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Big Data System Engineering with Scala  
Spring 2022  
Assignment No. 4



## Task

### 1. Implement 6 methods for RandomState

## Solution

```
// Hint: Think of the input and output, find the appropriate method that achieve this.
// 10 points
def flatMap[U](f: T => RandomState[U]): RandomState[U] = f(this.get)
```

```
// Hint: This a recursively method and it concatenate current element with following elements.
// 12 points
def toStream: LazyList[T] = LazyList.cons(this.get, this.next.toStream)
```

```
case class JavaRandomState[T](n: Long, g: Long => T) extends RandomState[T] {
  // Hint: Remember to use the "seed" to generate next RandomState.
  // 7 points
  def next: RandomState[T] = JavaRandomState(new Random(n).nextLong(), g)
  // Hint: Think of the input and output.
  // 5 points
  def get: T = g(n)
  // Hint: This one need function composition.
  // 13 points
  def map[U](f: T => U): RandomState[U] = JavaRandomState[U](n, g andThen f)
}
```

```
// Hint: This is a easy one, remember that it not only convert a Long to a Double
// but also scale down the number to -1 ~ 1.
// 4 points
val longToDouble: Long => Double = { x => x.toDouble / Long.MaxValue}
```

# Unit Test Screenshot

The screenshot shows an IDE window with the following components:

- Project Explorer:** Shows the project structure with folders like `src`, `test`, `scala`, and `edu`. The `RandomStateSpec` file is highlighted in the `test` folder.
- Code Editor:** Displays the `RandomStateSpec.scala` file. The code includes several test cases for `RandomState`, such as `"RandomState(0L)" should "match case RandomState(4804307197456638271)" in {` and `"7th element of RandomState(0)" should "match case RandomState(5082315122564986995L)"`.
- Run Console:** Shows the test results. The output indicates that all tests passed: `Tests passed: 10 of 10 tests - 68 ms`. The test results are listed as follows:
  - ✓ RandomStateSpec 68 ms
  - ✓ RandomState(0L) 31 ms
    - ✓ should match case Random 31 ms
    - ✓ should match case RandomS 0 ms
  - > 7th element of RandomState(0) 0 ms
  - > longToDouble 0 ms
  - > 0..1 stream 16 ms
  - > BetterRandomState 18 ms
  - > map 3 ms
  - > flatMap 0 ms
  - > for comprehension 0 ms
  - ✓ should work 0 ms
- Calendar Widget:** A small calendar widget is visible on the right side of the IDE, showing the date `2022年2月22日 正月廿二` and the time `13:39:34`.

## Project Source

<https://github.com/MrNiro/CSYE7200/tree/Spring2022/assignment-random-state/src/main/scala/edu/neu/coe/csye7200/asstrs>