Project: Tree shaped Knowledge base

1. Infrastructure

You have a classification of entities (mainly living beings). Convert the provided classification into a tree. Your program should read the text file provided on moodle and build the tree automatically. After building the tree, you need to be able to answer the following templates of questions:

- Cite NB/All of subtypes of SP of order NUMBER. EX. cite ***five*** subtypes of ***pets*** of order **one** (direct children of pet). *NUMBER* here measures the maximal distance between SP and the subtypes. If there are no *NB* children you just display what you have.
- What is the most diverse sub-species of (SP)? By diverse we mean the one that has more sub-categories.
- What is the lowest common ancestor of (SP02) and (SP03) starting from SP01? Ex. Sp01= animalia, Sp02=felidae, sp03=canidae → carnivore, Sp01=pet, sp02=fish. Sp03=Cat → in-house pet.

Please note that the text file is taken from the web (copy and paste). You should take that into consideration and deal with any possible errors as appropriate. You may use your internal format for the data. For example, you may convert Inert entity into inert_entity or inertEntity. The display should be in format the user can understand however: inertentity is not acceptable for the display.

2. Guess entity game

2.1. First scenario

This game consist of a user thinking about an entity (unknown initially to the computer) and the computer trying to guess the entity through a sequence of yes-no questions by the computer and answers from the user. The computer has seven questions it can ask before it fails. You need to implement at least two strategies for guessig the entity based on tree you will build. Discuss each in terms of complexity and chances of winning. In other words, which strategy you would use for an easy game and which one for an avacnced game. The questions asked should all be reasonable (based on what you have in the tree). For example, if the user says that the entity is not a felidae you cannot ask if it is a cat.

Computer	Human
Is it an inert entity?	no
Is it an animalia?	yes
Is it a cat?	no
Is it a fish?	no
Is it a herbivore?	yes
Is it an equidae?	yes
Is it a horse?	Yes, you wan!

2.2. Second scenario

In the second scenario, the computer picks an animal randomly and asks the user 5 questions about it. If the suer answers all the questions correctly, he wins otherwise he looses.

Computer	Human
Is a lion a subtype of animalia?	yes
Is a lion a subtype of Felidae?	yes
Is a whale a subtype of placental?	yes
Is barker a subtype of Lyon	Yes
Sorry you last answer is wrong try again	

3. Report

You need to write a project documentation describing your work (not more than five pages). This document could have the following layout:

- **Introduction:** where you describe the goal of your work,
- **Work description:** where you describe and discuss the data structures and algorithms you used to do the project. Your description should include a justification of your choices in terms of space (for DS) and runtime efficiency (for the algorithms). It also should include a table with the functions with the complexity of each. You may use small pieces of code to illustrate you ideas if need be. A table describing albor sharing (who did what) should also be included.
- **Conclusion:** where you talk about what you achieved and what learned, the difficulties, etc.

All the required work should be implemented by hand no existing libraries (such as STL) are allowed to use. You may use code that you have implemented for your labs.

4. Oral presentation

An oral presentation should include a presentation of the code and a running of the project should be done. You may use slides or any other method you are comfortable with. You just jave to be clear anc concise: the presentation is 10 minutes long only with 5 minutes for questions.