1. A. O(n2)

B. O(n)

C. O(n)

D.O(n2)

2. A. (0,1,2,3,3,4,5,7)

B. (0,1,2,3,4,5,6)

3. a. T(n)=1+(2n)+1=2n+2, O(n)

b. T(n)=O(rl×c2×cl×4), O(rl×c2×cl)

c.T(n)=2n+2n+2n=6n, O(n)

d. T(n)=O(log2​(n)), O(log2​(n))

4.O(n)- Linear time complexity

5. An Abstract Data Type (ADT) in data structures is a mathematical model for data types. It specifies a set of operations that can be performed on the data, without specifying how these operations should be implemented. This allows for flexibility in implementation while maintaining a consistent interface.

In Java, one common example of an ADT is the Queue. A Queue is a data structure that follows the First-In-First-Out (FIFO) principle, meaning that the first element added to the queue will be the first one to be removed.

6.

|  |  |  |
| --- | --- | --- |
| Features | List | ArayyList |
| Implementation | Interface | Class |
| Resizeble | Yes | Yes |
| Initialization | Cannot be directly initialized | Can be directly initialized |
| Imports | java.util.List | java.util.ArrayList |
| Usage | Suitable when flexibility is required | Suitable when random access is required |
|  |  |  |
|  |  |  |

7.A screenshot of a computer

Description automatically generated