1- What does ADT stand for in data structures?
- A) Abstract Data Technology
- B) Abstract Data Type
- C) Advanced Data Type
- D) Automatic Data Type
- Answer: B) Abstract Data Type

2- Which of the following is an example of an Abstract Data Type (ADT)?
- A) Integer
- B) Stack
- C) Function
- D) Char
- Answer: B) Stack

3- Which data structure works on the principle of Last In, First Out (LIFO)?
- A) Queue
- B) Stack
- C) Tree
- D) Graph
- Answer: B) Stack

4- What is the time complexity of the code "k++; "
- A) $O(1)$
- B) $O(\log n)$
- C) $O(n)$
- D) $O(2^n)$
- Answer: A) $O(1)$

5- Which Big O notation represents the fastest-growing time complexity?
- A) $O(1)$
- B) $O(\log n)$
- C) $O(n)$
- D) $O(2^n)$
- Answer: D) $O(2^n)$

6- What is the time complexity of :
k=0;
for(i=n; i>0; i=i/2)
   k++;
- A) $O(1)$
- B) $O(\log n)$
- C) $O(n)$
- D) $O(2^n)$

7- What is the error if an array is declared with int arr[3] = {1, 2, 3, 4};?
- A) Invalid array type
- B) Too many initializers
- C) Incomplete type error
- D) Array index out of bounds
- Answer: B) Too many initializers

8- Which term describes the stack property where the last item added is the first to be removed?
- A) FIFO
- B) LIFO
- C) FILO
- D) LILO
- Answer: B) LIFO

9- What happens when you try to push an element onto a full stack?
- A) The stack resizes to accommodate the new element
- B) An overflow state occurs
- C) The element is pushed without error
- D) The stack is cleared before the push
- Answer: B) An overflow state occurs

10- Which stack operation removes the top element?
- A) Push
- B) Pop
- C) Top
- D) Peek
- Answer: B) Pop

11- What is an example of an application that utilizes a stack?
- A) Binary search
- B) Sorting algorithms
- C) Function calls in C
- D) Graph traversal using BFS
- Answer: C) Function calls in C

12- Which operator is used to retrieve the address of a variable in C?
- A) *
- B) &
- C) ++
- D) --
- Answer: B) &

13- What is the output of the following code?

```
int arr[5] = {10, 20, 30, 40, 50};
for (int i = 0; i < 5; i++)
```

```
{
    cout << arr[i] << " ";
}
```
Answer: The output will be 10 20 30 40.

14- Consider the following code snippet for a stack using an array. Identify the error.
```
const int MAX_SIZE = 5;
int stack[MAX_SIZE];
int top = -1;

void push(int value) {
    if (top == MAX_SIZE) {
        cout << "Overflow" << endl;
        return;
    }
    stack[++top] = value;
}
```
Answer: The condition should be if (top == MAX_SIZE - 1) instead of if (top == MAX_SIZE) to prevent overflow when top reaches the last valid index.

15- Identify the error in the following pointer code and suggest a fix:
```
int *p;
*p = 10;
cout << *p << endl;
```
Answer: The pointer p is not initialized to point to a valid memory location, leading to undefined behavior. It should be assigned an address first, like int x; p = &x; *p = 10;.

16- Give an exmaple of array Initialization .

17- Accessing an element in an array at a specific index requires shifting other elements.
False (Array access at any index is O(1)

18- Stacks can be used to convert a decimal number to binary.
True

19- Using * in a pointer declaration specifies that the variable is a pointer type.
- True

20- Deleting an element from the end of an array has a time complexity of O(n).
- False (It is O(1) because no elements need to be shifted)

21- A stack can directly access any item within it based on an index.
  False (Stacks can only access the top item)

22- What is the main disadvantage of using a doubly linked list compared to a singly linked list?
- Answer: A doubly linked list requires more memory as each node stores two pointers (next and previous), increasing space complexity.