**1.**

* **Explain the concept of recursion and how it can simplify certain problems.**

**Ans :** Recursion is a method of solving problems where the solution depends on solutions to smaller instances of the same problem. It involves a function calling itself with modified parameters until a base condition is met.

**Benefit :** One of the main uses of recursion is in simplifying complex problems. It simplifies complex problems by turning them into more manageable, smaller problems. In particular, it works with problems having a natural hierarchical or nested structure.

**4.**

* **Discuss the time complexity of your recursive algorithm.**

**Ans :** The time complexity of the recursive method is O(n), where n is the number of periods. This is because the function makes a recursive call n times.

* **Binary Search**:

**Best Case**: O(1) (if the middle element is the target)

**Average Case**: O(log n) (divides the search space by half each step)

**Worst Case**: O(log n) (same as average case)

* **Discuss how to optimize the recursive solution to avoid excessive computation.**

**Ans :** Optimisation techniques are given below :

* **Memoization:** To avoid recalculating values for the same parameters, you can use memoization to store and reuse results of previous calculations. This is more applicable to recursive algorithms with overlapping subproblems.
* **Iterative Approach:** For this specific problem, an iterative approach could be more efficient. The iterative approach avoids the overhead of recursive calls.