CSCI 211 Lab 2. Array of Linked Stacks

Lab Objectives

- Be able to use a Linked ADT
- Understand how to set up an array of generic lists
- Be able to traverse a linked structure

Introduction

For this lab, you will modify and extend the LinkedStack class from the textbook. The goal will be to create an array of 12 lists of Person objects. The lists are associated with the 12 months of the year, January, February … December. A file with celebrities and their birthdays has been provided. You will construct an array of LinkedStack objects and for each celebrity, create a Person object and push it onto the Stack that is at the index that corresponds to their birth month. Note that the array will have 13 slots (0..12), but position 0 will be ignored. Once all of the celebrities have been stored in the structure, a list will be generated, by month, listing the celebrities and their birthdays.

Step 1. Download the zipped project `StackExample` from Blackboard and copy and paste it into an IntelliJ Maven Project (main > java). You should find seven classes:

- StackADT.java
- LinearNode.java
- EmptyCollectionException.java
- Birthdays.txt
- Person.java
- LinkedStack.java
- Driver.java

Note that you will only be making changes to the last three classes. The first four should be unchanged.

Step 2. Study the code to understand what is going on. Now, looking in the three classes you will modify, notice I have provided some of the code for you.

Step 3. Fill in the TODO sections of Person.java. You can use the shortcuts in IntelliJ! For example: ***Code/Generate/Constructor*** using Fields and ***Code/Generate/Getter and Setter***.

Step 4. Fill in the three incomplete methods in the LinkedStack class: peek, isEmpty, and size. Be sure to delete the dummy return statements once you have finished writing these methods. Also, look at how the pop method begins – if the stack is empty, an EmptyCollectionException is thrown. Your peek method should start in a similar way.

Now, examine the toString method that I have provided for you. Notice that you must iterate through the linked list from the beginning. To do this, I created a LinearNode called *current*, which is initialized to the *top* of the linked stack. Each iteration of the while loop, I set the current node to the next node in the list.

Step 5. In the Driver class there are three TODO comments that need to be addressed.

1. Instantiate each of *bday's* elements. You need to step through and create new LinkedStack objects for *bday's* array positions 1..12.
2. Push the person object *p* (already constructed for you) onto the proper stack, based on his or her birth month. This can be done in a single statement.
3. Print the celebrity birthdays. This should be a simple loop if your toString for Person was done properly. See sample output below.

Step 6. You must do ALL of the following to get credit for the lab

1. Use the queue system to let the TA know that you are ready for your work to be checked.
2. Demonstrate to the lab TA that your code works correctly.
3. Export the project (or zip it in Explorer or equivalent).
4. Upload the zip file to Lab 2 on Blackboard.

Sample Output:

```
January birthdays:

 Michelle Obama   1/17
 Elvis Presley    1/8

February birthdays:

 Tom Brokaw 2/6
 Abraham Lincoln  2/12
 Michael Jordan   2/17

March birthdays:

 Jim Parsons      3/24
 Albert Einstein  3/14

April birthdays:

 Kunal Nayyar     4/30
 Johnny Galecki   4/30
 Eddie Murphy     4/3
 Robert Khayat    4/18
 Queen Elizabeth II     4/21
 Maya Anglelou    4/4
```

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