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GEB Chapter 5- Recursive Structures and processes

- 1. Hofstadter writes about recursion in a very informal way in the first three sections of the chapter. Please write down five easily articulable ideas about recursion that he expressed in this chapter, ideas that resonate with you in a meaningful way.
 - a. A general idea is that recursion is nesting within itself like a story inside a story or a painting within a painting.
 - b. If something is recursive it never defines something in terms of itself, but always in terms of a simpler version of itself.
 - c. A recursive operation should never be circular and lead you to infinite regression but lead you to something new.
 - d. Push, pop, and stack are all terms used to describe a situation that is recursive. The ideas of the terms keep you from getting lost in your operations and keeps everything flowing.
 - e. Recursion can be seen in both music where a key is constantly being pushed onto a stack to get a desired melody or in language when pushing grammatical structures onto a stack to understand a sentence.
- 2. In a paragraph or two, without providing any explicit examples, describe "recursive transition networks". Please say something about what they are used for, what elements they are composed of, and their relationship to context free grammars.
 - a. Recursive transition networks are diagrams that shows various paths which can be followed to complete a particular task. Each path consists of a number of nodes (boxes with words in them), joined by arcs (lines with arrows). The first node in a RTN is always begin and the last node is always end. RTN's are related to context free grammars because RTN's can show the proper way to construct a grammar based on the syntactic rules.
- 3. Faithfully mimicking Hofstadter's representation of RTN's, draw a set of recursive transition networks for the language generated by the Mini Random Sentence language that was defined in class.



Sentence:



Descriptor:



4. Draw a set of recursive transition networks for Hofstadter's particular view of WFFs as presented in the first page and a half of chapter 7.



Implication:



- 5. Consider Diagram S shown below, which I constructed in the spirit of Diagram G and Diagram H that Hofstadter presents in the chapter.
 - a. Draw Diagram S yourself.



b. Draw Diagram S, once expanded.



c. Draw Diagram S, twice expanded.

