

## Data Structures and Algorithms Lab

### 06. Linked Lists

**Subject Code:** 17ECSP201

**Lab No:** 06

**Semester:** III

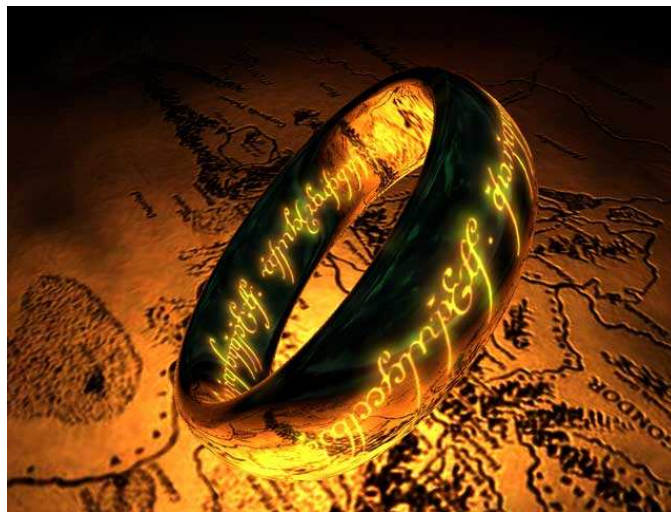
**Date:** 14 Sept 2017

**Batch:** C1

**Question:** The Return of “The Lord of the Rings”

**Objective:** Usage of linked lists

---



Ages ago, the Dark Lord Sauron and his army was defeated by Frodo baggins and his team of Men, Hobbits, Elves and Dwarves by destroying the Ring. The peace returned by destroying the black power and hence today we all are peacefully coding in DSA Lab. However it is not very simple to destroy the black magic easily until all the sources are ruined permanently.

Luke Baggins, great grandson of Frodo Baggins, near the water, the land, in the *shire* has found out that the dark army is getting ready in the middle of the earth, once again, to capture the earth. He needs your help to destroy the army. Are you ready for the adventure?

Luke Baggins after the research and studies in order to destroy the Nazguls, Orcs, Balrogs, Shelobs and Corsairs, has discovered a new potion called “**prolific-juice potion**”. But all the ingredients are not available in shire. Can you help him to prepare the potion and dispense it at the centre of the earth?

In order to prepare the prolific-juice potion, you need to buy the following:

**30 cups of fluxweed**

**20 bundles of knotgrass**

**42 leeches**

**50 Lacewing flies**

**9 Bicorn horn**

You need to add all of them into a cauldron and brew it for 20 days. The order in which you add must be same as the one mentioned above. Strictly in the same order!



Your task is to do it all. Go to market buy all the ingredients required, brew them in the same order and prepare the potion.

*Uno, Dos, Tres...  
Let the prolific-juice potion preparation begin!*

## At Professors Desk

### Your task is:

1. First buy all the required materials. We may not get all in the same shop. If the desired quantity is not available then we need to buy from next shop. However you can buy more than required as one or more may go damaged.

Maintain a linked list structure:

```
struct prolific_potion
{
    char ingredient[30];
    int quantity;
    struct prolific_potion * prev;
    struct prolific_potion * next;
};
```

You will keep on calling the function “insert\_at\_end” until you buy all the required or more ingredients in specified quantity.

The required ingredients can be purchased in any order.

### 2. Brew the potion

Now you need to add the ingredients in the same order as mentioned by Luke Baggins. Search for the required ingredient and you will decide whether to delete the node or update the node. You should remember that each ingredient can be found at different nodes in varying quantity.

Print appropriate message after adding each ingredient.

### 3. In the end print the message that:

“The POTION is ready, The dark army can now be defeated again! ” and exit the program.

**\*\* Happy Coding \*\***