DATA STRUCTURES

ARRAYS – EASY LEVEL

1. Which of the following best describes an array?
   A) Collection of variables of same size but different types
   B) A data structure with dynamic size only
   C) Collection of different data types
   D) Collection of elements stored at contiguous memory locations
   Answer: D

2. What is the index of the first element in a Python list or C array?
   A) -1
   B) Depends on language
   C) 1
   D) 0
   Answer: D

3. The time complexity to access an element in an array using index is:
   A) $O(n^2)$
   B) O(log n)
   C) O(1)
   D) O(n)
   Answer: C

4. Which operation is fastest in arrays?
   A) Insertion at beginning
   B) Deletion at middle
   C) Access by index
   D) Resizing
   Answer: C

5. If an array has 10 elements, what is the index of the last element?
   A) 9
   B) 10
   C) 11
   D) 8
   Answer: A

6. Arrays in C are:
   A) Dynamically allocated by default
   B) Stored at non-contiguous memory
   C) Fixed in size once declared
   D) Can store different types of data
   Answer: C

7. Which of the following is **not** an advantage of arrays?
   A) Random access
   B) Easy to sort and traverse

C) Constant time insertion at the beginning
D) Memory can be allocated at compile time
Answer: C

8. What is the correct way to declare an integer array of size 5 in C?
A) int arr(5);
B) int arr[5];
C) int arr = [5];
D) array int arr[5];
Answer: B

9. Which of these is the correct way to access the 3rd element of array arr?
A) arr[2]
B) arr(3)
C) arr{3}
D) arr[3]
Answer: A

10. What is the size of int arr[10]; in C if int takes 4 bytes?
A) 20 bytes
B) 40 bytes
C) 10 bytes
D) 4 bytes
Answer: B

11. Which language allows arrays with negative indices?
A) Python (via slicing with negative indices)
B) C
C) Java
D) C++
Answer: A

12. Which of the following is used to find the length of an array in Python?
A) size()
B) count()
C) length()
D) len()
Answer: D

13. What happens if you try to access an index beyond array size in C?
A) Zero is returned
B) Compile-time error
C) Segmentation fault / undefined behavior
D) Last element is returned
Answer: C

14. Which of the following is true for arrays?
A) Index starts from 1
B) Size must always be specified at declaration in C
C) Array elements are stored randomly

D) Arrays can grow automatically
Answer: B

15. In Python, which of the following is **not** a valid list operation?
    A) append()
    B) pop()
    C) push()
    D) insert()
    Answer: C

16. Which sorting algorithm is most efficient for small arrays?
    A) Quick Sort
    B) Bubble Sort
    C) Merge Sort
    D) Heap Sort
    Answer: B

17. Which of the following is the default value of an integer array in Java?
    A) null
    B) 1
    C) 0
    D) Garbage value
    Answer: C

18. Which of these can arrays store?
    A) Functions
    B) Objects (in Java/Python)
    C) Only primitive types
    D) Only strings
    Answer: B

19. What is the output of len([1,2,3,4]) in Python?
    A) 5
    B) 3
    C) 4
    D) Error
    Answer: C

20. What is the worst-case time complexity for searching in an unsorted array?
    A) O(1)
    B) O(log n)
    C) O(n)
    D) $O(n^2)$
    Answer: C

21. Which traversal is used for arrays?
    A) Preorder
    B) Postorder
    C) Sequential
    D) Level order
    Answer: C

22. What does arr[-1] return in Python?
    A) First element
    B) Last element
    C) Error
    D) None
    Answer: B

23. Which of the following is correct about array indexing?
    A) C starts from index 1
    B) Python starts from index 0
    C) Java starts from index -1
    D) All start from 1
    Answer: B

24. Which of the following operations has O(1) time in arrays?
    A) Deletion at front
    B) Searching unsorted
    C) Insertion at random position
    D) Access by index
    Answer: D

25. What is required for binary search on an array?
    A) Array must be sorted
    B) Array must be unsorted
    C) Array must be 2D
    D) Array must be dynamic
    Answer: A

26. Which of the following statements is correct?
    A) Arrays can have variable size in C
    B) Arrays in Java are objects
    C) Arrays in C++ are objects
    D) Arrays in C are linked structures
    Answer: B

27. In Python, slicing arr[1:4] gives:
    A) Elements at index 1,2,3
    B) Elements at index 1,2,3,4
    C) All elements except 1
    D) Error
    Answer: A

28. Which is true about multi-dimensional arrays?
    A) Stored in contiguous blocks row by row or column by column
    B) Always stored in linked list format
    C) Do not exist in C
    D) Cannot be represented in memory
    Answer: A

29. What is the base address of an array?
    A) Address of last element

B) Address of first element
C) Address of random element
D) Sum of addresses
Answer: B

30. Which of these is a jagged array?
A) An array with all rows equal length
B) An array with unequal row lengths
C) A one-dimensional array
D) None
Answer: B

31. If an array has n elements, valid index values are:
A) 0 to n
B) 1 to n
C) 0 to n-1
D) -1 to n
Answer: C

32. Which is the best case complexity of linear search?
A) O(log n)
B) O(1)
C) O(n)
D) $O(n^2)$
Answer: B

33. Which of these is used to copy arrays in Python?
A) arr.copy()
B) arr.clone()
C) arr.duplicate()
D) arr.transfer()
Answer: A

34. What is the default value of an uninitialized array element in C?
A) 0
B) Garbage value
C) null
D) None
Answer: B

35. Arrays are mostly used for:
A) Storing sequential data
B) Dynamic data manipulation
C) Database operations
D) Graph storage only
Answer: A

36. Which of these is not an array type?
A) One-dimensional
B) Two-dimensional
C) Circular array

D) Hash array
Answer: D

37. The maximum number of dimensions allowed in a C array is:
    A) 2
    B) 32
    C) Compiler dependent
    D) Unlimited
    Answer: C

38. Which function in Python returns max element of list?
    A) maximum()
    B) max()
    C) largest()
    D) big()
    Answer: B

39. The array index should always be:
    A) Integer
    B) Float
    C) Character
    D) String
    Answer: A

40. Which operation is slowest in arrays?
    A) Access
    B) Traversal
    C) Insertion at beginning
    D) Deletion at end
    Answer: C

41. In C, which header file is required for array declaration?
    A) stdio.h
    B) stdlib.h
    C) No special header file
    D) array.h
    Answer: C

42. Which notation is used to calculate the address of an element in array?
    A) Address = Base + (index × size)
    B) Address = Base × Index
    C) Address = Index / Size
    D) Address = Base – Index
    Answer: A

43. Which algorithm is best for searching sorted arrays?
    A) Linear search
    B) Binary search
    C) Jump search
    D) Both B and C
    Answer: D

44. In Python, arr = [ ] creates:
    A) An empty array
    B) An empty list
    C) Null pointer
    D) Error
    Answer: B

45. The time complexity of inserting at the end of an array (amortized in Python lists) is:
    A) O(1)
    B) O(n)
    C) O(log n)
    D) $O(n^2)$
    Answer: A

46. What does arr.clear() do in Python?
    A) Deletes array permanently
    B) Removes all elements
    C) Resets to None
    D) Creates a copy
    Answer: B

47. Which of these can be stored in arrays?
    A) Homogeneous data
    B) Heterogeneous data (in Python lists)
    C) Only integers
    D) Only floats
    Answer: A, B (depends on language)

48. In C, if array int arr[5] = {1,2}; then remaining elements are:
    A) Garbage
    B) Zeros
    C) Null
    D) Ones
    Answer: B

49. What is the main disadvantage of arrays?
    A) Random access
    B) Fixed size
    C) Easy traversal
    D) Contiguous memory allocation
    Answer: B

50. Which of the following is true?
    A) Arrays are static in size in C
    B) Arrays in Java are objects
    C) Arrays in Python are lists
    D) All of the above
    Answer: D