A7 Quiz3

Q1 (25 points): Study the following code to answer the question below

```
class Footballer(var name: String, var numGoldenBall: Int, var numGoldenBoot: Int) {

  override def toString() = name
}


def q1(): Unit = {
 var footballers = List(
   new Footballer("Mbappe", 0, 0),
   new Footballer("Ronaldo", 5, 4),
   new Footballer("Suarez", 0, 2),
   new Footballer("Modric", 1, 0),
   new Footballer("Messi", 5, 5),
   new Footballer("Neymar", 0, 0)
 )

 val goatComparator: (Footballer, Footballer) => Boolean =
   (a: Footballer, b: Footballer) => {
       if (a.numGoldenBall==b.numGoldenBall){
              a.numGoldenBoot>b.numGoldenBoot
       }
       else{
              a.numGoldenBall>b.numGoldenBall
       }
  }

 footballers = footballers.sortWith(goatComparator)

 println(footballers)
}
```

In what order are the elements of the Footballer list printed at the end of the q1() method call? (You may want to describe it in terms of the fields in the class)

Q2 (25 points): Study the following code to answer the question below

```
def f( node: LinkedListNode[Int]): Int = {
 if (node==Null) {
   0
 } else {
   if(node.value % 2 == 1){
        node.value + f(node.next)
   }
  else{
        f(node.next)
  }
 }
}
```

Consider the LinkedListNode class is the same as you have seen in lecture with two fields- value and next.

If “head” is the reference to the first node in the linked list that has values **[7,6,5,4,3,2,1]** (ask your TAs if unclear)

What is returned by the method call ***f(head)***?

Q3 (25 points): Study the following code to answer the question below

```
def f(x: Int, n: Int): Int = {
 if (n==1) {
   x
 } else {
   f(x, n/2) * f(x, n/2)
 }

}
```

What is returned by the method call $f(5,4)$?

Q4 (25 points): Study the following code to answer the question below

```
class Footballer(var name: String, var numGoldenBall: Int, var numGoldenBoot: Int) {

  override toString(){ name }
} // Note: same class as Q1


class LinkedListNode[A](var value: A, var next: LinkedListNode[A]) {

 def countWinners(f: A => Int): Int = {
   if (this.next == null) {
     f(this)
   }else{
     f(this) +  this.next.countWinners(f)
   }
 }
}

def q4(): Int = {
 var myList: LinkedListNode[Footballer] = new LinkedListNode[Footballer](
   new Footballer("Mbappe", 0, 0), null)

 myList = myList.prepend(new Footballer("Messi", 5, 5))
 myList = myList.prepend(new Footballer("Suarez", 0, 2))
 myList = myList.prepend(new Footballer("Ronaldo", 5, 4))
 myList = myList.prepend(new Footballer("Neymar", 0, 0))
 myList = myList.prepend(new Footballer("Modric", 1, 0))


 val isGoat: Footballer => Int = (x: Footballer) =>{
        if(x.numGoldenBall > 1 || x.numGoldenBoot > 1){
               1
       }
       else{
               0
       }
}


myList.countWinners(isGoat)
}
```

What does q4() return?