**Time and Space complexity**

**1. What is the time complexity of binary search in a sorted array?**  
A) O(n)  
**B) O(log n)**  
C) O(n log n)  
D) O(1)

**2. What is the average-case time complexity of quicksort?**  
**A) O(n log n)**  
B) O(n²)  
C) O(log n)  
D) O(n)

**3. Consider the following code:**

for (int i = 0; i < n; i++) {

    for (int j = 0; j < n; j++) {

        System.out.print("\*");

    }

}

What is the time complexity?  
A) O(n)  
B) O(log n)  
**C) O(n²)**  
D) O(1)

**4. What is the space complexity of merge sort?**  
A) O(1)  
**B) O(n)**  
C) O(log n)  
D) O(n²)

**5. What is the time complexity of the following loop?**

for (int i = 1; i < n; i \*= 2) {

    System.out.println(i);

}

A) O(n)  
**B) O(log n)**  
C) O(n log n)  
D) O(1)

**6. What is the space complexity of an iterative binary search algorithm?**  
A) O(n)  
**B) O(1)**  
C) O(log n)  
D) O(n²)

**7. What is the time complexity of inserting an element at the start of a LinkedList?**  
A) O(n)  
**B) O(1)**  
C) O(log n)  
D) O(n log n)

**8. What is the time complexity of accessing an element in an array using its index?**  
A) O(n)  
B) O(log n)  
**C) O(1)**  
D) O(n²)

**9. What is the worst-case time complexity of bubble sort?**  
A) O(n log n)  
**B) O(n²)**  
C) O(log n)  
D) O(n)

**10. Consider the following code:**

int count = 0;

for (int i = 0; i < n; i++) {

    count += 1;

}

What is the time complexity?  
A) O(n²)  
B) O(n log n)  
**C) O(n)**  
D) O(1)

**11. What is the time complexity of reversing a LinkedList with n elements (iterative approach)?**  
**A) O(n)**  
B) O(log n)  
C) O(n²)  
D) O(1)

**12. What is the space complexity of the following recursive function?**

void printRec(int n) {

    if (n == 0) return;

    System.out.println(n);

    printRec(n - 1);

}

**A) O(n)**  
B) O(1)  
C) O(log n)  
D) O(n²)

**13. What is the time complexity of inserting an element in a HashMap (average case)?**  
A) O(n)  
**B) O(1)**  
C) O(log n)  
D) O(n log n)

**14. Consider the following code:**

for (int i = 0; i < n; i++) {

    for (int j = 0; j < Math.sqrt(n); j++) {

        System.out.print("\*");

    }

}

What is the time complexity?  
A) O(n²)  
B) O(n log n)  
**C) O(n√n)**  
D) O(log n)

**15. What is the space complexity of an array of size n?**  
A) O(log n)  
**B) O(n)**  
C) O(1)  
D) O(n²)

**16. Which of the following has the lowest average-case time complexity?**  
A) Selection Sort  
**B) Merge Sort**  
C) Bubble Sort  
D) Insertion Sort

**17. What is the time complexity of multiplying two n x n matrices using the standard method?**  
A) O(n)  
B) O(n²)  
**C) O(n³)**  
D) O(n log n)

**18. What is the best-case time complexity of insertion sort?**  
**A) O(n)**  
B) O(n log n)  
C) O(n²)  
D) O(1)

**19. What is the time complexity of this loop?**

for (int i = 0; i < n; i++) {

    for (int j = i; j < n; j++) {

        System.out.print("\*");

    }

}

**A) O(n²)**  
B) O(n)  
C) O(log n)  
D) O(n log n)

**20. What is the time complexity of searching in a hash table in the worst case?**  
A) O(1)  
B) O(log n)  
**C) O(n)**  
D) O(n log n)