Practical 1: Tree and Network Representation

Name Surname Name Surname

12/09/2023, submission deadline 18/09/2023

Solve the following exercise in groups of two students. Write the Python scripts, perform the computations, and make the graphics that are asked for (if any) in the practical below. Write your solution in a LaTeX document and generate a PDF file with your solution. Take care to number your answers exactly as in this exercise. Upload your solution in PDF format to the web page of the course at `raco.fib.upc.edu` no later than the submission deadline.

You can make use of the Python package **networkx** (and other packages) to compute your answers, as you please. The datasets (if any) can be downloaded from the web page of the course at `raco.fib.upc.edu`.

1. (40 points) Given a file **newick.tre** of phylogenetic trees in Newick format, write a Python script to extract the phylogenetic trees into a graph representation. Give the code of your Python script as your answer to this question, using the LaTeX package **listings**.
2. (5 points) How many phylogenetic trees are there?
3. (5 points) Are these phylogenetic trees rooted or unrooted?
4. (40 points) Given a file **enewick.tre** of phylogenetic networks in extended Newick format, write a Python script to extract the phylogenetic networks into a graph representation. Give the code of your Python script as your answer to this question, using the LaTeX package **listings**.
5. (5 points) How many phylogenetic networks are there?
6. (5 points) Are these phylogenetic networks rooted or unrooted?

```
\documentclass[12pt,a4paper]{article}
\usepackage{listings}
\usepackage{mathptmx}
\usepackage{savetrees}
\title{Practical 1: Tree and Network Representation}
\author{Name Surname \and Name Surname}
\date{12/09/2023, submission deadline 18/09/2023}
\begin{document}
\maketitle
\begin{enumerate}
\item ...
\item ...
\item ...
\item ...
\item ...
\item ...
\end{enumerate}
\end{document}
```