# assignment4

### November 12, 2024

## 1 Assignment 4 - Ishaan Sathaye

Write Scala programs to solve the following problems. Do not use Spark. Try to use appropriate data structures and avoid using traditional Java-style loops if possible.

1. The program reads a file full of integers and computes the number of integers that are divisible by 3.

Example input file:

```
23 234 234 2 23
234 234 22 2 32324
234 23432
```

Solution:

```scala
import scala.io._

object q1 {
    def main(args: Array[String]) {
        val filename = "q1.txt"
        val lines = Source.fromFile(filename).getLines.toList
        val numbers = lines.flatMap(_.split(" ").map(_.toInt))
        val divisibleBy3 = numbers.filter(_ % 3 == 0)
        println(divisibleBy3.length)
    }
}
```

2. The program reads a file that contains the date and a temperature that is measured for this day. There can be multiple temperatures that are measured each day. The program should print to the screen the highest temperature for each day.

Example input file:

```
2022/01/03 20
2022/01/03 30
2022/01/05 23
```

Solution:

```scala
import scala.io._

object q2 {
```

```scala
    def main(args: Array[String]) {
        val filename = "q2.txt"
        val lines = Source.fromFile(filename).getLines.toList
        val temperatures = lines.map(_.split(" ")).map(x => (x(0), x(1).toInt))
        val maxTemperatures = temperatures.groupBy(_._1).mapValues(_.map(_._2).max)
        maxTemperatures.foreach(println)
    }
}
```

3. Consider an input file with the following example input.

```
John Back, 23, B, CSC366
Bob Wilson, 11, B, CS201
John Back, 23, A, CSC369
```

In general, the input file will contain the student name, the student ID number, grade, and course. The program should print the student name, student id, and the list of classes for that student. The output should be **sorted by** name and then sorted by grade for each name.

Here is example output:

```
Bob Wilson, 11, (B, CS201)
John Back, 23, (A, CSC369), (B, CSC366)
// sorted by name and then by grade
```

Solution:

```scala
import scala.io._

object q3 {
    def main(args: Array[String]) {
        val filename = "q3.txt"
        val lines = Source.fromFile(filename).getLines.toList
        val students = lines.map(line => {
            val parts = line.split(", ")
            (parts(0), parts(1), parts(2), parts(3))
        })

        val studentMap = students.groupBy(_._1).mapValues(_.map(x => (x._2, x._3, x._4)))
        val sortedStudentMap = studentMap.toList.sortBy(_._1).map(x => {
            val student = x._1
            val classes = x._2.sortBy(_._2).map(y => {
                s"(${y._2}, ${y._3})"
            }).mkString(", ")
            val id = x._2(0)._1
            s"$student, $id, $classes"
        })
        sortedStudentMap.foreach(println)
    }
}
```