Run 1:

C:\Users\Jennifer\.jdks\openjdk-17.0.1\bin\java.exe "-javaagent:C:\Program Files\JetBrains\IntelliJ IDEA Community Edition 2021.2.3\lib\idea\_rt.jar=51914:C:\Program Files\JetBrains\IntelliJ IDEA Community Edition 2021.2.3\bin" -Dfile.encoding=UTF-8 -classpath "C:\Users\Jennifer\Documents\masters\244P Concurrent\Module 3\ex3.1\out\production\ex3.1" HashMapTest

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xkoniyxrzv: 66

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xkoniyxrzv: 66

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pvbpidvjpd: 86

xkoniyxrzv: 66

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pvbpidvjpd: 86

xkoniyxrzv: 66

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zazvrvxqwo: 64

Exception in thread "Printer" java.util.ConcurrentModificationException

at java.base/java.util.HashMap$HashIterator.nextNode(HashMap.java:1597)

at java.base/java.util.HashMap$EntryIterator.next(HashMap.java:1630)

at java.base/java.util.HashMap$EntryIterator.next(HashMap.java:1628)

at HashMapTest.printPeople(HashMapTest.java:24)

at HashMapTest$1.run(HashMapTest.java:36)

at java.base/java.lang.Thread.run(Thread.java:833)

Exception in thread "Deleter" java.util.ConcurrentModificationException

at java.base/java.util.HashMap$HashIterator.nextNode(HashMap.java:1597)

at java.base/java.util.HashMap$KeyIterator.next(HashMap.java:1620)

at HashMapTest.deletePeople(HashMapTest.java:15)

at HashMapTest$2.run(HashMapTest.java:49)

at java.base/java.lang.Thread.run(Thread.java:833)

Process finished with exit code 0

**Notes**:

* While printPeople thread is iterating and printing out names, the Deleter thread deletes an entry, now the printPeople doesn’t have the entry to print, resulting in an Exception

Run 2: Same issue

Run 3: same issue

“Printer” thread calls PrintPeople

To avoid this from happening, we can add “locks” just like the cars on the bridge.

Chapter 5

5.1

Solution:

Add the keyword “synchronized” to addPerson(), deletePeople(), printPeople (). So now only one of these functions can be running at a time.

Other threads that need to access the collection will block

until the iteration is complete; (book)