

CS515 CS Lab 2

Assignment No: 3

Given that total number of Balls n (numbered from 1 to n) are placed in a circular fashion, and a number k which indicates that $k-1$ balls are skipped and the k^{th} ball will be removed from that circle in clockwise direction. After each operation, the count will start from $k+1^{\text{th}}$ ball. The task is to find the ball (number) in the circle so that when all these operations are performed starting from 1st place in the circle, that ball (number) remains.

(a) Show the updates in your circular list at each iteration.

(b) State the complexity of your algorithm and justify it.

Example:

Given $n = 5$ and $k = 3$, the safe position is 4. The explanation is given below.

$N = 5$, i.e. Balls 1, 2, 3, 4, 5. Given $k = 3$

Step 1: 3rd ball is removed; the remaining balls are 1, 2, 4, 5.

The count will start from 4th ball

Step 2: 3rd ball is removed; the remaining balls are 2, 4, 5.

The count will start from 2nd ball

Step 3: 3rd ball is removed; the remaining balls are 2, 4.

The count will start from 2nd ball

Step 4: 3rd ball is removed; the remaining is 4th ball.