SSN College of Engineering

Department of Information Technology

UIT2201 — Programming and Data Structures

2022 – 2023

Exercise — 11

June 21, 2023

- This homework is due by 10PM on July 3, 2023
- Grace period may be given up to midnight of July 3, 2023
- You can upload only one ZIP file
- The naming convention is "<Your first name (first letter capital and all the other letters small)>-UIT2201-ex-11.zip"
- Judicious use of Python features and standard modules, version control using 'git', adhering to Python coding standards are expected
- You are expected to use PSP0.1 process for all the code that you write!

The purpose of this exercise is to understand the design of Tree ADT with various operations.

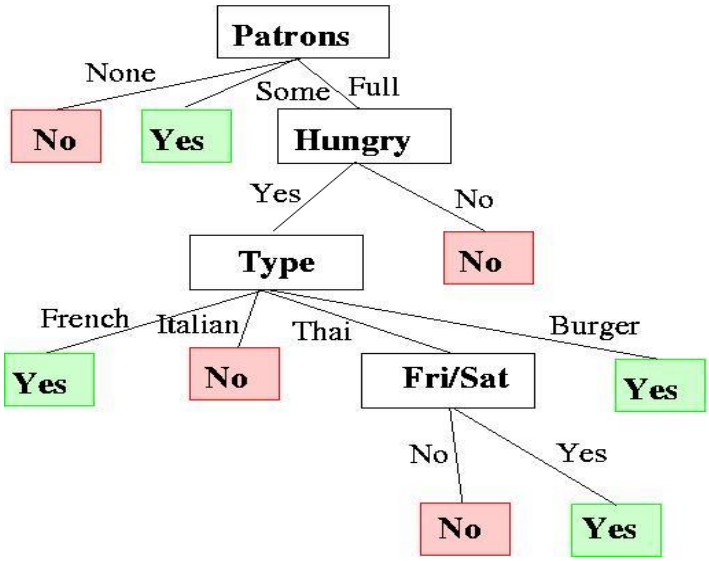
Part A

1. Write a parser that takes an expression string in postfix notation (for eg, "ab+a*cd-e+/afg-*h+-) and constructs the corresponding expression tree. You may assume that only binary operators are used in the expression and all the identifiers are single characters only.

2. Given a binary tree, write a Python code to convert the binary tree into its Mirror tree. Mirror of a Binary Tree T is another Binary Tree M(T) with left and right children of all non-leaf nodes interchanged.

Part B

3. A decision tree is a tree structure where each internal node denotes the features, edges denote the rules and the leaf nodes denote the output label. An example of decision tree is given below:



Given the set of features, possible feature values, rules, output labels, write a Python code to construct a decision tree using Tree ADT.