

## DATA STRUCTURES – FALL 2021

### LAB 03



## Learning Outcomes

In this lab you are expected to learn the following:

- Generics
- ArrayList

## Objective

To understand Generics with ArrayList in JAVA and its operations in a practical perspective.



## Task 1:

You are familiar with **ArrayList** and have used it in different capacities. The most prominent feature of ArrayList is that it *expands automatically as elements are added to it*. It can be traversed using a for loop, for each loop and **iterator**( which you have implemented in Lab 2).

In this lab you are going to implement your own ArrayList and its functionalities.

**Task 1.1:** Create a class **Generic ArrayList** with attributes.

**Task 1.2:** Implement a **constructor** for your ArrayList class.

**Task 1.3:** Implement **add()** method for adding elements to ArrayList. Remember, ArrayList adds elements dynamically. It doesn't depend on user defined size.

**Task 1.4:** Implement **remove()** method for removing an element from a specific index. Remember, ArrayList stores elements in a consecutive sequence. If an element is removed from middle you have to re-adjust the elements in the correct sequence.

**Note:** Break down your implementation by defining helper methods for different tasks, rather than implementing your logic in a single method.

## Task 2:

Consider a scenario of **Contacts Database**, in which all information of user contacts will be stored. In the given scenario you have to implement your database of contacts using the **Generic ArrayList** you have created in Task 1.

### Steps to Follow:

#### Step 1:

In first step you have to create Contact class with the following attributes;

- First Name
- Last Name
- Phone Number
- Email Address

Add mutator and accessor methods for all given attributes

#### Step 2:

You have to create a menu consisting of the following functionalities;

1. Add a new contact
2. Display all contacts
3. Display specific contact
4. Delete a contact
5. Quit



## Output:

```
1)Add a new contact
2)Display all contacts
3)Display specific contact
4)Delete a contact
-1) Quit
Enter Your choice: 1
Enter first name: Don
Enter last name: Tom
Enter phone number: 123-456-7890
Enter Email address: DonTom@gmail.com

1)Add a new contact
2)Display all contacts
3)Display specific contact
4)Delete a contact
-1) Quit
Enter Your choice: 1
Enter first name: Josh
Enter last name: Krush
Enter phone number: 980-765-54321
Enter Email address: JoshKrush@yahoo.com

1)Add a new contact
2)Display all contacts
3)Display specific contact
4)Delete a contact
-1) Quit
Enter Your choice: 2
Tom Don; Phone number: 123-456-7890; Email: DonTom@gmail.com
Krush Josh; Phone number: 980-765-54321; Email: JoshKrush@yahoo.com

1)Add a new contact
2)Display all contacts
3)Display specific contact
4)Delete a contact
-1) Quit
Enter Your choice: 3
Enter an information piece about person:
Josh
Krush, Josh; Phone number: 980-765-54321; Email: JoshKrush@yahoo.com
```



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```
1)Add a new contact
2)Display all contacts
3)Display specific contact
4)Delete a contact
-1) Quit
Enter Your choice: 4
Enter an information piece about person:
Josh
Krush, Josh;                               Phone number: 980-765-54321; Email: JoshKrush@yahoo
o.com
Are you sure to delete contact? (Y/N)
y
Contact deleted successfully.
```

---

```
1)Add a new contact
2)Display all contacts
3)Display specific contact
4)Delete a contact
-1) Quit
Enter Your choice: 2
Tom Don; Phone number: 123-456-7890; Email: DonTom@gmail.com
```

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```
1)Add a new contact
2)Display all contacts
3)Display specific contact
4)Delete a contact
-1) Quit
Enter Your choice: -1
```

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