Homework 3

1. (5 pts) What events do the following components generate in either Swing or FX:

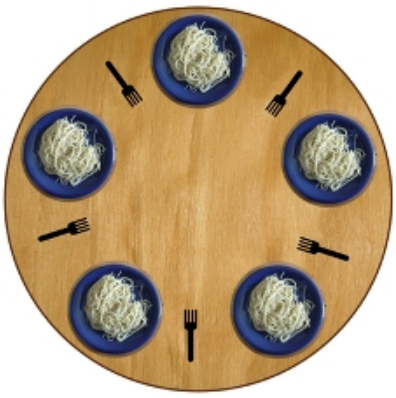
- JButton or Button
- JTextField or TextField
- JComboBox or ComboBox

2. (5 pts) What methods does JTable implement which are required by the interfaces implemented by the JTable class beyond those interfaces implemented by the various parent classes of JTable?

3. (5 pts) Address how the differences among these various layout managers, focusing on their behavior as their container is resized:

a. FlowPane in FX (or FlowLayout in Swing)
b. GridPane in FX (or GridLayout in Swing)
c. AncherPane
d. TilePane
e. Any other layout of your choice in FX or Swing.

4. (10 pts) (Ex 1.8.2) The dining philosophers problem was invented by E. W. Dijkstra, a concurrency pioneer, to clarify the notions of deadlock and starvation freedom. Imagine five philosophers who spend their lives just thinking and feasting. They sit around a circular table with five chairs. The table has a big plate of rice. However, there are only five chopsticks (in the original formulation forks) available, as shown in Fig. 1.5. Each philosopher thinks. When he gets hungry, he sits down and picks up the two chopsticks that are closest to him. If a philosopher can pick up both chopsticks, he can eat for a while. After a philosopher finishes eating, he puts down the chopsticks and again starts to think.



a. What is wrong with everybody doing the following - other than that the philosophers never get up from the table?

1. think for a while
2. get left chopstick
3. get right chopstick
4. eat for a while
5. return left chopstick
6. return right chopstick
7. return to 1

b. How can the above be fixed to avoid deadlocks?

c. Is your solution starvation free? Literally!

5. (10 pts) What methods must a class implementing the java.util.concurrent.locks.Lock interface implement? Describe some of the expected characteristics of each of the methods of this interface?

6. (5 pts) Explain what the JVM does when it encounters a synchronized directive. Hint: consider carefully what is synchronized.

7. (10 pts) What is the difference between Lock Interface and synchronized keyword?

Grading Rubric:

Attribute	Meets	Does not meet
Problem 1	**5 points** Lists the events associated with each provided component.	**0 points** Does not list the events associated with each provided component.
Problem 2	**5 points** Lists the methods JTable implements. Lists the methods which are required by the interfaces implemented by the JTable class beyond those interfaces implemented by the various parent classes of JTable.	**0 points** Does not list the methods JTable implements. Does not list the methods which are required by the interfaces implemented by the JTable class beyond those interfaces implemented by the various parent classes of JTable.
Problem 3	**5 points** Addresses the differences among the various layout managers. Focuses on their behavior as their container is resized.	**0 points** Does not address the differences among the various layout managers. Does not focus on their behavior as their container is resized.
Problem 4	**10 points** Explains what is wrong with	**0 points** Does not explain what is wrong with everybody doing the actions provided.

	everybody doing the actions provided. Explains how the actions be fixed to avoid deadlocks. Explains if the solution provided is starvation free.	Does not explain how the actions be fixed to avoid deadlocks. Does not explain if the solution provided is starvation free.
Problem 5	**10 points** Explains what methods a class implementing the java.util.concurrent.locks.Lock interface must implement. Describes some of the expected characteristics of each of the methods of this interface.	**0 points** Does not explain what methods a class implementing the java.util.concurrent.locks.Lock interface must implement. Does not describe some of the expected characteristics of each of the methods of this interface.
Problem 6	**5 points** Explains what the JVM does when it encounters a synchronized directive.	**0 points** Does not explain what the JVM does when it encounters a synchronized directive.
Problem 7	**10 points** Explains difference between Lock interface and synchronized keyword.	**0 points** Does not explains difference between Lock interface and synchronized keyword.