

COP3330C Module 7 Practice Exercise

In this exercise we will modify the Module 6 solution for the HappyBirthday application to create a stream (“magic pipeline”) to process our birthday cards. We will also change our main application class to act as a singleton object.

The rules for creating a singleton:

1. Ensure that only one instance of the class exists by declaring a static member variable (instead of instantiating it in the main method as a local variable)
2. Restrict access to only that instance by declaring all constructors of the class to be private
3. Provide a public static method which returns the singleton instance

```
private static HappyBirthdayApp hba = new HappyBirthdayApp();

private HappyBirthdayApp() { }

public static HappyBirthdayApp getApp() {
    return hba;
}
```

We implement the stream by wrapping a queue (linked list) and use the stream in the application's main method to iterate through the birthday cards in the queue.

```
// Use a Queue<LinkedList> to act as message queue for the dispatcher
private Queue<BirthdayCard> queue = new LinkedList<BirthdayCard>();
private Stream<BirthdayCard> stream = queue.stream();
```

A generic Dispatch interface has been created which is responsible for dispatching cards (adding them to the queue). This interface is stored in a new package subcomponent called “dispatch”.

```
// Dispatcher.java
// D. Singletary
// 2/15/23
// A generic interface for dispatching messages.

package edu.fscj.cop3330c.dispatch;

public interface Dispatcher<T> {
    public void dispatch(T t);
}
```

The sendCard method in the HappyBirthApp class has been changed to dispatch the cards using a lambda expression:

```
public void sendCard(BirthdayCard bc) {
    Dispatcher<BirthdayCard> d = (c)-> {
        this.queue.add(c);
    };
    d.dispatch(bc);
}
```

At the end of the main method, we process the stream using the forEach method:

```
// process the stream
System.out.println("starting forEach");
hba.stream.forEach(System.out::print);
```

Sample output (no changes from module 6, since we are only modifying internals for this version):

```
Here are the birthdays:
Miles Bennell:
Sorry, today is not their birthday.

Becky Driscoll:
Birthday card for Becky Driscoll
bdc-child.jpg (JPG)

sending email to Becky.Driscoll@email.test

Jack Belicec:
Birthday card for Jack Belicec
|-----|
| Happy Birthday! Hope your day is as awesome as you are |
|           and all your birthday wishes come true! 🎉🎊           |
|-----|

sending email to Jack.Belicec@email.test

Theodora Belicec:
Birthday card for Theodora Belicec
bdc-adult.jpg (JPG)

sending email to Theodora.Belicec.@email.test

Sally Withers:
Birthday card for Sally Withers
|-----|
|           Happy Birthday!           |
| May this special day bring you cherished memories, joy |
|           in the present, and hopes for the future. |
| Wishing all of your birthday dreams and wishes come true! |
|-----|

sending email to Sally.Withers@email.test
```