**Generic Types**

# Objective

* The objective of this lab is to understand the implementation of dynamic array using Generic class.

# Task

1. Build a program to implement generic Dynamic Array (in java.util package as ArrayList) where size of the array is resizable.

Class MyArrayList<T extends Comparable<T>>

{

T[] arr;

int currIndex;

MyArrayList() // default constructor to create an array

{

arr = (T[])new Comparable[10];

currIndex=-1;

}

MyArrayList(int size) // constructor to create an array

{

arr = (T[])new Comparable[size];

currIndex=-1;

}

public String toString(){ String str=””;

for(int i=0; i<arr.length;i++) str=str+arr[i]+”\n”;

return str;

}

**public void add (T data)** // method to add value in an array

{ // Assume the insertion is going to perform in the end,

// next to the last inserted location. If no available space

// then increases (doubles) the arr size to insert new value

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **23** | **56** | **12** | **44** | **22** |  |  |  | **. . .** |  |



lastInsertedIndex

}

length-1

# public int Find(T value)

{ … } // if the value found in array then return it’s index; otherwise return -1.

# public void clear(T value)

{ … } // make array empty (keep the size same).

# public T get(int index)

{ … } // return value at the index (if the index is valid)

# public void update(int index, T value)

{ … } // update value at the given index with the given value

# public void remove(T value)

{ … } // first find the value in an array then delete the value.

// delete through backward movement in an array.

}

2. Implement a Student class with variables like name, age and cgpa. Also, implement interface comparable for the Student class which allows comparing two instances of the class based on cgpa.

Also, implement toString method for the Student class which returns the student’s name, age and cgpa as a String.

Next, create a list of students using the MyArrayList class implemented above. Check if the find method of MyArrayList is working correctly. For this, insert a student with 3.5 cgpa in the list and find it using the find method.

3. Add a findMax method in the MyArrayList class. It will find the student with the best cgpa.