

GP - GEB Problem Set: Recursion, RTNs, and More!

What's It All About?

Name: Vicky Liu

This is a problem set that is based primarily on Chapter 5 of Hofstadter's GEB. Just a bit of Chapter 7 comes into play, as well.

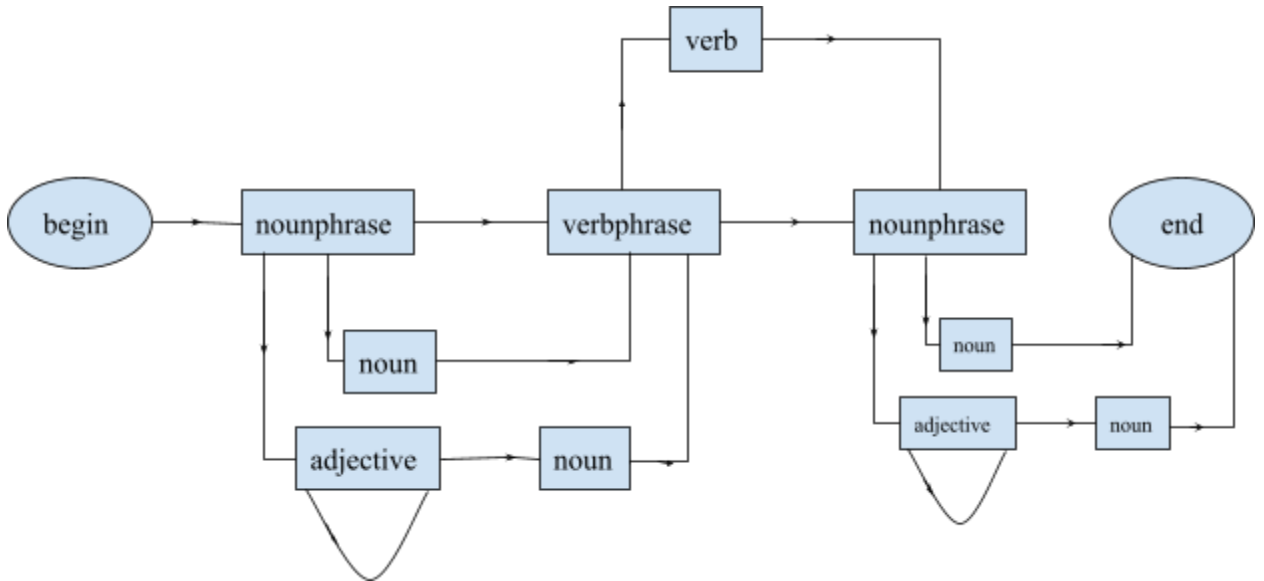
Task

Craft a nicely formatted document consisting of both the questions that you see below, and, immediately following each question, your answer to the question. Please format your work on this problem set in just the same way that you were asked to format the Post production system problem sets. And, as always, please save your document as a pdf file.

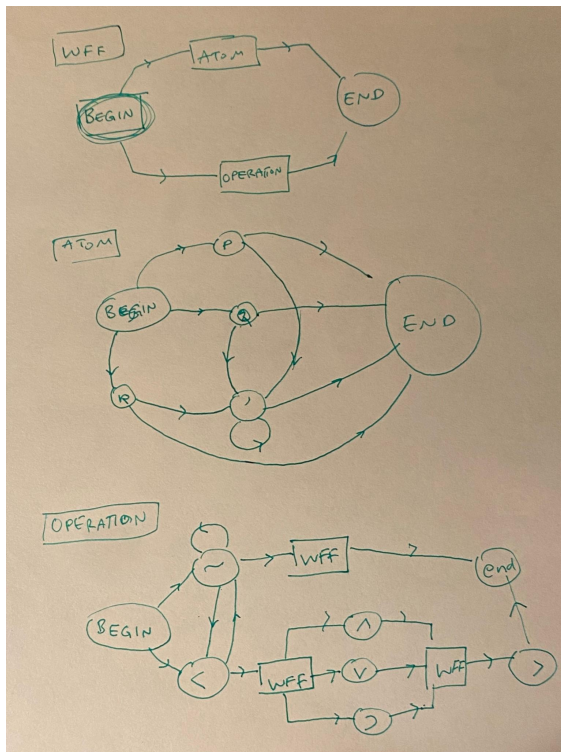
1. Hofstadter writes about recursion in a very informal way in the first three sections of Chapter 5. Please write down five easily articulable ideas about recursion that he expresses in those sections of this chapter, ideas that resonate with you in a meaningful way.
 1. Nesting, and variations on nesting
 - a. Examples: stories inside stories, movies inside movies, painting inside painting Russian dolls inside Russian dolls, x inside x, etc.
 2. "A recursive definition never leads to infinite regress or paradox...because it never defines something in terms of itself but always in terms of simpler version of itself."
 3. "When you postpone completing a task in favor of a simpler task, often of the same type"
 4. In our Dialogue, Achilles and Tortoise appeared on all different levels
 5. Recursion is also present in music
 - a. Bach's French Suite no. 5
2. In a paragraph or two, without providing any explicit examples, describe "recursive transition networks". Please say something about (1) what they are used for, (2) what elements they are composed of, and (3) their relationship to context free grammars.

Recursive transition networks are diagrams showing various paths which can be followed to accomplish a particular task. They are composed of a number of nodes, or little boxes with words, joined by arcs, or lines with arrows. Recursive transition networks relate to context free grammars because RTN shows a visual representation of how context free grammars work. The same we can derive something through context free grammars, we can derive using RTN by using the various paths, of which the arcs represent production and the nodes represent symbols.

3. Faithfully mimicking Hofstadter's representation of RTNs, draw a set of recursive transition networks which defines the "English Like Language" that was featured in the CFG/CFG assignment. That is, draw a set of recursive transitions that correspond in a faithful manner to the CFG provided for the "English Like Language".



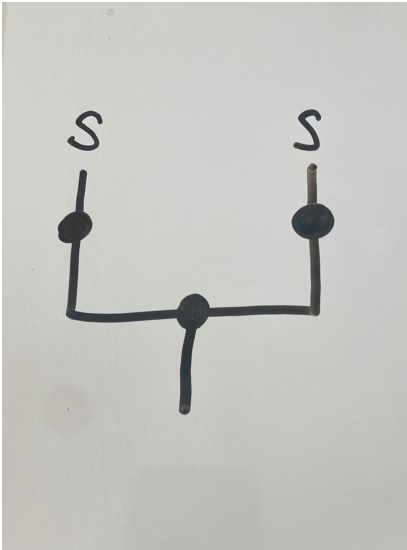
4. Please read the first page and a half of Chapter 7 "The Propositional Calculus". Draw a set of recursive transition networks for Hofstadter's particular variant of WFFs, as presented in the first page and a half of Chapter 7.



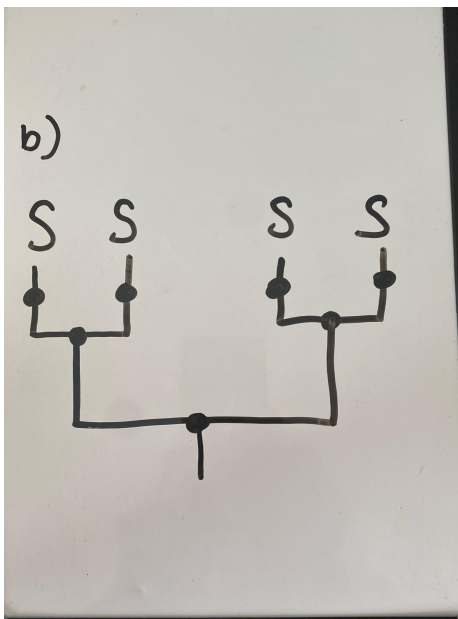
5. Consider Diagram S shown below, which I constructed in the spirit of Diagram G and Diagram H that Hofstadter presented in the chapter.

Please:

- (a) Draw Diagram S yourself.



- (b) Draw Diagram S, once expanded.



(c) Draw Diagram S, twice expanded.

