

Data Structures and Algorithms Lab

08. Linked Lists

Subject Code: 17ECSP201

Lab No: 08

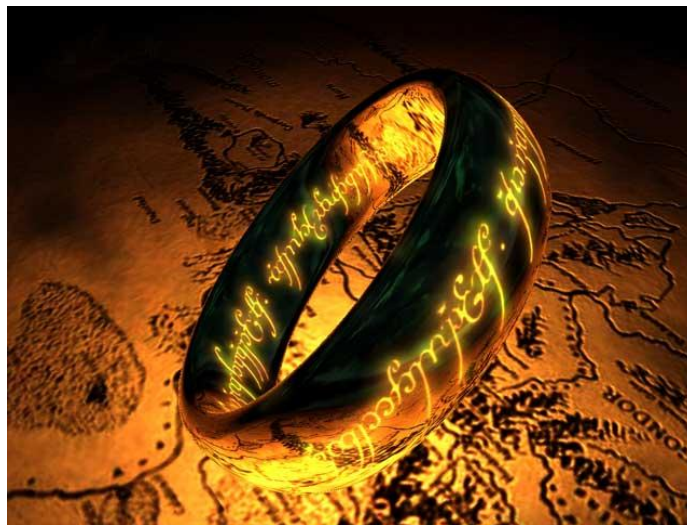
Semester: III

Date: 01 Sept 2018

Batch: D

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 was returned by destroying the black power and hence today we all are peacefully coding for DSA Lab assignments. However, and but, there is always a but! It is not easy to destroy the black magic 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 imprison the earth. He needs your help to destroy the army. Are you ready for the adventure? (of-c(o)urse you are)

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 the 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. Means, user can enter any item in any order with any quantity. You must keep accepting the input until all the items are gathered. You can have equal or more than required items but not less.

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. A node has to be deleted only if it becomes empty. 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.

Note:

This assignment opens on 01 September 2018, 7.00pm and is open until 02 September 2018, 10.00am.

Submission process:

Email the completed prolific-potion.c(provided with layout, structure and api's) file to prakash.hegade@kletech.ac.in

Subject: Lab 08 Code Submission

Include your name, roll number and SRN in your .c file.

**** Happy Coding ****