

## Solving the Josephus problem with circular lists

For solving this problem. I used 2 classes.

- The class Node:
  - a. Creating a node

Also, the Node class is used to implement the functions for the circular list.

- The class List is used for implementing a circular linked list.
  - a. Constructor
  - b. def append = this function puts a new value in a new node and puts that node at the end of the list
  - c. def getNode = gives the position of a node. This function helps us when we create the function which gives us the previous node. Also, it is used to give us the position of the node we want to remove when we apply the Josephus algorithm.
  - d. def prevNode = it gives the previous node of a given node. The variable "referenceNode" from the function's argument is the given node.
  - e. def putAfter = puts a node after another node
  - f. def putBefore = puts a node in front of another node. The way this function works is by using the function putAfter. It calls that function in order to put the new node in front of the previous node of the referenceNode. So, between the previous and referenceNode.
  - g. def putAtEnd = the new node is put at the end of the list. If the head is empty, that means that the list is empty and the new node will be the head of the list. If the list is not empty, we call the function above, which calls the function above it and, finally, it puts the new node at the end of the list.
  - h. def delete = function for deleting a node
  - i. def verify = verifies if a value is in the list. It is useful for the next function when we see for the third element.
  - j. def thirdElement = it lists the third element from the given list
- def oneNode = check is the list has or hasn't more than 1 node
- def josephuSolution = the function for the algorithm. Firstly, we check if the list is empty or not. If not, we set the "person with the gun" as the head of the list. While the list's length is bigger than 1, we get the position of the node we need to remove, set it and delete it. We repeat this until there is only one node left.
- In the main function we get as input the length of the list and the number of the node which will be killed first. We call josephuSolution and it will output the last node alive from the list.