFFFF (255,255,255)	7
Slow run forest	#02D03C (2,208,60)	6
Walk forest	#028828 (2,136,40)	5
Impassable vegetation	#054918 (5,73,24)	0
Lake/Swamp/Marsh	#0000FF (0,0,255)	0

Paved road	#473303 (71,51,3)	10
Footpath	#000000 (0,0,0)	9
Out of bounds	#CD0065 (205,0,101)	0

Spring:

The edge of the waterbody is determined and then 15 pixels outside of it which was not “Out of bounds” are marked with a different colour(#F5F542) to increase the difficulty to walk there. Walking on water is not possible.

Winter:

The edge of the waterbody is determined and then 7 pixels into the water is frozen and marked with different colour (#42BFF5) so that it is walkable.

Fall:

For fall season the toughness of the terrains are increased by 2.

Terrain	Colour	Terrain Speed(Lowest value means slow)
Easy movement forest	#FFFFFF (255,255,255)	5
Slow run forest	#02D03C (2,208,60)	4
Walk forest	#028828 (2,136,40)	3

For both spring and winter the edge of the water the pixels are checked if the match the condition and they are coloured in a different colour by using BFS the limiting case for this is that the distance between the current point and the start point is 7.