4009 DSA – Test 2 Solutions

Part A: Multiple Choice Questions

1	2	3	4	5	6	7	8	9	10
A	D	A	C	A	B	B	A	D	C

Part B: Short Answer Questions

11. Any of the three answers are correct:

- A linked list class is a collection which can contain many objects of the same type like an ArrayList.
- A linked list is a collection of nodes that together form a linear ordering. The ordering is determined as in the child's game "follow the leader" to which each node is an object that stores a reference to an element and a reference called next, to another node.
- A linked list is a list where nodes are linked together. Each node contains data and a pointer or link.

12. Any of the four answers are correct:

- A stack is a collection of objects that are inserted and removed according to the last -in, first -out
- (LIFO) principle.
- A stack is a linear data structure that follows the Last-in, First-Out principle.
- A stack is a data structure that can hold many elements.
- A stack is a data structure usually used to simplify certain programming operations.

13. Any of the three answers are correct:

- A queue is a collection of objects that are inserted and removed according to the first-in, first-out (FIFO) principle.
- A queue is a linear data structure that operates on the First-In, First-Out (FIFO) principle, where the first element added is the first one removed.
- A queue is a data structure that can hold many elements

14. Any of the two answers are correct:

- A basic unit of a Linked List containing data and a reference to the next node.
- Each element in a linked list that holds data and a link or pointer to next node is called a node

15. **Last-In-First-Out (LIFO)** principle is the method and management of a stack data structure. The most recent element (last element) is added in last in the stack while the first element is removed first. **First-In-First-Out (FIFO)** principle is a method or management of element/data where elements can be inserted at any time but only the element in the queue the longest can be removed next. Elements enter at the back and are removed from the front. For example: the metaphor of ATM line.

16. Each node stores two things:

- data – the value or element of the node
- next – a reference to the next node in the list.

17. The five methods used with stacks are:

- Push: Adds a new element on the stack.
- Pop: Removes and returns the top element from the stack.
- Peek: Returns the top element on the stack.
- isEmpty: Checks if the stack is empty.
- Size: Finds the number of elements in the stack.

18. The five methods used with queues are:

- enqueue: Adds a new element to the back of the queue
- dequeue: Removes and returns the front element from the queue
- first: returns the first element of the queue
- isEmpty: Checks if the queue is empty.
- Size: Finds the number of elements in the queue.

19.

a: Name of the program or class name – the whole program is contained inside the class of the program named DSATest2

b: Create a stack datastructure or object called itiCourses that can store or holds String values

c: The push() method inserts or adds the element DICT into the stack data structure

d: The peek() method returns the top element of the stack

e: The size() method returns the number of elements in the stack

20. Stack or stacks data structure

21. Strings datatype

22. DIT

False

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