## Lecture 6-linked lists vs. arrays

1. What is the key CS idea emphasized in the lecture?

a) Polymorphism

b) Encapsulation

c) Abstraction

d) Inheritance

Answer: c) Abstraction

2. Which of the following is more efficient for inserting elements?

a) Arrays

b) Linked Lists

c) Both are equally efficient

d) It depends on the implementation

Answer: b) Linked Lists

3. In a doubly linked list, each node contains:

a) Data and a reference to the next node

b) Data and a reference to the previous node

c) Data and references to both the next and previous nodes

d) Only data

Answer: c) Data and references to both the next and previous nodes

4. What is the purpose of sentinel nodes in a linked list?

a) To store data

b) To make implementation of functionality slightly easier

c) To increase the list size

d) To improve search efficiency

Answer: b) To make implementation of functionality slightly easier

5. In the worst case, how long does it take to access an element in a linked list?

a) O(1)

b) O(log n)

c) O(n)

d) O(n^2)

Answer: c) O(n)

6. What does the type parameter E represent in the ListNode<E> class?

a) The element type stored in the list

b) The exception type

c) The enumeration type

d) The error type

Answer: a) The element type stored in the list

7. Which of the following is NOT a correct way to handle bad inputs in a method?

a) Return -1 to flag the bad input

b) Return null to flag the bad input

c) Throw an exception

d) All of the above are correct

Answer: a) Return -1 to flag the bad input

8. What is the purpose of the "throws" keyword in a method signature?

a) To catch exceptions

b) To declare that the method might throw a specific exception

c) To create a new exception

d) To handle exceptions within the method

Answer: b) To declare that the method might throw a specific exception

9. In a linked list implementation, what is the initial value of the head and tail nodes?

a) 0

b) null

c) -1

d) An empty node

Answer: b) null

10. Which operation in a linked list typically requires traversing the entire list?

a) Adding an element at the beginning

b) Removing the last element

c) Accessing the first element

d) Checking if an element is contained in the list

Answer: d) Checking if an element is contained in the list

11. What is the main advantage of using a generic class in Java?

a) Improved performance

b) Reduced code complexity

c) Type safety and code reusability

d) Automatic memory management

Answer: c) Type safety and code reusability

12. In the context of testing, what does "black box testing" refer to?

a) Testing the internal implementation of a class

b) Testing only through the interface without knowledge of implementation

c) Testing only negative scenarios

d) Testing without any documentation

Answer: b) Testing only through the interface without knowledge of implementation

13. What is the purpose of the @Before annotation in JUnit?

a) To run a method after each test

b) To run a method before each test to initialize variables and objects

c) To mark a method as a test

d) To ignore a test method

Answer: b) To run a method before each test to initialize variables and objects

14. Which method is used in JUnit to enforce that two values are equal?

a) assertTrue()

b) assertFalse()

c) assertEquals()

d) assertNull()

Answer: c) assertEquals()

15. What is the main difference between ArrayList and LinkedList in terms of data storage?

a) ArrayList uses a dynamic array, LinkedList uses a doubly linked list

b) ArrayList uses a linked list, LinkedList uses an array

c) Both use arrays but with different implementations

d) There is no difference in data storage

Answer: a) ArrayList uses a dynamic array, LinkedList uses a doubly linked list

16. Which list implementation is generally better for frequent data manipulation?

a) ArrayList

b) LinkedList

c) Both are equally efficient

d) It depends on the specific use case

Answer: b) LinkedList

17. What is the time complexity of adding an element at the beginning of an ArrayList?

a) O(1)

b) O(log n)

c) O(n)

d) O(n^2)

Answer: c) O(n)

18. In a doubly linked list, which operation can be performed in O(1) time?

a) Finding the middle element

b) Reversing the list

c) Adding an element at the beginning

d) Searching for an element

Answer: c) Adding an element at the beginning

19. What is the purpose of the "fail()" method in JUnit?

a) To mark a test as failed

b) To end the test execution

c) To skip a test

d) To indicate that an expected exception was not thrown

Answer: d) To indicate that an expected exception was not thrown

20. Which of the following is NOT a typical operation performed on a linked list?

a) Insertion

b) Deletion

c) Traversal

d) Binary search

Answer: d) Binary search