# Module 1

## JavaScript Language

#### Questions that you must be able to answer in detail:

1. Can you name two programming paradigms important for JavaScript app developers?
2. **What is a “closure” in JavaScript? Provide an example.**
3. **What is the difference between const, let and var?**
4. **What is scope in JavaScript?**
5. **What is the difference between function expression, fat arrows and function declaration** What is “this in JavaScript?
6. What are the benefits of including 'use strict' at the beginning of a JavaScript source file?
7. What is NaN? What is its type?
8. **What is an immediately-invoked function expression? Why use it? Provide an example**
9. **What are the benefits of using array methods (forEach, map, etc.) over loops?**

#### Questions you should have general knowledge of and should answer in a few words:

1. List some differences of between ES5 and ES2016?
2. What are generators? Provide an example of their usage.

## Data Structures and Algorithms

#### Questions that you must be able to answer in detail:

1. What is data-structure?
2. What is a linear data structure?
3. What operations can we perform on data structures?
4. **Explain what is a linked-list?**
5. **Explain what is a stack?**
6. **Explain what is a queue?**
7. **What is algorithm analysis?**
8. Why do we need to do algorithm analysis?
9. What are asymptotic notations?
10. What is a recursive function?
11. What is linear searching?
12. **What is binary searching?**
13. **Describe how quick sort work. Pros and Cons.**
14. **Implement bubble sort?**
15. **Describe how merge sort work. Pros and Cons.**
16. Describe how heap sort work. Pros and Cons.
17. Implement insertion sort?
18. Describe how heaps work. Write some pseudo code
19. What is a tree?
20. What is post-order, pre-order, in-order traversal?
21. **What is a binary tree?**
22. **What is a binary search tree?**
23. What is the value of in-order in binary search tree?
24. **What is a graph?**
25. Provide practical examples of graphs. Explain them.
26. **List some graph algorithms and their usage.**
27. **When to use the Dijkstra algorithm?**
28. **Provide a practical example of Dijkstra. Explain it.**
29. **How does depth-first traversal work?**
30. **Provide a practical example of DFS. Explain it.**
31. **How does breadth-first traversal work?**
32. **Provide a practical example of BFS. Explain it.**
33. What is hashing?
34. What is memoization?
35. Provide practical example of memoization. Explain it.
36. Describe how hash tables work. Provide some pseudo code.
37. When to use Map, Set or plain JavaScript objects? What are the values of each?

#### Questions you should have general knowledge of and should answer in a few words:

1. What is interpolation search?
2. What are state machines?
3. What is the Tower of Hanoi?
4. Explain divide and conquer algorithms?
5. What is dynamic programming?