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| **package** com.company;  **public class** Main {   **public static void** main(String[] args) {  Customer customer = **new** Customer(**"noel"**, 12.60);  System.***out***.println(**"Name : "** + customer.getName() + **" Balnce : "** + customer.getBalance());  *//pointing the same object, causes the overwriting in memory* Customer customer1 = customer;  customer1.setName(**"Zyan"**);  customer1.setBalance(60.90);  System.***out***.println(**"Name : "** + customer.getName() + **" Balnce : "** + customer.getBalance());  System.***out***.println(**"Name : "** + customer1.getName() + **" Balnce : "** + customer1.getBalance());  } } | Name : noel Balnce : 12.6  Name : Zyan Balnce : 60.9  Name : Zyan Balnce : 60.9 |

ARRAY NEED MOST MANIPULATION WHILE ADDING, REMOVING(remove from a place, pull next element up). Linked list eliminates this.

Array is much shower when manipulating millions of data at a time.

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| **package** com.company;  **import** java.util.ArrayList;  **public class** Main {   **public static void** main(String[] args) {  ArrayList<Integer> into = **new** ArrayList<Integer>();  into.add(10);  into.add(20);  into.add(30);  into.add(40);  **for** (**int** i = 0; i < into.size(); i++){  System.***out***.println(**"index "** + i + **" element "** + into.get(i));  }  System.***out***.println();  into.add(1, 500);  **for** (**int** i = 0; i < into.size(); i++){  System.***out***.println(**"index "** + i + **" element "** + into.get(i));  }  } } | index 0 element 10  index 1 element 20  index 2 element 30  index 3 element 40  index 0 element 10  index 1 element 500  index 2 element 20  index 3 element 30  index 4 element 40 |

LINKED LIST

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| **package** com.company;  **import** java.util.ArrayList; **import** java.util.Iterator; **import** java.util.LinkedList;  **public class** Main {   **public static void** main(String[] args) {  LinkedList<String> city = **new** LinkedList<String>();  city.add(**"kolkata"**);  city.add(**"Chenni"**);  city.add(**"Delhi"**);  city.add(**"Mumbai"**);  city.add(**"kashmir"**);  city.add(**"Punjab"**);   *printCities*(city);  *//Adding A city in a certain place,  // in case of ArrayList elemnts come down but  // REMOVING a linked list will remove the elemnt parmanently* city.remove(2);  *printCities*(city); *//DELHI is removed* city.add(2, **"Simla"**);  *printCities*(city);  }  *//printing the cities via linked list* **public static void** printCities(LinkedList<String> cityLinkedList){  Iterator<String> i = cityLinkedList.iterator();  **while** (i.hasNext()){  System.***out***.println(**"Now visiting "** + i.next());  }  System.***out***.println(**"=============="**);  } } | Now visiting kolkata  Now visiting Chenni  Now visiting Delhi  Now visiting Mumbai  Now visiting kashmir  Now visiting Punjab  ==============  Now visiting kolkata  Now visiting Chenni  Now visiting Mumbai  Now visiting kashmir  Now visiting Punjab  ==============  Now visiting kolkata  Now visiting Chenni  Now visiting Simla  Now visiting Mumbai  Now visiting kashmir  Now visiting Punjab  ============== |

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| **package** com.company;  **import** java.util.ArrayList; **import** java.util.Iterator; **import** java.util.LinkedList; **import** java.util.ListIterator;  **public class** Main {   **public static void** main(String[] args) {  LinkedList<String> city = **new** LinkedList<String>();  *addInOrder*(city, **"Kolkata"**);  *addInOrder*(city, **"Chenni"**);  *addInOrder*(city, **"Delhi"**);  *addInOrder*(city, **"Mumbai"**);  *addInOrder*(city, **"Kashmir"**);  *addInOrder*(city, **"Punjab"**);   *printCities*(city);  }  *//printing the cities via linked list* **public static void** printCities(LinkedList<String> cityLinkedList){  Iterator<String> i = cityLinkedList.iterator();  **while** (i.hasNext()){  System.***out***.println(**"Now visiting "** + i.next());  }  System.***out***.println(**"=============="**);  }  *//finding the cities in alphabetical order* **public static boolean** addInOrder(LinkedList<String> linkedList, String newCity){  ListIterator<String> iterateString = linkedList.listIterator();  **while** (iterateString.hasNext()){  **int** comparison = iterateString.next().compareTo(newCity);  **if** (comparison == 0){  System.***out***.println(newCity + **" has already been added"**);  **return false**;  }**else if** (comparison > 0 ){  //pointer has moved next so, we can’tcompare it with the current one  iterateString.previous();  iterateString.add(newCity);  **return true**;  }**else** {  *//generally comes at the end of the list* }  }  iterateString.add(newCity);  **return true**;  } } | Now visiting Chenni  Now visiting Delhi  Now visiting Kashmir  Now visiting Kolkata  Now visiting Mumbai  Now visiting Punjab  compareTo()  0 = matched  >0 = smaller then the alphabet is pointed  <0 = greater then the alphabet is pointed |
| System.***out***.println(); *addInOrder*(city, **"Bihar"**); *addInOrder*(city, **"Delhi"**); *printCities*(city); | Delhi has already been added  Now visiting Bihar  Now visiting Chenni  Now visiting Delhi  Now visiting Kashmir  Now visiting Kolkata  Now visiting Mumbai  Now visiting Punjab |

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| **package** com.company;  **import** java.util.\*;  **public class** Main {   **public static void** main(String[] args) {  LinkedList<String> city = **new** LinkedList<String>();  *addInOrder*(city, **"Kolkata"**);  *addInOrder*(city, **"Chenni"**);  *addInOrder*(city, **"Delhi"**);  *addInOrder*(city, **"Mumbai"**);  *addInOrder*(city, **"Kashmir"**);  *addInOrder*(city, **"Punjab"**);   *printCities*(city);   *//add an new value* System.***out***.println();  *addInOrder*(city, **"Bihar"**);  *addInOrder*(city, **"Delhi"**);  *printCities*(city);   *//moving  movingThrough*(city);  }  *//printing the cities via linked list* **public static void** printCities(LinkedList<String> cityLinkedList){  Iterator<String> i = cityLinkedList.iterator();  **while** (i.hasNext()){  System.***out***.println(**"Now visiting "** + i.next());  }  System.***out***.println(**"=============="**);  }  *//finding the cities in alphabetical order* **public static boolean** addInOrder(LinkedList<String> linkedList, String newCity){  ListIterator<String> iterateString = linkedList.listIterator();  **while** (iterateString.hasNext()){  **int** comparison = iterateString.next().compareTo(newCity);  **if** (comparison == 0){  System.***out***.println(newCity + **" has already been added"**);  **return false**;  }**else if** (comparison > 0 ){  iterateString.previous();  iterateString.add(newCity);  **return true**;  }**else** {  *//generally comes at the end of the list* }  }  iterateString.add(newCity);  **return true**;  }  *//moving trhough the linked list* **public static void** movingThrough(LinkedList linkedCity){  Scanner scanner = **new** Scanner(System.***in***);  **boolean** x = **false**;  ListIterator<String> listIterator = linkedCity.listIterator();   **if** (linkedCity.getFirst() == **""**){  System.***out***.println(**"no cities are in the list"**);  **return**;  } **else** {  System.***out***.println(**"Now visiting "** + listIterator.next());  *printManu*();  }   **while** (!x){  **int** action = scanner.nextInt();  scanner.nextLine();  **switch** (action){  **case** 0:  System.***out***.println(**"no more holiday bitch"**);  x = **true**;  **break**;  **case** 1:  **if** (listIterator.hasNext()){  System.***out***.println(**"Now visiting"** + listIterator.next());  } **else** {  System.***out***.println(**"Reached the end of the list"**);  }  **break**;  **case** 2:  **if** (listIterator.hasPrevious()){  System.***out***.println(**"Now visiting"** + listIterator.previous());  } **else** {  System.***out***.println(**"Reached the end of the list"**);  }  **break**;  **case** 3:  System.***out***.println(**"Print menu"**);  *printManu*();  **break**;  }  }  }   **public static void** printManu(){  System.***out***.println(**"1. go to next city"**);  System.***out***.println(**"2. go to previous city"**);  System.***out***.println(**"3. get the city list"**);  }  } | Now visiting Chenni  Now visiting Delhi  Now visiting Kashmir  Now visiting Kolkata  Now visiting Mumbai  Now visiting Punjab  ==============  Delhi has already been added  Now visiting Bihar  Now visiting Chenni  Now visiting Delhi  Now visiting Kashmir  Now visiting Kolkata  Now visiting Mumbai  Now visiting Punjab  ==============  Now visiting Bihar  1. go to next city  2. go to previous city  3. get the city list  1  Now visitingChenni  1  Now visitingDelhi  1  Now visitingKashmir  1  Now visitingKolkata  2  Now visitingKolkata //SHOWING THE SAME ITEM TWICE  2  Now visitingKashmir  2  Now visitingDelhi  2  Now visitingChenni  2  Now visiting Chenni  Now visiting Delhi  Now visiting Kashmir  Now visiting Kolkata  Now visiting Mumbai  Now visiting Punjab  ==============  Delhi has already been added  Now visiting Bihar  Now visiting Chenni  Now visiting Delhi  Now visiting Kashmir  Now visiting Kolkata  Now visiting Mumbai  Now visiting Punjab  ==============  Now visiting Bihar  1. go to next city  2. go to previous city  3. get the city list  2  Now visitingBihar  2  Reached the end of the list  2  Now visitingBihar  1  Now visitingChenni  1  Now visitingDelhi  1  Now visitingKashmir  1  Now visitingKolkata  1  Now visitingMumbai  1  Now visitingPunjab  1  Reached the end of the list  0  no more holiday bitch |

Solving the problem here :

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| **package** com.company;  **import** java.util.\*;  **public class** Main {   **public static void** main(String[] args) {  LinkedList<String> city = **new** LinkedList<String>();  *addInOrder*(city, **"Kolkata"**);  *addInOrder*(city, **"Chenni"**);  *addInOrder*(city, **"Delhi"**);  *addInOrder*(city, **"Mumbai"**);  *addInOrder*(city, **"Kashmir"**);  *addInOrder*(city, **"Punjab"**);   *printCities*(city);   *//add an new value* System.***out***.println();  *addInOrder*(city, **"Bihar"**);  *addInOrder*(city, **"Delhi"**);  *printCities*(city);   *//moving  movingThrough*(city);  }  *//printing the cities via linked list* **public static void** printCities(LinkedList<String> cityLinkedList){  Iterator<String> i = cityLinkedList.iterator();  **while** (i.hasNext()){  System.***out***.println(**"Now visiting "** + i.next());  }  System.***out***.println(**"=============="**);  }  *//finding the cities in alphabetical order* **public static boolean** addInOrder(LinkedList<String> linkedList, String newCity){  ListIterator<String> iterateString = linkedList.listIterator();  **while** (iterateString.hasNext()){  **int** comparison = iterateString.next().compareTo(newCity);  **if** (comparison == 0){  System.***out***.println(newCity + **" has already been added"**);  **return false**;  }**else if** (comparison > 0 ){  iterateString.previous();  iterateString.add(newCity);  **return true**;  }**else** {  *//generally comes at the end of the list* }  }  iterateString.add(newCity);  **return true**;  }  *//moving trhough the linked list* **public static void** movingThrough(LinkedList linkedCity){  Scanner scanner = **new** Scanner(System.***in***);  **boolean** x = **false**;  **boolean** goingForward = **false**;  ListIterator<String> listIterator = linkedCity.listIterator();   **if** (linkedCity.getFirst() == **""**){  System.***out***.println(**"no cities are in the list"**);  **return**;  } **else** {  System.***out***.println(**"Now visiting "** + listIterator.next());  *printManu*();  }   **while** (!x){  **int** action = scanner.nextInt();  scanner.nextLine();  **switch** (action){  **case** 0:  System.***out***.println(**"no more holiday bitch"**);  x = **true**;  **break**;  **case** 1:  **if** (!goingForward){  **if** (listIterator.hasNext()){  listIterator.next();  }  goingForward = **true**;  }  **if** (listIterator.hasNext()){  System.***out***.println(**"Now visiting"** + listIterator.next());  } **else** {  System.***out***.println(**"Reached the end of the list"**);  goingForward = **false**;  }  **break**;  **case** 2:  **if** (goingForward){  **if** (listIterator.hasPrevious()){  listIterator.previous();  }  goingForward = **false**;  }  **if** (listIterator.hasPrevious()){  System.***out***.println(**"Now visiting"** + listIterator.previous());  } **else** {  System.***out***.println(**"Reached the top of the list"**);  goingForward = **true**;  }  **break**;  **case** 3:  System.***out***.println(**"Print menu"**);  *printManu*();  **break**;  }  }  }   **public static void** printManu(){  System.***out***.println(**"1. go to next city"**);  System.***out***.println(**"2. go to previous city"**);  System.***out***.println(**"3. get the city list"**);  } } | Now visiting Chenni  Now visiting Delhi  Now visiting Kashmir  Now visiting Kolkata  Now visiting Mumbai  Now visiting Punjab  ==============  Delhi has already been added  Now visiting Bihar  Now visiting Chenni  Now visiting Delhi  Now visiting Kashmir  Now visiting Kolkata  Now visiting Mumbai  Now visiting Punjab  ==============  Now visiting Bihar  1. go to next city  2. go to previous city  3. get the city list  1  Now visitingDelhi  1  Now visitingKashmir  1  Now visitingKolkata  2  Now visitingKashmir  2  Now visitingDelhi  1  Now visitingKashmir  1  Now visitingKolkata  1  Now visitingMumbai |