GP - GEB Problem Set: The MIU-system

What's It All About?

This problem set is based on Chapter 1 of Hofstadters GEB. In this chapter DRH presents his first Post Production System, the MIU-System.

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 see the accompanying partial template, which is intended to suggest a sound formatting scheme for your work on this assignment. Please save your document as a **pdf** file.

1. What, does Hofstadter claim, is one of the most central notions running through GEB?

2. Who invented the sort of formal system that Hofstadter features in his book (the sort of system that the MIU-system expemplifies), and when did this invention take place?

3. In one four-word question, state the puzzle that is featured in this chapter.

4. What is the given string in the MIU-system?

5. What is the goal string of the MU-puzzle?

6. How many rules in the MIU-system?

7. Carefully, precisely, write down the first rule of the MIU-system, and give **two** examples of its use, one directly from the chapter, and one that does not appear explicitly in the chapter.

8. Carefully, precisely, write down the second rule of the MIU-system, and give **two** examples of its use, one directly from the chapter, and one that does not appear explicitly in the chapter.

9. Carefully, precisely, write down the third rule of the MIU-system, and give **two** examples of its use, one directly from the chapter, and one that does not appear explicitly in the chapter.

10. Carefully, precisely, write down the fourth rule of the MIU-system, and give **two** examples of its use, one directly from the chapter, and one that does not appear explicitly in the chapter.

11. What is the word used to describe strings that are producible by the rules of a formal system from strings that have already been produced?

12. What is the technical term for the string `MI` in the MIU-ystem?

13. In a formal system, is it more appropriate to say that theorems are *proven* or that theorems are *produced*?

14. How does Hofstadter define the term *derivation*?

15. Reproduce, line by line, character by character (including "reasons" (rule citations)) Hofstadter's derivation of the string `MUIIU`.

16. Write down, line by line (including "reasons" (rule citations)) a derivation of the string `MIIUIIU`.

17. On page 37, Hofstadter claims that there is a fundamental difference between a machine and a human? What is that difference?

18. With respect to formal systems, what is the difference between "working inside the system" and "working outside the system".

19. Are there any theorems in the MIU-system that do not start with the letter M?

20. How is the previous question answered, by working within the system or by working outside the system.

21. What does "M-mode" refer to? What does "I-mode" refer to?

22. Do you think that humans can work in M-mode? Please defend your answer.

23. Do you think that machines can work in I-mode? Please defend your answer.

24. Two of the rules of the MIU-system are lengthening rules. What does this mean? Two of the rules of the MIU-system are shortening rules. What does this mean?

25. Define "decision procedure" with respect to a formal system.

Further Instructions

As previously mentioned, please save your document as a **pdf** file. Only files in the **pdf** format will be accepted. Then, please respond to my email soliciting your work with respect to this assignment, just one time, being sure to attach your **pdf** file. **Please note: This is not an email for you to respond to with questions or comments. Just the pdf file containing your work with respect to this assignment.**

Due date

Friday, February 4, 2022. Any time of the day will due.