





# BPSC TRE4.0/STET बिहार शिक्षक भर्ती

**Computer Science**

**Data Structure**

**Array and Linked List  
MCQ**

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1. Which of these best describes an array?
  - a) A data structure that shows a hierarchical behavior
  - b) Container of objects of similar types
  - c) Arrays are immutable once initialized
  - d) More than one of the above
  - e) None of the above

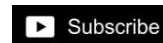


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**2. How do you initialize an array in C?**

- a) `int arr[3] = (1,2,3);`**
- b) `int arr(3) = {1,2,3};`**
- c) `int arr[3] = {1,2,3};`**
- d) More than one of the above**
- e) None of the above**





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**3. How do you instantiate an array in Java?**

- a) `int arr[] = new int(3);`**
- b) `int arr[];`**
- c) `int arr[] = new int[3];`**
- d) More than one of the above**
- e) None of the above**





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4. Which of the following is the correct way to declare a multidimensional array in Java?
- a) `int[] arr;`
  - b) `int arr [[]];`
  - c) `int [][]arr;`
  - d) More than one of the above
  - e) None of the above



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5. What is the output of the following Java code?

```
public class array
{
    public static void main(String args[])
    {
        int []arr = {1,2,3,4,5};
        System.out.println(arr[2]);
        System.out.println(arr[4]);    }    }
```

- a) 3 and 5
- b) 5 and 3
- c) 2 and 4
- d) More than one of the above
- e) None of the above





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6. What is the output of the following Java code?

```
public class array
{
    public static void main(String args[])
    {
        int []arr = {1,2,3,4,5};
        System.out.println(arr[5]);
    }
}
```

- a) 4
- b) 5
- c) ArrayIndexOutOfBoundsException
- d) More than one of the above
- e) None of the above



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- 7. When does the `ArrayIndexOutOfBoundsException` occur?**
- a) Compile-time**
  - b) Run-time**
  - c) Not an error**
  - d) More than one of the above**
  - e) None of the above**





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- 8. Which of the following concepts make extensive use of arrays?**
- a) Binary trees**
  - b) Scheduling of processes**
  - c) Caching**
  - d) Spatial locality**
  - e) More than one of the above**



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9. What are the advantages of arrays?
- a) Objects of mixed data types can be stored
  - b) Elements in an array cannot be sorted
  - c) Index of the first element of an array is 1
  - d) Easier to store elements of the same data type
  - e) More than one of the above

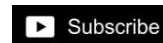


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**10. What are the disadvantages of arrays?**

- a) Data structures like queue or stack cannot be implemented**
- b) There are chances of wastage of memory space if elements inserted in an array are lesser than the allocated size**
- c) Index value of an array can be negative**
- d) Elements are sequentially accessed**
- e) More than one of the above**





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**11. Assuming int is of 4 bytes, what is the size of int arr[15];?**

- a) 45**
- b) 19**
- c) 30**
- d) 60**
- e) None of the above**

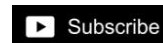


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**12. In general, the index of the first element in an array is \_\_\_\_\_.**

- a) 0**
- b) -1**
- c) 2**
- d) More than one of the above**
- e) None of the above**





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**13. Elements in an array are accessed \_\_\_\_\_.**

- a) Randomly**
- b) Sequentially**
- c) Exponentially**
- d) Logarithmically**
- e) More than one of the above**





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- 14. Which of the following is the limitation of the array?**
- a) Elements can be accessed from anywhere**
  - b) The size of the array is fixed**
  - c) Indexing is started from Zero**
  - d) Memory waste if an array's elements are smaller than the size allotted to them**
  - e) More than one of the above**



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- 15. In an array `int arr[3]={1,2,3}`, what will happen if we try to access `arr[4]` in C/C++?**
- a) Run-time error**
  - b) 3**
  - c) 0**
  - d) Garbage Value**
  - e) More than one of the above**





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- 16. What is the time complexity to insert a single element in the array at the end?**
- a)  $O(1)$**
  - b)  $O(n)$**
  - c)  $O(\log n)$**
  - d) More than one of the above**
  - e) None of the above**



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17. If we declare a 2D array like `int arr[3][4]`, then it will be stored in the format of \_\_\_\_\_.
- a) 4 rows 3 columns
  - b) 4 rows 4 columns
  - c) 3 rows 3 columns
  - d) 3 rows 4 columns
  - e) None of the above



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**18. What is the time complexity for traversing a 2D array?**

- a)  $O(n)$**
- b)  $O(n \log n)$**
- c)  $O(n^2)$**
- d) More than one of the above**
- e) None of the above**



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19. What is the output of the following program?

```
#include <bits/stdc++.h>
using namespace std;
int main()
{   int arr[] = { 1, 2, 3, 4, 5 };
    for (int i = 0; i < 5; i++)
        cout << *(arr + i) << endl;
    return 0;}
```

- a) 1, 3, 5, 7, 9
- b) 1200, 1201, 1202, 1203, 1204
- c) 1, 2, 3, 4, 5
- d) More than one of the above
- e) None of the above



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20. What is the output of the following program?

```
#include <iostream>
using namespace std;
int main()
{   int val = 10;
    int* ptr = &val;
    cout << *ptr << endl;
    cout << ptr << endl;
    return 0; }
```

- a) Address of val, Address of val
- b) Address of val, 10
- c) 10, 10
- d) More than one of the above
- e) None of the above



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**21. What is the time complexity for inserting/deleting at the beginning of the array?**

- a)  $O(1)$**
- b)  $O(\log N)$**
- c)  $O(N \log N)$**
- d)  $O(N)$**
- e) None of the above**



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**22. In C++, we can create a dynamic array using the \_\_\_\_\_ keyword.**

- a) array**
- b) this**
- c) super**
- d) new**
- e) None of the above**



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**23. What is the advantage of a dynamic array over a static array?**

- a) The dynamic array is fixed**
- b) The dynamic array takes  $O(n)$  time**
- c) The size of the dynamic array is not fixed**
- d) More than one of the above**
- e) None of the above**







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**24. How can we create a dynamic array in C?**

- a) vector()**
- b) dynamic\_array()**
- c) malloc()**
- d) More than one of the above**
- e) None of the above**





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25. Consider a 2-dimensional array  $a[4][5]$ , the array is stored in row-major format. If the first element  $x[0][0]$  occupies the memory location with address 1000 and each element occupies only 4 bytes, find the address of the element  $A[2][3]$ .

- a) 1048
- b) 1052
- c) 1060
- d) 1072
- e) None of the above



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**26. What is the time complexity to count the number of elements in the linked list?**

- a)  $O(1)$**
- b)  $O(n)$**
- c)  $O(\log n)$**
- d)  $O(n^2)$**
- e) More than one of the above**



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**27. What is the time complexity for deleting a node from linked list?**

- a)  $O(1)$**
- b)  $O(n)$**
- c)  $O(\log n)$**
- d) More than one of the above**
- e) None of the above**

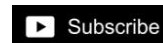


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**28. Which of these is not an application of a linked list?**

- a) To implement file systems**
- b) For separate chaining in hash-tables**
- c) To implement non-binary trees**
- d) Random Access of elements**
- e) More than one of the above**





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- 29. A linear collection of data elements where the linear node is given by a pointer is called?**
- a) Linked list**
  - b) Node list**
  - c) Primitive list**
  - d) Unordered list**
  - e) More than one of the above**



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**30. Consider an implementation of unsorted singly linked list. Suppose it has its representation with a head pointer only. Given the representation, which of the following operation can be implemented in  $O(1)$  time?**

- i) Insertion at the front of the linked list**
- ii) Insertion at the end of the linked list**
- iii) Deletion of the front node of the linked list**
- iv) Deletion of the last node of the linked list**
- a) I and II**
- b) I and III**
- c) I, II and III**
- d) I, II and IV**
- e) More than one of the above**



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- 31. In linked list, each node contains a minimum of two fields. One field is the data field to store the data. The second field is?**
- a) Pointer to character**
  - b) Pointer to integer**
  - c) Pointer to node**
  - d) Node**
  - e) More than one of the above**





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- 32. What would be the asymptotic time complexity to add a node at the end of singly linked list, if the pointer is initially pointing to the head of the list?**
- a)  $O(1)$**
  - b)  $O(n)$**
  - c)  $\theta(n^2)$**
  - d) More than one of the above**
  - e) None of the above**



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- 33. What would be the asymptotic time complexity to insert an element at the front of the linked list (head is known)?**
- a)  $O(1)$**
  - b)  $O(n)$**
  - c)  $O(n^2)$**
  - d) More than one of the above**
  - e) None of the above**



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**34. What would be the asymptotic time complexity to find an element in the linked list?**

- a)  $O(1)$**
- b)  $O(n)$**
- c)  $O(n^2)$**
- d) More than one of the above**
- e) None of the above**



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- 35. What would be the asymptotic time complexity to insert an element at the second position in the linked list?**
- a)  $O(1)$**
  - b)  $O(n)$**
  - c)  $O(n^2)$**
  - d) More than one of the above**
  - e) None of the above**



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- 36. The concatenation of two lists can be performed in  $O(1)$  time. Which of the following variation of the linked list can be used?**
- a) Singly linked list**
  - b) Doubly linked list**
  - c) Circular doubly linked list**
  - d) More than one of the above**
  - e) None of the above**



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**37. Which data structure is typically used to implement hash table ?**

- a) Linked list**
- b) Array**
- c) Binary Tree**
- d) More than one of the above**
- e) None of the above**



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- 38. What kind of linked list is best to answer questions like “What is the item at position n?”**
- a) Singly linked list**
  - b) Doubly linked list**
  - c) Circular linked list**
  - d) Array implementation of linked list**
  - e) More than one of the above**



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**39. Linked lists are not suitable for the implementation of \_\_\_\_\_.**

- a) Insertion sort**
- b) Radix sort**
- c) Polynomial manipulation**
- d) Binary search**
- e) More than one of the above**







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40. Linked list is considered as an example of \_\_\_\_\_ type of memory allocation.

- a) Dynamic
- b) Static
- c) Compile time
- d) Heap
- e) More than one of the above



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**41. In Linked List implementation, a node carries information regarding**

**\_\_\_\_\_.**

- a) Data**
- b) Link**
- c) Data and Link**
- d) Node**
- e) More than one of the above**

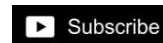


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**42. Linked list data structure offers considerable saving in \_\_\_\_\_.**

- a) Computational Time**
- b) Space Utilization**
- c) Speed Utilization**
- d) More than one of the above**
- e) None of the above**





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- 43. Which of the following points is/are not true about Linked List data structure when it is compared with an array?**
- a) Arrays have better cache locality that can make them better in terms of performance**
  - b) It is easy to insert and delete elements in Linked List**
  - c) Random access is not allowed in a typical implementation of Linked Lists**
  - d) Access of elements in linked list takes less time than compared to arrays**
  - e) More than one of the above**



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**44. Which of the following sorting algorithms can be used to sort a random linked list with minimum time complexity?**

- a) Insertion Sort**
- b) Quick Sort**
- c) Heap Sort**
- d) Merge Sort**



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45. In the worst case, the number of comparisons needed to search a singly linked list of length  $n$  for a given element is?
- a)  $\log_2 n$
  - b)  $n/2$
  - c)  $\log_2 n - 1$
  - d) More than one of the above
  - e) None of the above



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- 46. Given a pointer to a node X in a singly linked list. Only one pointer is given, pointer to the head node is not given. Can we delete the node X from the given linked list?**
- a) Possible if X is not the last node**
  - b) Possible if the size of the linked list is even**
  - c) Possible if the size of the linked list is odd**
  - d) Possible if X is not the first node**
  - e) More than one of the above**



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**47. You are given pointers to the first and last nodes of a singly linked list. Which of the following operations are dependent on the length of the linked list?**

- a) Delete the first element**
- b) Insert a new element as the first element**
- c) Delete the last element of the list**
- d) Add a new element at the end of the list**
- e) More than one of the above**



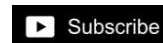


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**48. In the worst case, the number of comparisons needed to search a singly linked list of length  $n$  for a given element is?**

- a)  $\log_2 n$**
- b)  $n/2$**
- c)  $\log_2 n - 1$**
- d) More than one of the above**
- e) None of the above**



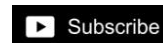


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**49. Which of the following is false about a doubly linked list?**

- a) We can navigate in both directions**
- b) It requires more space than a singly linked list**
- c) The insertion and deletion of a node take a bit longer**
- d) Implementing a doubly linked list is easier than a singly linked list**
- e) More than one of the above**



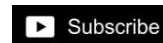


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**50. What is a memory-efficient double linked list?**

- a) Each node has only one pointer to traverse the list back and forth**
- b) The list has breakpoints for faster traversal**
- c) An auxiliary singly linked list acts as a helper list to traverse through the doubly linked list**
- d) A doubly linked list that uses a bitwise AND operator for storing addresses**
- e) More than one of the above**





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**51. How do you calculate the pointer difference in a memory-efficient doubly linked list?**

- a) Head xor tail**
- b) Pointer to previous node xor pointer to next node**
- c) Pointer to previous node – pointer to next node**
- d) Pointer to next node – pointer to previous node**
- e) None of the above**



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- 52. What is the worst-case time complexity of inserting a node in a doubly linked list?**
- a)  $O(n \log n)$**
  - b)  $O(\log n)$**
  - c)  $O(n)$**
  - d) More than one of the above**
  - e) None of the above**



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- 53. What differentiates a circular linked list from a normal linked list?**
- a) You cannot have the 'next' pointer point to null in a circular linked list**
  - b) It is faster to traverse the circular linked list**
  - c) In a circular linked list, each node points to the previous node instead of the next node**
  - d) The head node is known in a circular linked list**
  - e) More than one of the above**



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**54. What is the time complexity of searching for an element in a circular linked list?**

- a)  $O(n)$**
- b)  $O(n \log n)$**
- c)  $O(1)$**
- d)  $O(n^2)$**



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**55. Which of the following applications makes use of a circular linked list?**

- a) Undo operation in a text editor**
- b) Recursive function calls**
- c) Allocating CPU to resources**
- d) Implementing hash tables**
- e) More than one of the above**



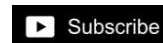


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**56. Which of the following is false about a circular linked list?**

- a) Every node has a successor**
- b) Time complexity of inserting a new node at the head of the list is  $O(1)$**
- c) Time complexity for deleting the last node is  $O(n)$**
- d) We can traverse the whole circular linked list by starting from any point**
- e) More than one of the above**





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- 57. Consider a small circular linked list. How can you effectively detect the presence of cycles in this list?**
- a) Keep one node as head and traverse another temp node until the end to check if its 'next' points to head**
  - b) Have fast and slow pointers, with the fast pointer advancing two nodes at a time and the slow pointer advancing by one node at a time**
  - c) Cannot determine, you have to pre-define if the list contains cycles**
  - d) A circular linked list itself represents a cycle, so no new cycles can be generated**
  - e) More than one of the above**



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**58. Which of the following methods can be used to search for an element in a linked list?**

- a) Iterative linear search**
- b) Iterative binary search**
- c) Recursive binary search**
- d) Normal binary search**
- e) More than one of the above**



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**59. What will be the time complexity when binary search is applied to a linked list?**

- a)  $O(1)$**
- b)  $O(n)$**
- c)  $O(n^2)$**
- d) More than one of the above**
- e) None of the above**



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60. Which type of linked list stores the address of the header node in the next field of the last node?
- a) Singly linked list
  - b) Circular linked list
  - c) Doubly linked list
  - d) Hashed list
  - e) None of the above