WIA1002/WIB1002 Data Structures

Tutorial: Linked List & Doubly Linked List

Question 1

```
1     public E xyz(int index,E e)
2     {
3        Node<E> current=head;
4        Node<E> temp;
5             if(index<0) return null;
6             else if(index>=size-1) {
7                 this.addLast(e);
8                 return null;
9            }
10             else if(index==0) {
11                 temp=head;
12                 head.element=e;
13                 return temp.element;
14              }else{
15                 for (int i = 1; i < index; i++) {
16                     current=current.next;
17                 }
18                 temp=current.next;
19                 current.next.element=e;
20                 return temp.element;
21             }

}
```

Given method xyz with 2 arguments:

a) Based on the above source code, explain what the lines of code do from line 10 – 21.
b) What is the main purpose of the method xyz()?
c) Obviously, there are some bugs in the source code. Debug the code and make it concise and simpler.

Question 2

```
1  else{
2        Node<E> temp = head;
3        for(int i=0; i<index; i++){
4        temp = temp.next;
5        }
6        element = temp.element;
7        temp.next.prev = temp.prev;
8        temp.prev.next = temp.next;
9        temp.next = null;
10       temp.prev = null;
11       size --;
12 }
```

Based on the source code above, assume the index given is 3

a) Explain what the lines of code do from line 2-11.
b) Draw the nodes for lines 7 - 10

Question 3

A doubly linked list keeps a set of characters. The head, the middle and the tail nodes respectively contains alphabet ‘a’, ‘b’ and ‘c’. These nodes are in successive order. Create a new node that contains alphabet ‘z’. Add this new node at the last location of this linked list. Draw all of these nodes including their correct references.