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| **package** com.company;  **import** java.util.Scanner;  **public class** Main {   **private static** Scanner *s* = **new** Scanner(System.***in***);  **private static int**[] *baseData* = **new int**[10];   **public static void** main(String[] args) {  Array\_List ob = **new** Array\_List();  ob.addGrocery(**"Milk"**);  ob.addGrocery(**"Sugar"**);  ob.addGrocery(**"Coffee"**);  ob.addGrocery(**"Beer"**);  ob.addGrocery(**"Rice"**);  ob.addGrocery(**"Honey"**);  ob.addGrocery(**"ENO"**);   ob.getList();   ob.modifyList(5, **"Wine"**);   ob.getList();   ob.removeItem(5);   ob.getList();   ob.findItem(**"Beer"**);   ob.findItem(**"Nudals"**);  } } | **package** com.company;  **import** java.util.ArrayList;  **public class** Array\_List {   *//arraylist* **private** ArrayList<String> **gross** = **new** ArrayList<String>();   **public void** addGrocery(String item){  **gross**.add(item);  }   **public void** getList(){  System.***out***.println(**"you have "** +**gross**.size()+ **" number of items"**);  **for** (**int** i=0; i < **gross**.size(); i++)  System.***out***.println((i+1) +**" Grocery is : "** + **gross**.get(i));  }   **public void** modifyList(**int** position, String item){  **int** posReal = position - 1;  **gross**.set(posReal, item);  System.***out***.println(**"grocery item "** + (position + 1) + **" is modified"**);  }   **public void** removeItem(**int** position){  **int** posReal = position - 1;  String it = **gross**.get(posReal);  **gross**.remove(it);  }   **public void** findItem(String item){  **boolean** b = **gross**.contains(item);   *//using index, to pull the element in the array  //if exists returns INDEX,  //or returns -1 if doesn't exists* **int** x = **gross**.indexOf(item);  **if** (x >= 0){  System.***out***.println(**"index found at : "** + (x+1));  } **else** {  System.***out***.println(**"index not found"**);  }  } } | you have 7 number of items  1 Grocery is : Milk  2 Grocery is : Sugar  3 Grocery is : Coffee  4 Grocery is : Beer  5 Grocery is : Rice  6 Grocery is : Honey  7 Grocery is : ENO  grocery item 6 is modified  you have 7 number of items  1 Grocery is : Milk  2 Grocery is : Sugar  3 Grocery is : Coffee  4 Grocery is : Beer  5 Grocery is : Wine  6 Grocery is : Honey  7 Grocery is : ENO  you have 6 number of items  1 Grocery is : Milk  2 Grocery is : Sugar  3 Grocery is : Coffee  4 Grocery is : Beer  5 Grocery is : Honey  6 Grocery is : ENO  index found at : 4  index not found |

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| **package** com.company;  **import** java.util.ArrayList; **import** java.util.Scanner;  **public class** Main {   **public static void** main(String[] args) {  Array\_List ob = **new** Array\_List();  ob.addGrocery(**"Milk"**);  ob.addGrocery(**"Sugar"**);  ob.addGrocery(**"Coffee"**);  ob.addGrocery(**"Beer"**);  ob.addGrocery(**"Rice"**);  ob.addGrocery(**"Honey"**);  ob.addGrocery(**"ENO"**);  ob.addGrocery(**"Honey"**);  ob.addGrocery(**"Snakes"**);   ob.getList();   ob.modifyList(5, **"Wine"**);   ob.getList();   ob.removeItem(5);   ob.getList();   ob.findItem(**"Beer"**);   ob.findItem(**"Nudals"**);   *//copy the list into array  //first getting an listArray* ArrayList<String> arrayList = **new** ArrayList<String>();  arrayList.addAll(ob.getGross());   *//declaring a new list* String[] grocery = **new** String[arrayList.size()];  *//converting an array list into an array,* grocery = ob.getGross().toArray(grocery);   **for** (**int** i=0; i< grocery.**length**; i++){  System.***out***.println(**"element "** + (i+1) +**" is : "** + grocery[i]);  }  } } | **package** com.company;  **import** java.util.ArrayList;  **public class** Array\_List {   *//arraylist* **private** ArrayList<String> **gross** = **new** ArrayList<String>();   **public** ArrayList<String> getGross() {  **return gross**;  }   **public void** addGrocery(String item){  **if** (!**gross**.contains(item)) *//avoiding duplication* **gross**.add(item);  **else** System.***out***.println(**"Already exists"**);  }   **public void** getList(){  System.***out***.println(**"you have "** +**gross**.size()+ **" number of items"**);  **for** (**int** i=0; i < **gross**.size(); i++)  System.***out***.println((i+1) +**" Grocery is : "** + **gross**.get(i));  }   **public void** modifyList(**int** position, String item){  **int** posReal = position - 1;  **gross**.set(posReal, item);  System.***out***.println(**"grocery item "** + (position + 1) + **" is modified"**);  }   **public void** removeItem(**int** position){  **int** posReal = position - 1;  String it = **gross**.get(posReal);  **gross**.remove(it);  }   **public void** findItem(String item){  **boolean** b = **gross**.contains(item);   *//using index, to pull the element in the array  //if exists returns INDEX,  //or returns -1 if doesn't exists* **int** x = **gross**.indexOf(item);  **if** (x >= 0){  System.***out***.println(**"index found at : "** + (x+1));  } **else** {  System.***out***.println(**"index not found"**);  }  } } | Already exists  you have 8 number of items  1 Grocery is : Milk  2 Grocery is : Sugar  3 Grocery is : Coffee  4 Grocery is : Beer  5 Grocery is : Rice  6 Grocery is : Honey  7 Grocery is : ENO  8 Grocery is : Snakes  grocery item 6 is modified  you have 8 number of items  1 Grocery is : Milk  2 Grocery is : Sugar  3 Grocery is : Coffee  4 Grocery is : Beer  5 Grocery is : Wine  6 Grocery is : Honey  7 Grocery is : ENO  8 Grocery is : Snakes  you have 7 number of items  1 Grocery is : Milk  2 Grocery is : Sugar  3 Grocery is : Coffee  4 Grocery is : Beer  5 Grocery is : Honey  6 Grocery is : ENO  7 Grocery is : Snakes  index found at : 4  index not found  element 1 is : Milk  element 2 is : Sugar  element 3 is : Coffee  element 4 is : Beer  element 5 is : Honey  element 6 is : ENO  element 7 is : Snakes |

***CHALLENGE :* MAIN**

**package** com.company;  
  
**import** java.util.Scanner;  
  
**public class** Main {  
 **private static** Scanner *scanner*;  
 **private static** MobilePhone *mobilePhone*;  
  
 **public** Main() {  
 }  
  
 **public static void** main(String[] args) {  
 **boolean** quit = **false**;  
 *startPhone*();  
 *printActions*();  
  
 **while**(!quit) {  
 System.***out***.println(**"\nEnter action: (6 to show available actions)"**);  
 **int** action = *scanner*.nextInt();  
 *scanner*.nextLine();  
 **switch**(action) {  
 **case** 0:  
 System.***out***.println(**"\nShutting down..."**);  
 quit = **true**;  
 **break**;  
 **case** 1:  
 *mobilePhone*.printContacts();  
 **break**;  
 **case** 2:  
 *addNewContact*();  
 **break**;  
 **case** 3:  
 *updateContact*();  
 **break**;  
 **case** 4:  
 *removeContact*();  
 **break**;  
 **case** 5:  
 *queryContact*();  
 **break**;  
 **case** 6:  
 *printActions*();  
 }  
 }  
  
 }  
  
 **private static void** addNewContact() {  
 System.***out***.println(**"Enter new contact name: "**);  
 String name = *scanner*.nextLine();  
 System.***out***.println(**"Enter phone number: "**);  
 String phone = *scanner*.nextLine();  
 Contact newContact = Contact.*createContact*(name, phone);  
 **if** (*mobilePhone*.addNewContact(newContact)) {  
 System.***out***.println(**"New contact added: name = "** + name + **", phone = "** + phone);  
 } **else** {  
 System.***out***.println(**"Cannot add, "** + name + **" already on file"**);  
 }  
  
 }  
  
 **private static void** updateContact() {  
 System.***out***.println(**"Enter existing contact name: "**);  
 String name = *scanner*.nextLine();  
 Contact existingContactRecord = *mobilePhone*.queryContact(name);  
 **if** (existingContactRecord == **null**) {  
 System.***out***.println(**"Contact not found."**);  
 } **else** {  
 System.***out***.print(**"Enter new contact name: "**);  
 String newName = *scanner*.nextLine();  
 System.***out***.print(**"Enter new contact phone number: "**);  
 String newNumber = *scanner*.nextLine();  
 Contact newContact = Contact.*createContact*(newName, newNumber);  
 **if** (*mobilePhone*.updateContact(existingContactRecord, newContact)) {  
 System.***out***.println(**"Successfully updated record"**);  
 } **else** {  
 System.***out***.println(**"Error updating record."**);  
 }  
  
 }  
 }  
  
 **private static void** removeContact() {  
 System.***out***.println(**"Enter existing contact name: "**);  
 String name = *scanner*.nextLine();  
 Contact existingContactRecord = *mobilePhone*.queryContact(name);  
 **if** (existingContactRecord == **null**) {  
 System.***out***.println(**"Contact not found."**);  
 } **else** {  
 **if** (*mobilePhone*.removeContact(existingContactRecord)) {  
 System.***out***.println(**"Successfully deleted"**);  
 } **else** {  
 System.***out***.println(**"Error deleting contact"**);  
 }  
  
 }  
 }  
  
 **private static void** queryContact() {  
 System.***out***.println(**"Enter existing contact name: "**);  
 String name = *scanner*.nextLine();  
 Contact existingContactRecord = *mobilePhone*.queryContact(name);  
 **if** (existingContactRecord == **null**) {  
 System.***out***.println(**"Contact not found."**);  
 } **else** {  
 System.***out***.println(**"Name: "** + existingContactRecord.getName() + **" phone number is "** + existingContactRecord.getPhoneNumber());  
 }  
 }  
  
 **private static void** startPhone() {  
 System.***out***.println(**"Starting phone..."**);  
 }  
  
 **private static void** printActions() {  
 System.***out***.println(**"\nAvailable actions:\npress"**);  
 System.***out***.println(**"0 - to shutdown\n1 - to print contacts\n2 - to add a new contact\n3 - to update existing an existing contact\n4 - to remove an existing contact\n5 - query if an existing contact exists\n6 - to print a list of available actions."**);  
 System.***out***.println(**"Choose your action: "**);  
 }  
  
 **static** {  
 *scanner* = **new** Scanner(System.***in***);  
 *mobilePhone* = **new** MobilePhone(**"0039 330 4404"**);  
 }  
}

**MobilePhone**

**package** com.company;  
  
  
**import** java.util.ArrayList;  
  
**public class** MobilePhone {  
 **private** String **myNumber**;  
 **private** ArrayList<Contact> **myContacts**;  
  
 **public** MobilePhone(String myNumber) {  
 **this**.**myNumber** = myNumber;  
 **this**.**myContacts** = **new** ArrayList();  
 }  
  
 **public boolean** addNewContact(Contact contact) {  
 **if** (**this**.findContact(contact.getName()) >= 0) {  
 System.***out***.println(**"Contact is already on file"**);  
 **return false**;  
 } **else** {  
 **this**.**myContacts**.add(contact);  
 **return true**;  
 }  
 }  
  
 **public boolean** updateContact(Contact oldContact, Contact newContact) {  
 **int** foundPosition = **this**.findContact(oldContact);  
 **if** (foundPosition < 0) {  
 System.***out***.println(oldContact.getName() + **", was not found."**);  
 **return false**;  
 } **else** {  
 **this**.**myContacts**.set(foundPosition, newContact);  
 System.***out***.println(oldContact.getName() + **", was replaced with "** + newContact.getName());  
 **return true**;  
 }  
 }  
  
 **public boolean** removeContact(Contact contact) {  
 **int** foundPosition = **this**.findContact(contact);  
 **if** (foundPosition < 0) {  
 System.***out***.println(contact.getName() + **", was not found."**);  
 **return false**;  
 } **else** {  
 **this**.**myContacts**.remove(foundPosition);  
 System.***out***.println(contact.getName() + **", was deleted."**);  
 **return true**;  
 }  
 }  
  
 **private int** findContact(Contact contact) {  
 **return this**.**myContacts**.indexOf(contact);  
 }  
  
 **private int** findContact(String contactName) {  
 **for**(**int** i = 0; i < **this**.**myContacts**.size(); ++i) {  
 Contact contact = (Contact)**this**.**myContacts**.get(i);  
 **if** (contact.getName().equals(contactName)) {  
 **return** i;  
 }  
 }  
  
 **return** -1;  
 }  
  
 **public** String queryContact(Contact contact) {  
 **return this**.findContact(contact) >= 0 ? contact.getName() : **null**;  
 }  
  
 **public** Contact queryContact(String name) {  
 **int** position = **this**.findContact(name);  
 **return** position >= 0 ? (Contact)**this**.**myContacts**.get(position) : **null**;  
 }  
  
 **public void** printContacts() {  
 System.***out***.println(**"Contact List"**);  
  
 **for**(**int** i = 0; i < **this**.**myContacts**.size(); ++i) {  
 System.***out***.println(i + 1 + **"."** + ((Contact)**this**.**myContacts**.get(i)).getName() + **" -> "** + ((Contact)**this**.**myContacts**.get(i)).getPhoneNumber());  
 }  
  
 }  
}

**CONTACT**

**package** com.company;  
  
**public class** Contact {  
 **private** String **name**;  
 **private** String **phoneNumber**;  
  
 **public** Contact(String name, String phoneNumber) {  
 **this**.**name** = name;  
 **this**.**phoneNumber** = phoneNumber;  
 }  
  
 **public** String getName() {  
 **return this**.**name**;  
 }  
  
 **public** String getPhoneNumber() {  
 **return this**.**phoneNumber**;  
 }  
  
 **public static** Contact createContact(String name, String phoneNumber) {  
 **return new** Contact(name, phoneNumber);  
 }  
}