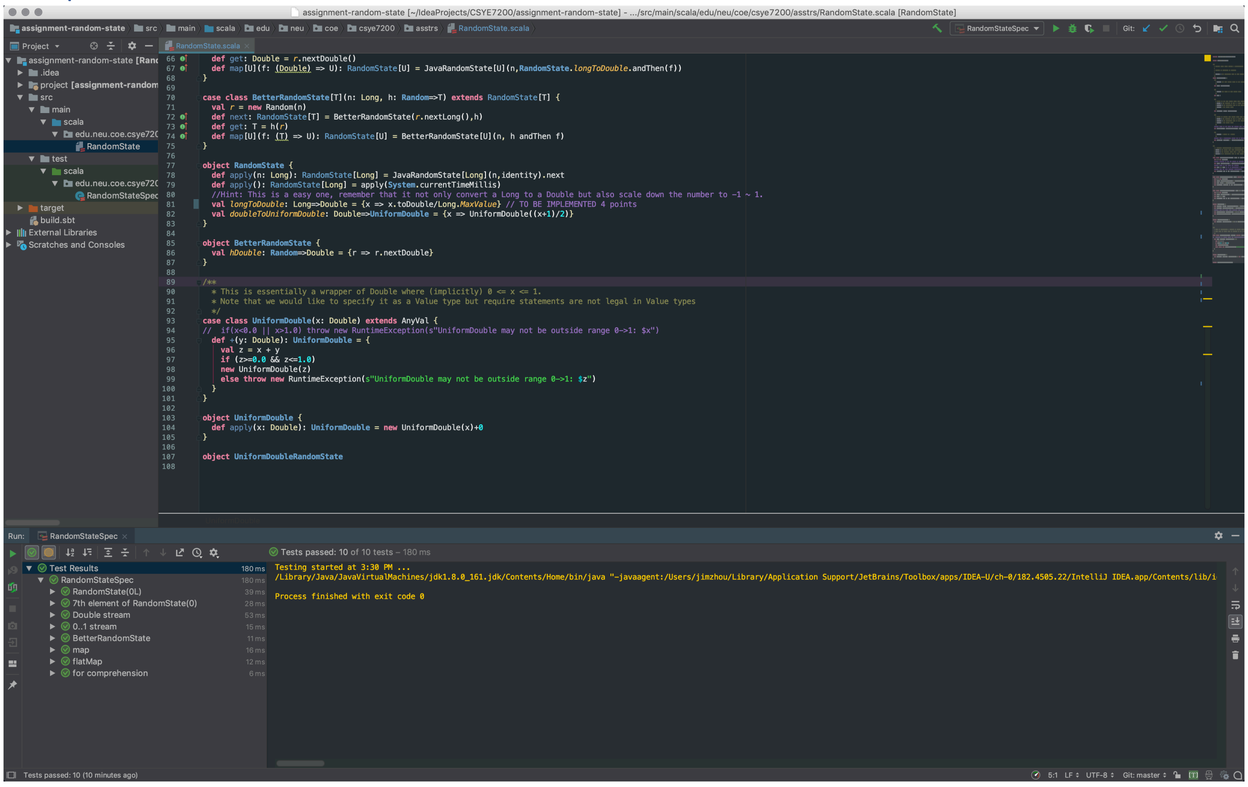
Assignment4: RandomState
Name: Qixiang Zhou
NUID: 001822974

Snapshot of the test case:


assignment-random-state [~/IdeaProjects/CSYE7200/assignment-random-state] - .../src/main/scala/edu/neu/coe/csye7200/asstrs/RandomState.scala [RandomState]

```scala
  def get: Double = r.nextDouble()
  def map[U](f: (Double) => U): RandomState[U] = JavaRandomState[U](n,RandomState.longToDouble.andThen(f))
}

case class BetterRandomState[T](n: Long, h: Random=>T) extends RandomState[T] {
  val r = new Random(n)
  def next: RandomState[T] = BetterRandomState(r.nextLong(),h)
  def get: T = h(r)
  def map[U](f: (T) => U): RandomState[U] = BetterRandomState[U](n, h andThen f)
}

object RandomState {
  def apply(n: Long): RandomState[Long] = JavaRandomState[Long](n,identity).next
  def apply(): RandomState[Long] = apply(System.currentTimeMillis)
  //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.
  val longToDouble: Long=>Double = {x => x.toDouble/Long.MaxValue} // TO BE IMPLEMENTED 4 points
  val doubleToUniformDouble: Double=>UniformDouble = {x => UniformDouble((x+1)/2)}
}

object BetterRandomState {
  val hDouble: Random=>Double = {r => r.nextDouble}
}

/**
  * This is essentially a wrapper of Double where (implicitly) 0 <= x <= 1.
  * Note that we would like to specify it as a Value type but require statements are not legal in Value types
  */
case class UniformDouble(x: Double) extends AnyVal {
//  if(x<0.0 || x>1.0) throw new RuntimeException(s"UniformDouble may not be outside range 0->1: $x")
  def +(y: Double): UniformDouble = {
    val z = x + y
    if (z>=0.0 && z<=1.0)
    new UniformDouble(z)
    else throw new RuntimeException(s"UniformDouble may not be outside range 0->1: $z")
  }
}

object UniformDouble {
  def apply(x: Double): UniformDouble = new UniformDouble(x)+0
}

object UniformDoubleRandomState
```

Run: RandomStateSpec

Tests passed: 10 of 10 tests – 180 ms

```
Test Results                    180 ms
  RandomStateSpec               180 ms
    RandomState(0L)              39 ms
    7th element of RandomState(0) 28 ms
    Double stream                53 ms
    0..1 stream                  15 ms
    BetterRandomState            11 ms
    map                          16 ms
    flatMap                      12 ms
    for comprehension             6 ms
```

```
Testing started at 3:30 PM ...
/Library/Java/JavaVirtualMachines/jdk1.8.0_161.jdk/Contents/Home/bin/java "-javaagent:/Users/jimzhou/Library/Application Support/JetBrains/Toolbox/apps/IDEA-U/ch-0/182.4505.22/IntelliJ IDEA.app/Contents/lib/i

Process finished with exit code 0
```

Tests passed: 10 (10 minutes ago)