# ASSIGNMENT 2

*We only accept programs that are written using the algorithmic patterns. The program should not use any datatype (for example arrays, vectors, strings) whose size is proportional to the length of the file. The program cannot have loops within loops, define functions to achieve this (you can call a function which has a loop from within a loop). Use the enumerator algorithmic patterns and implement custom enumerators as classes.*

1. The results of the National Angler's Championship is stored in a text file. Each line of the file contains the identifier of the participant and the championship (strings without whitespace), and the list of the caught fish, which are stored as pairs: (the kind of the fish, the size of the fish). The kind of the fish is a string without whitespace, its size is a natural number. The data in a line are separated by whitespace. The lines of the text file are sorted according to the name of the championship. You can assume that the text file is correct.

   An example for a line of the text file:

   James BigLakeChampionship Tuna 50 Salmon 20 Sardine 5 Tuna 100

   At which championship has the most fish been caught?

2. The results of the National Angler's Championship is stored in a text file. Each line of the file contains the identifier of the participant and the championship (strings without whitespace), and the list of the caught fish, which are stored as pairs: (the kind of the fish, the size of the fish). The kind of the fish is a string without whitespace, its size is a natural number. The data in a line are separated by whitespace. The lines of the text file are sorted according to the name of the championship. You can assume that the text file is correct.

   An example for a line of the text file:

   James BigLakeChampionship Tuna 50 Salmon 20 Sardine 5 Tuna 100

   At how many championships has no fish been caught?

3. The results of the National Angler's Championship is stored in a text file. Each line of the file contains the identifier of the participant and the championship (strings without whitespace), and the list of the caught fish, which are stored as pairs: (the kind of the fish, the size of the fish). The kind of the fish is a string without whitespace, its size is a natural number. The data in a line are separated by whitespace. The lines of the text file are sorted according to the name of the championship. You can assume that the text file is correct.

   An example for a line of the text file:

   James BigLakeChampionship Tuna 50 Salmon 20 Sardine 5 Tuna 100

   List all the championships where tuna has been caught.

4. The results of the National Angler's Championship is stored in a text file. Each line of the file contains the identifier of the participant and the championship (strings without whitespace), and the list of the caught fish, which are stored as pairs: (the kind of the fish, the size of the fish). The kind of the fish is a string without whitespace, its size is a natural number. The data in a line are separated by whitespace. The lines of the text file are sorted according to the name of the championship. You can assume that the text file is correct.

   An example for a line of the text file:

   James BigLakeChampionship Tuna 50 Salmon 20 Sardine 5 Tuna 100

   Was there a championship where the largest caught fish was a salmon?

5. The results of the National Angler's Championship is stored in a text file. Each line of the file contains the identifier of the participant and the championship (strings without

whitespace), and the list of the caught fish, which are stored as pairs: (the kind of the fish, the size of the fish). The kind of the fish is a string without whitespace, its size is a natural number. The data in a line are separated by whitespace. The lines of the text file are sorted according to the name of the championship. You can assume that the text file is correct.

An example for a line of the text file:

James BigLakeChampionship Tuna 50 Salmon 20 Sardine 5 Tuna 100

Which championship had the most participants?

**6.** The results of the National Angler's Championship is stored in a text file. Each line of the file contains the identifier of the participant and the championship (strings without whitespace), and the list of the caught fish, which are stored as pairs: (the kind of the fish, the size of the fish). The kind of the fish is a string without whitespace, its size is a natural number. The data in a line are separated by whitespace. The lines of the text file are sorted according to the name of the participants. You can assume that the text file is correct.

An example for a line of the text file:

James BigLakeChampionship Tuna 50 Salmon 20 Sardine 5 Tuna 100

Was there an angler who caught a sardine at all the championships where he/she participated?

**7.** The results of the National Angler's Championship is stored in a text file. Each line of the file contains the identifier of the participant and the championship (strings without whitespace), and the list of the caught fish, which are stored as pairs: (the kind of the fish, the size of the fish). The kind of the fish is a string without whitespace, its size is a natural number. The data in a line are separated by whitespace. The lines of the text file are sorted according to the name of the participants. You can assume that the text file is correct.

An example for a line of the text file:

James BigLakeChampionship Tuna 50 Salmon 20 Sardine 5 Tuna 100

Which angler participated in the most championships where he/she caught no fish?

**8.** The results of the National Angler's Championship is stored in a text file. Each line of the file contains the identifier of the participant and the championship (strings without whitespace), and the list of the caught fish, which are stored as pairs: (the kind of the fish, the size of the fish). The kind of the fish is a string without whitespace, its size is a natural number. The data in a line are separated by whitespace. The lines of the text file are sorted according to the name of the participants. You can assume that the text file is correct.

An example for a line of the text file:

James BigLakeChampionship Tuna 50 Salmon 20 Sardine 5 Tuna 100

Which angler caught the most tuna?

**9.** The results of the National Angler's Championship is stored in a text file. Each line of the file contains the identifier of the participant and the championship (strings without whitespace), and the list of the caught fish, which are stored as pairs: (the kind of the fish, the size of the fish). The kind of the fish is a string without whitespace, its size is a natural number. The data in a line are separated by whitespace. The lines of the text file are sorted according to the name of the participants. You can assume that the text file is correct.

An example for a line of the text file:

James BigLakeChampionship Tuna 50 Salmon 20 Sardine 5 Tuna 100

How many anglers caught only tuna at the championships?

**10.** The results of the National Angler's Championship is stored in a text file. Each line of the file contains the identifier of the participant and the championship (strings without

whitespace), and the list of the caught fish, which are stored as pairs: (the kind of the fish, the size of the fish). The kind of the fish is a string without whitespace, its size is a natural number. The data in a line are separated by whitespace. The lines of the text file are sorted according to the name of the participants. You can assume that the text file is correct.

An example for a line of the text file:

James BigLakeChampionship Tuna 50 Salmon 20 Sardine 5 Tuna 100

Is it true that all anglers caught tuna at at least two championships?