*CSE 102*

**Collections - II**

**(HashMap, HashSet and LinkedList)**

1. You and your friends form a circle to play a game. The game starts with you picking either the friend on your right or the one on your left with equal probability and whispering the secret word to her ear. Game continues with that chosen friend taking your role and so on. The game ends when everybody in the circle knows the word.

Simulate this game in Java. As a bonus try to come up with a formula relating the number of people in the circle and the average number of rounds the game takes.

1. Recall the Round-Robin job scheduling algorithm. Represent each job’s remaining execution time with a LinkedList<Integer>. Write a program which simulates this scheduling algorithm, consider why using a LinkedList data structure is appropriate.
2. You want to buy a card collection which consists of 30 different cards in total. Each card normally costs 3 liras. However shop assistant is too bored that day and proposed you another scheme to buy the cards. According to the alternative scheme, you would draw a card from a bag randomly (where probability of drawing any different card is always equal), and you are supposed to pay 1 lira for each draw whether or not you draw a new card or one you have already drawn before. You are also allowed to switch between schemes at any time you want. What is the best strategy to buy the whole collection? Which strategy would you prefer if switching hadn’t been allowed?
3. Write a function which takes a HashMap<Integer, String> and removes duplicates in the value collection while preserving the mapping. That is for any integer *n* in the keyset, *map*(*n*) = *s* iff *map’*(*n*) = *s* where *map’* is the changed map.
4. Write a function which takes a HashMap<Integer, Integer> and checks if it is a permutation mapping (in the same sense as the permutation function in math).
5. Write a function which takes two integers *a* and *b,* and a HashMap<String, Integer>, mapping each person’s name to her age, and returns another HashMap<String, Integer> which filters the input mapping and includes only those people with the age in between *a* and *b*. You can assume that *a<=b.*