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)
Answer: B) O(log n)

2. What is the average-case time complexity of quicksort?
A) O(n log n)
B) $O(n^2)$
C) O(log n)
D) O(n)
Answer: A) O(n log n)

3. Consider the following code:

```
java
CopyEdit
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) $O(n^2)$
D) O(1)
Answer: C) $O(n^2)$

4. What is the space complexity of merge sort?
A) O(1)
B) O(n)
C) O(log n)
D) $O(n^2)$
Answer: B) O(n)

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

```
java
CopyEdit
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)
Answer: B) O(log n)

6. What is the space complexity of an iterative binary search algorithm?
A) O(n)
B) O(1)
C) O(log n)
D) $O(n^2)$
Answer: B) O(1)

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)
Answer: B) O(1)

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) $O(n^2)$
Answer: C) O(1)

9. What is the worst-case time complexity of bubble sort?
A) O(n log n)
B) $O(n^2)$
C) O(log n)
D) O(n)
Answer: B) $O(n^2)$

10. Consider the following code:

```
java
CopyEdit
int count = 0;
for (int i = 0; i < n; i++) {
  count += 1;
}
```

What is the time complexity?
A) $O(n^2)$
B) O(n log n)
C) O(n)
D) O(1)
Answer: C) O(n)

11. What is the time complexity of reversing a LinkedList with n elements (iterative approach)?
A) O(n)
B) O(log n)
C) $O(n^2)$
D) O(1)
Answer: A) O(n)

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

```
java
CopyEdit
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(n^2)
Answer: A) O(n)

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)
Answer: B) O(1)

14. Consider the following code:

```
java
CopyEdit
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(n^2)
B) O(n log n)
C) O($n\sqrt{n}$)
D) O(log n)
Answer: C) O($n\sqrt{n}$)

15. What is the space complexity of an array of size n?
A) O(log n)
B) O(n)
C) O(1)
D) O(n^2)
Answer: B) O(n)

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

17. What is the time complexity of multiplying two n x n matrices using the standard method?
A) O(n)
B) $O(n^2)$
C) $O(n^3)$
D) O(n log n)
Answer: C) $O(n^3)$

18. What is the best-case time complexity of insertion sort?
A) O(n)
B) O(n log n)
C) $O(n^2)$
D) O(1)
Answer: A) O(n)

19. What is the time complexity of this loop?

```
java
CopyEdit
for (int i = 0; i < n; i++) {
  for (int j = i; j < n; j++) {
    System.out.print("*");
  }
}
```

A) $O(n^2)$
B) O(n)
C) O(log n)
D) O(n log n)
Answer: A) $O(n^2)$

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)
Answer: C) O(n)