Criterion A: Planning

**Visualization of data structure and some basic algorithms**

**Defining the problem**

Client Mr xx is a DP computer science student at a Chinese IBDP School; He is currently struggling with some data structures and algorithms discussed within DP Computer science. He thinks the pseudocode and lexical description provided by the textbook are not intuitive. He wants a more intuitive illustration to help him understand these data structures, algorithms, and how to use them. Besides, he also thinks that only reading code and graphs are not entertaining enough. It’s not easy for him to find a way that is entertaining and intuitive to help he understand these various concepts.

In May 2022 Mr xx asked me how to do postorder traversal for the binary tree. It took me a while to explain what is postorder traversal and how to do it. He mentioned to me that it would be awesome to have an interesting and intuitive way to explain these data structures and algorithms.

I think this was an excellent material for my Internal Assessment because I can provide Mr xx with a technical solution for his question that seeking an intuitive and entertaining way to illustrate algorithms and data structures. In order to analyze this question more deeply, I decided to make an online interview to find out more requirements he had.

**Rationale for proposed solution**

From my point of view, we can solve Mr xx’s problem with a Java program. The best way to understand algorithms and data structure is to see how each step moves graphically. So, I decided to do an interactive graphical visualization of data structures and algorithms. In this way, we provide an intuitive way to interpret algorithms and data structures.

For the entertaining part, I will use swing to provide a graphical user interface. Mr xx. can play with the data structures whatever he wanted. When he played with the data structures and algorithms, we can quiz him on what the code will do in the next step. If he answers correctly, the system will award him a trophy. If he does not, the system will play some funny noise. Besides, I can provide some basic card games to help Mr xx. understand how data structures worked.

Based on these requirements, I choose to use Java because: 1) I am currently learning java at school; 2) Use swing with java can provide a more interesting user interface; 3) it is easy to make some changes in the later version

**Stating Success Criteria**

1. The program visualizes each data structure and corresponding algorithms within DP Computer Science correctly.
2. The program allows the user to change the content within data structures.
3. The program has an interesting and user-friendly interface.
4. The program can quiz on what should do in the next step.
5. If the user has the wrong answer, the program needs to be able to correct it and play a funny sound.
6. If the user has the correct answer, the program needs to be able to reward the user with a trophy.
7. The program is able to store which data structure the user having a problem on.