IFT 2015  
TP3  
(15 Points)  
April 4, 2014

You will write a program that performs a simulation *"Jumping Leprechauns."* This simulation involves arbitrary number of leprechauns, numbered to . Each leprechaun has a pot filled with gold coins. At the beginning of the simulation, each leprechaun pot is filled with a million gold coins ( = 1 000 000 for ). In addition, the simulation also holds for each leprechaun , a position on the horizon, represented by a real number and initialized to for . At each iteration of the simulation, leprechauns act in order from to . The action begins with a leprechaun calculate its new position on the horizon, determined by

Where is a random real number between and . The leprechaun then has half gold ( ⌈ceiling⌉ ) the nearest of his new position leprechaun and added the gold to his cauldron. When leprechaun has no more gold in her cauldron , it disappears . You must write a program that performs many iterations of this simulation it takes up all that remains two leprechauns , for an arbitrary initial number 𝑛 of leprechauns . You must use two data structures abstract data type ( ADT ) sorted map, implemented in two tree structures ( different or identical ) to take respectively the pairs ( 𝑖 , 𝑥 u ) and ( u 𝑥 , 𝑔 u). While iterations on leprechauns should be on the first structure , the search for the leprechauns closer to a new position should be sorted in the second map . In order to optimize the algorithm , corresponding to a node should be deleted Leprechaun in both structures when it has no more gold .

Le leprechaun 9 disparait ! Il reste 9 leprechauns.   
Le leprechaun 5 disparait ! Il reste 8 leprechauns.   
Le leprechaun 7 disparait ! Il reste 7 leprechauns.   
Le leprechaun 10 disparait ! Il reste 6 leprechauns.   
Le leprechaun 6 disparait ! Il reste 5 leprechauns.   
Le leprechaun 2 disparait ! Il reste 4 leprechauns.   
Le leprechaun 8 disparait ! Il reste 3 leprechauns.   
Le leprechaun 3 disparait ! Il reste 2 leprechauns.

Les 2 gagnants sont les leprechauns 1 et 4.  
0.09923219680786133 secondes