Operating Systems
Spring Semester 2020

Greg Witt
greg.witt625@gmail.com

Program 4- Producer Consumer

Java Classes with Main Method

```
import java.io.File;

import java.io.BufferedReader;

import java.io.FileReader;

import java.io.IOException;

public class Program4 {

   public static void main(String[] args) {

       try {

           File f = new File(args[0]); // Creation of File Descriptor for input file

           // Creates Two CubbyHoles for the Banana/Carrot Consumers

           CubbyHole vowelsCub_1 = new CubbyHole();

           CubbyHole consonantCub_2 = new CubbyHole();

           // Creates Producer

           Producer apple = new Producer(vowelsCub_1, consonantCub_2, f);

           // Vowels Consumer

           Consumer banana = new Consumer(vowelsCub_1);

           // Consonants Consumer
```

```
            Consumer carrot = new Consumer(consonantCub_2);
            apple.start();
            banana.start();
            carrot.start();
        } catch (Exception e) {
            System.out.println(e);
        }
    }
}
class CubbyHole {
    private char contents;
    private boolean available = false;
    public synchronized char get() {
        while (available == false) {
            try {
                wait();
            } catch (InterruptedException e) {
            }
        }
        available = false;
        notifyAll();
        return contents;
    }
    public synchronized void put(char value) {
```

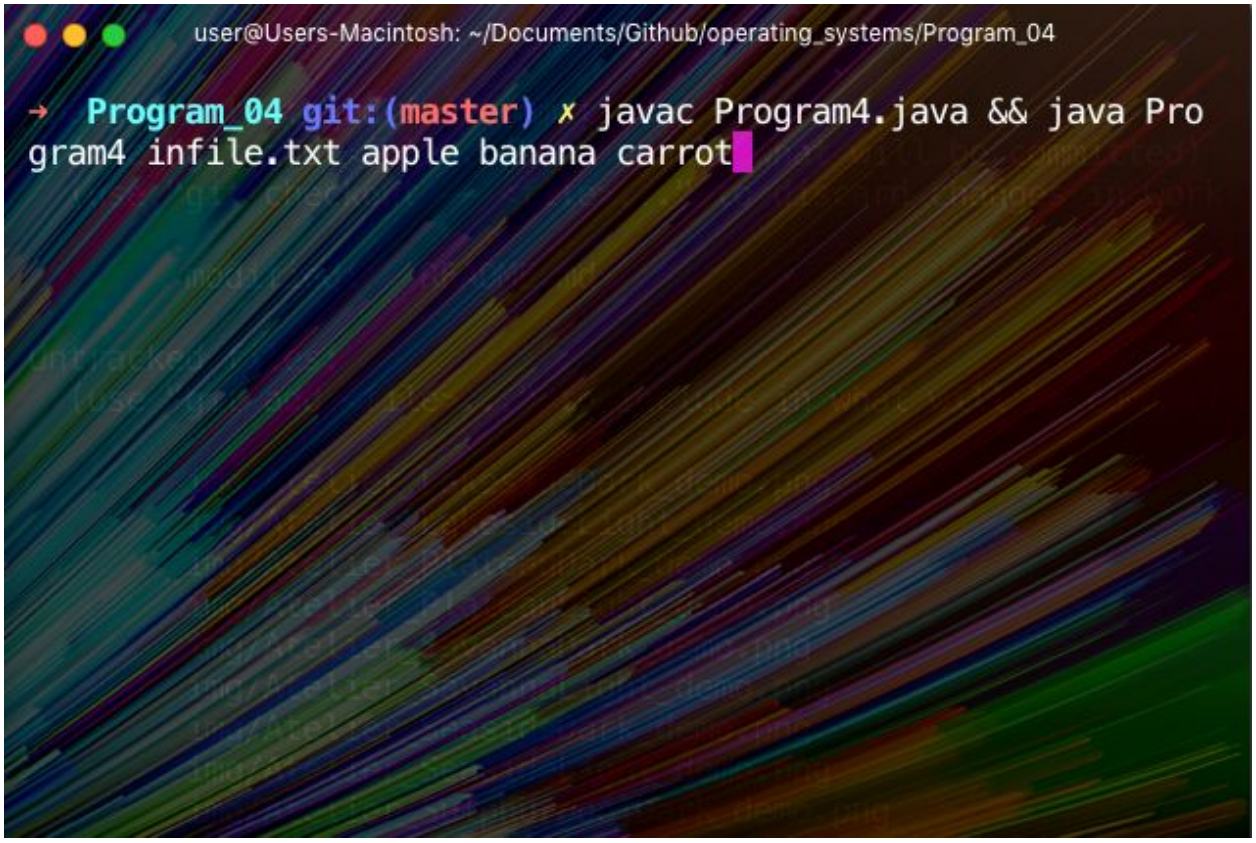
```
        while (available == true) {
            try {
                wait();
            } catch (InterruptedException e) {
            }
        }
        contents = value;
        available = true;
        notifyAll();
    }
}
class Consumer extends Thread {
    private CubbyHole cubbyhole;
    private char character;
    public Consumer(CubbyHole c) {
        cubbyhole = c;
    }
  public void run() {
        do {
            character = cubbyhole.get();
            System.out.println("Consumer #" + this.cubbyhole + " got: " + character);
        } while (character != '.');
    }
}
```

```
class Producer extends Thread {

   // Cubbyholes to hold vowels

   private CubbyHole bananaCub_1;

   // Cubbyholes to hold consonants

   private CubbyHole carrotCub_2;

   private File filetoRead;

   public Producer(CubbyHole c1, CubbyHole c2, File f) {

       // Vowels

       bananaCub_1 = c1;

       // Consonants

       carrotCub_2 = c2;

       filetoRead = f;

   }

   public void run() {

       try {

           FileReader fr = new FileReader(filetoRead); // Creation of File Reader
object

           BufferedReader br = new BufferedReader(fr); // Creation of BufferedReader
object

           int c = 0;

           while ((c = br.read()) != -1) // Read char by Char

           {

               char character = (char) c;

               switch (character) {

                   case 'a':
```

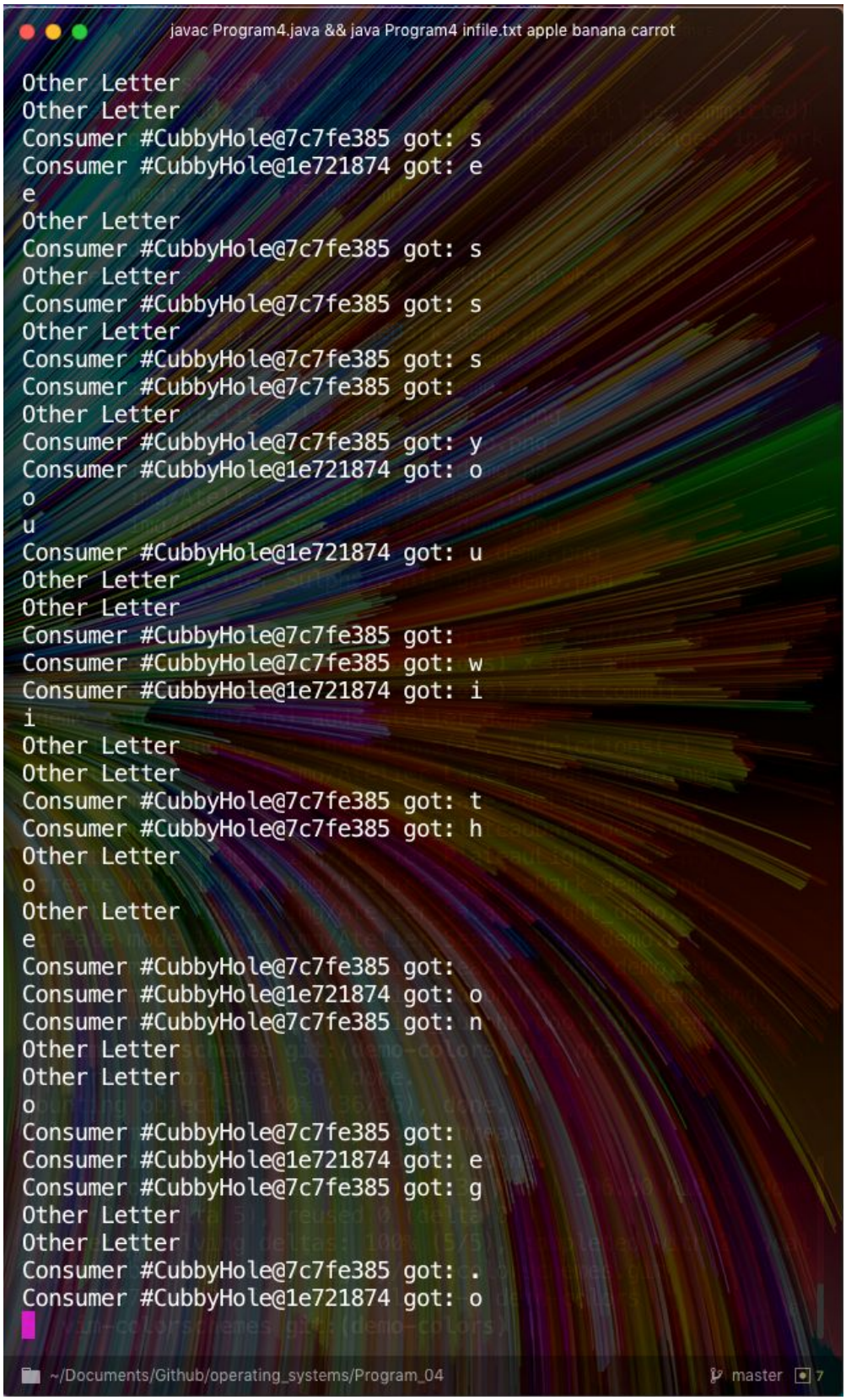
```
                    // Call Cub_1.put()
                    bananaCub_1.put('a');
                    System.out.println('a');
                    break;
                case 'e':
                    // Call Cub_1.put()
                    bananaCub_1.put('e');
                    System.out.println('e');
                    break;
                case 'i':
                    // Call Cub_1.put()
                    bananaCub_1.put('i');
                    System.out.println('i');
                    break;
                case 'o':
                    // Call Cub_1.put()
                    bananaCub_1.put('o');
                    System.out.println('o');
                    break;
                case 'u':
                    // Call Cub_1.put()
                    bananaCub_1.put('u');
                    System.out.println('u');
                    break;
```

```
                    default:
                        // Call Cub_2.put()
                        carrotCub_2.put(character);
                        System.out.println("Other Letter");
                }
            }
        } catch (Exception e) {
            System.out.println(e);
        }
        // File Done! Sends . to both consumers:
    }
}
```

Code Execution



Output


javac Program4.java && java Program4 infile.txt apple banana carrot
Other Letter
Other Letter
Consumer #CubbyHole@7c7fe385 got: s
Consumer #CubbyHole@1e721874 got: e
e
Other Letter
Consumer #CubbyHole@7c7fe385 got: s
Other Letter
Consumer #CubbyHole@7c7fe385 got: s
Other Letter
Consumer #CubbyHole@7c7fe385 got: s
Consumer #CubbyHole@7c7fe385 got:
Other Letter
Consumer #CubbyHole@7c7fe385 got: y
Consumer #CubbyHole@1e721874 got: o
o
u
Consumer #CubbyHole@1e721874 got: u
Other Letter
Other Letter
Consumer #CubbyHole@7c7fe385 got:
Consumer #CubbyHole@7c7fe385 got: w
Consumer #CubbyHole@1e721874 got: i
i
Other Letter
Other Letter
Consumer #CubbyHole@7c7fe385 got: t
Consumer #CubbyHole@7c7fe385 got: h
Other Letter
o
Other Letter
e
Consumer #CubbyHole@7c7fe385 got:
Consumer #CubbyHole@1e721874 got: o
Consumer #CubbyHole@7c7fe385 got: n
Other Letter
Other Letter
o
Consumer #CubbyHole@7c7fe385 got:
Consumer #CubbyHole@1e721874 got: e
Consumer #CubbyHole@7c7fe385 got: g
Other Letter
Other Letter
Consumer #CubbyHole@7c7fe385 got: .
Consumer #CubbyHole@1e721874 got: o
~/Documents/Github/operating_systems/Program_04
master 7