**ENTRY NODE 🡪**

l.lock();   
counter = proc.execCounter;  
}

**throw** **new** RuntimeException("Locking error 1");  
}

False

True

**public** **class** CriticalProcessExecManager {

**private** Random rand = **new** Random();  
**class** Lock {  
**boolean** lockActive;  
Lock() {lockActive = **false**;}  
**void** lock() {lockActive = **true**;}  
**void** unlock() {lockActive = **false**;}  
**boolean** isLocked() {**return** lockActive;}  
}  
**class** Process {  
**int** execCounter = 0;  
**void** exec() {  
  /\* ... do something critical \*/  
  execCounter++;  
  }  
}

**void** exec(Process proc) {

Lock l = **new** Lock();  
**int** counter;  
**do** {

**if** (l.isLocked()) {

False

True

**if** (rand.nextBoolean()) {

proc.exec();

False

**if** (!l.isLocked()) {

True

**throw** **new** RuntimeException("Locking error 3");

l.unlock();

False

True

**if** (!l.isLocked()) {

**while** (counter != proc.execCounter);

l.unlock();

**throw** **new** RuntimeException("Locking error 2");  
}

**Question 1:**

There are CFG paths that leads to throwing the exceptions "Locking error 1", "Locking error 2" and "Locking error 3". Their CFG path i sas follows:

**Locking error 1**

**void** exec(Process proc) {

Lock l = **new** Lock();  
**int** counter;  
**do** {

**if** (l.isLocked()) {

True

**throw** **new** RuntimeException("Locking error 1");  
}

**Locking error 2**

**void** exec(Process proc) {

Lock l = **new** Lock();  
**int** counter;  
**do** {

**if** (l.isLocked()) {

False

l.lock();   
counter = proc.execCounter;

}

**if** (rand.nextBoolean()) {

False

**if** (!l.isLocked()) {

True

**throw** **new** RuntimeException("Locking error 2");  
}

**Locking error 3**

**void** exec(Process proc) {

Lock l = **new** Lock();  
**int** counter;  
**do** {

**if** (l.isLocked()) {

False

l.lock();   
counter = proc.execCounter;

}

**if** (rand.nextBoolean()) {

True

proc.exec();

**if** (!l.isLocked()) {

True

**throw** **new** RuntimeException("Locking error 3");

**Question 2:**

Considering the CFG paths of question 1 we can say that for both Locking error 1 and Locking error 2 it is possible to have executions that lead to them. This is not possible when we want to get a Locking error 3 because in order to get this type of error we should have the lock active after the ending of the do-while cycle which is not possible.