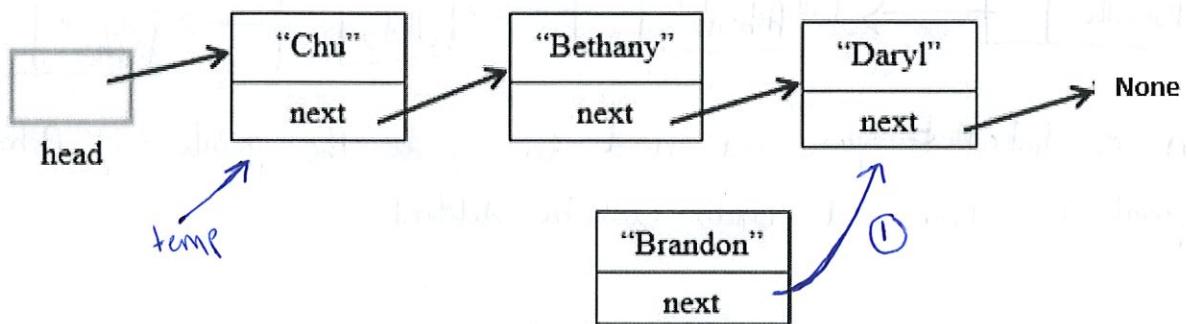


Quiz 2

Name: Chido Chimbetele

1. A node with the data, "Brandon" needs to be inserted between two nodes, "Bethany" and "Daryl".



Which step of the following needs to be performed first?

- a. Update the value of the box, **next** in the node with "Bethany" first.
- b. Assign the value of the box, **next** in the node with "Brandon" first.

Your Answer is b (a or b) (10%)

Why?

You do so to make sure you do not lose the pointer/address of Daryl. (10%)

Write the code to insert the node with "Brandon". Remember to use a temporary variable to move your pointer instead of moving by head. (20%)

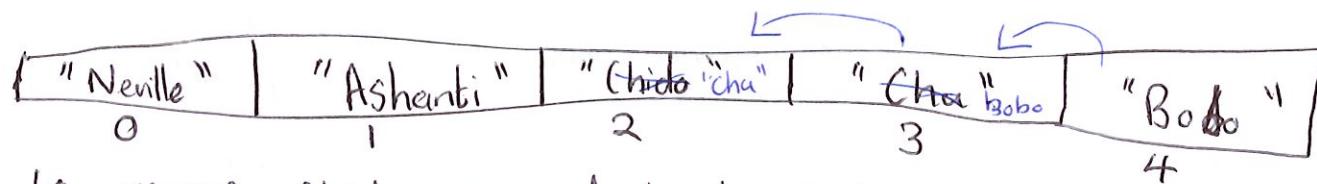
```

temp = head
while temp.data != "Bethany":
    temp = temp.next
temp.next = Node("Brandon", temp.next)
  
```

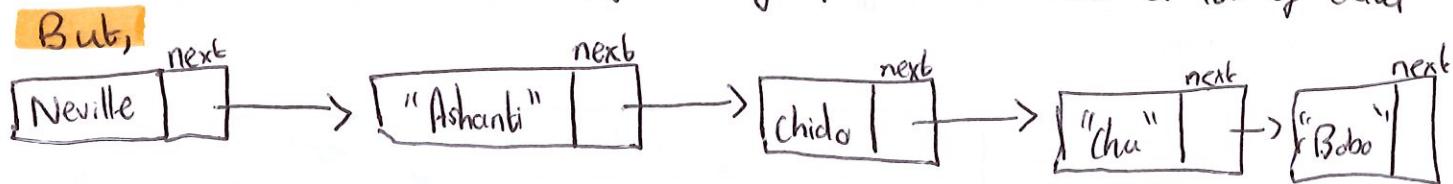
2. What is the **advantage** of using a **LinkedList** over an **ArrayList**? (10%)

The advantage of using a **LinkedList** over an **ArrayList** is that it is **fast** and **easy** to insert and delete a value. It takes **O(1)** time when you know which data or value you want to delete or insert at a specific position. For example:

You want to delete "Chido" from both the Array and LINKEDLIST



To remove Chido you need to shift the values and indices of the data after and if the Array is long you would move a lot of data.



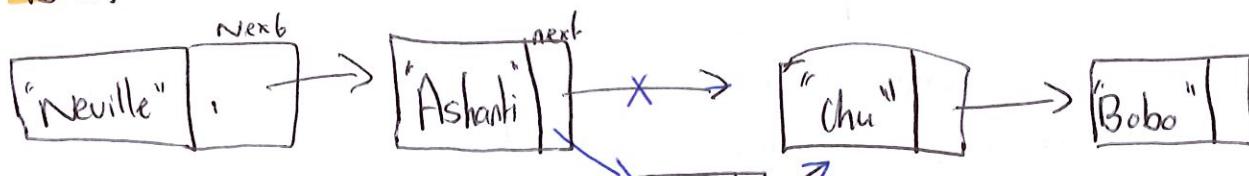
In a linkedlist you just need to update the pointer of Ashanti to now point to Chu and Chido will be deleted

You want to insert the value "Chido" back into the Array and linkedlist



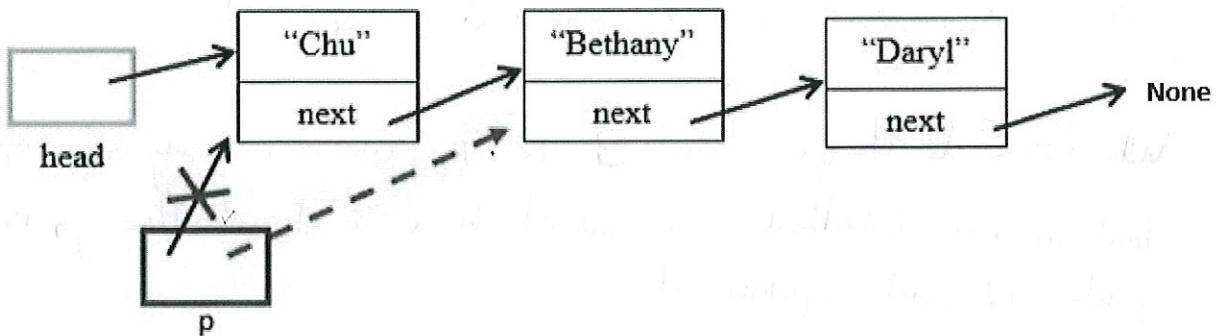
To insert in the array you need to create a new location at the end of the list and move all the data ^{from} the back until you reach where to insert Chido and this can take up to $O(n)$ time.

But,



In a linkedlist you just need to update the pointers to point to chido from the newNode created and "Ashanti" to "Chido".

3. According to the linked list below, we want to move the **p** to refer to the node with data "Bethany" if two variables, **head** and **p** referred to the node "Chu" already.



How to move **p** to refer to the node "Bethany"

- p.next = p**
- p = p.next**

Your Answer is b (a or b) (10%)

Why?

first you check the value or location of the next value of **p** the right hand side and assign it to be the new value of **p** moving the **p** to "Bethany" (10%)

4. How do you **insert a node at the beginning** of a linked list? Describe the procedure in English.(10%)
- to insert node at the beginning first check if the head and **p** are pointing at the same address if so you are at the head of the list so you can assign the new Node to point at **head** and then the head can now point to the new Node address e.g **head = ("Chido", head)** chido becoming the head of the linkedlist. ^{Note} _{Call constructor please.}

5. How do you **delete a node at the tail (end)** of a linked list? Describe the procedure in English.(10%)
- to delete a node at the tail you need to travel through the linked list until the next Node is None when the last node points to None you have reached the end so you need to remove that Node. You should have a previous pointer that keeps track of the previous node so that when you reach the end the previous point can now be set to point to none

6. What is the **advantage** of using an **ArrayList** over a **LinkedList**? (10%) prev.next = None

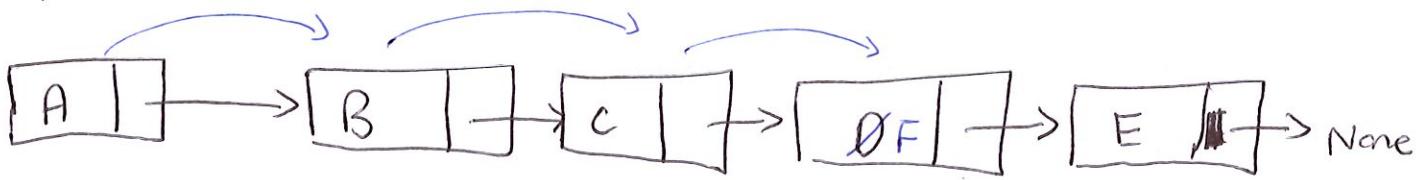
The advantages of ArrayList over LinkedList is that if you want to change a specific value we can easily access it using the index unlike the linkedlist you need to travel to find the value. If you know the index of the value you can retrieve it easily. The time it takes to do the job in an Array is $O(1)$ but in a linkedlist it $O(n)$ if the value is at the end of the list.

For example

mylist

A	B	C	D	E	F	G	H
0	1	2	3	4	5	6	7

We want to change index 3 to F we can easily say $\text{mylist}[3] = F$
but in an linkedlist we would have to travel through the list to
find D and update it



travel to D and update the data to F

While $\text{temp}.\text{data} \neq "D"$:

$\text{temp} = \text{temp}.\text{next}$

~~$\text{temp}.\text{data} = \text{update}(\text{temp}.\text{data}, \text{temp}.\text{next})$~~

$\text{temp}.\text{data} = "F"$