Exercise

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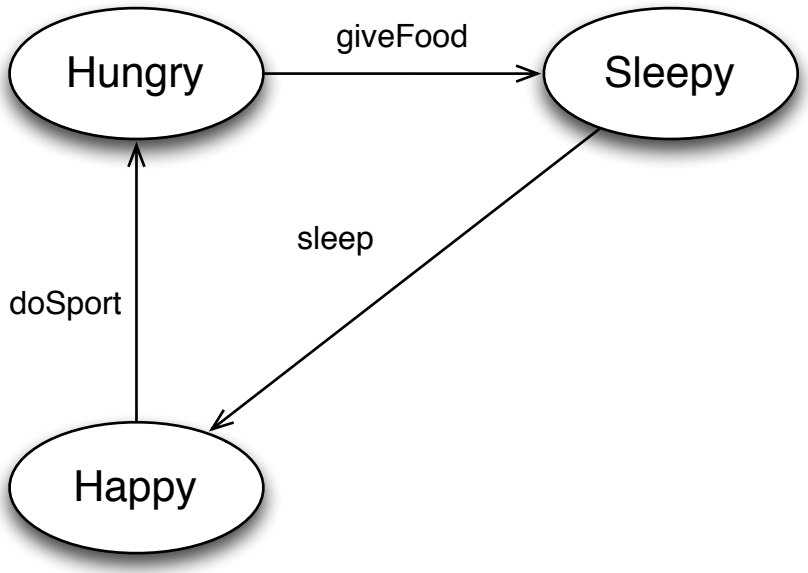
Tamagotchi

Un Tamagotchi es un pequeño animal virtual. Como todo los seres vivos, un tamagotchi tiene necesidades. A continuación se muestra un pequeño diagrama de estado:



Tamagotchi

Al principio un Tamagotchi esta feliz (happy). Si él hace deporte, tiene hambre (hungry). Al darle comida, le da sueño y se pone a dormir (sleepy). Después haber dormido, esta de nuevo feliz.

Exercise

Parte A - Implementa el Tamagotchi.

Parte B - Para poder hacer “tests”, queremos tener una forma de saber en que estado esta el tamagotchi.

Por ejemplo, tenemos `new Tamagotchi().isHappy()` que retorna true.

Tenemos `Tamagotchi t = new Tamagotchi(); t.doSport();` `t.isHungry()` retorna true y `t.isHappy()` retorna false. Proponga una implementación para los métodos isHappy(), isHungry() y isSleepy().

A solution

```
class Tamagotchi() {
  private var state: State = new Happy()

  def isHappy(): Boolean = state.isHappy
  def isHungry(): Boolean = state.isHungry

  def doSport(): Unit = state.doSport()
  def giveFood(): Unit = state.giveFood()
  def sleep(): Unit = state.sleep()

  def isSleepy(): Boolean = state.isSleepy()

  def setState(s: State): Unit = {
    state = s
    s.setTamagotchi(this)
  }
}
```

A solution

```
abstract class State {
  protected var tama: Tamagotchi = null

  def isHappy() = false
  def isHungry() = false
  def isSleepy() = false

  def error(): Unit = throw new AssertionError("Wrong state!")

  def doSport(): Unit = this.error()
  def giveFood(): Unit = this.error()
  def sleep(): Unit = this.error()

  def setState(aState: State): Unit = tama.setState(aState)

  def setTamagotchi(tamagotchi: Tamagotchi): Unit = {
    tama = tamagotchi
  }
}
```

A solution

```
class Happy extends State {
  override def isHappy = true
  override def doSport(): Unit = this.setState(new Hungry())
}


class Hungry extends State {
  override def isHungry = true
  override def giveFood(): Unit = this.setState(new Sleepy())
}


class Sleepy extends State {
  override def isSleepy = false
  override def sleep(): Unit = this.setState(new Happy())
}
```

A solution

```
class TamagotchiTest extends munit.FunSuite {
  private var tamagotchi: Tamagotchi = null

  override def beforeEach(context: BeforeEach): Unit = {
    tamagotchi = new Tamagotchi()
  }

  test("testHappy"){
    assert(tamagotchi.isHappy())
  }

  test("testDoSport"){
    tamagotchi.doSport()
    assert(!tamagotchi.isHappy())
    assert(tamagotchi.isHungry())
  }

  test("testWrongState"){
    val e = Assert.assertThrows(classOf[AssertionError], () => tamagotchi.giveFood())
    assertEquals("Wrong state!", e.getMessage)
  }
}
```

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