Java Workshop Lab File

Object Oriented Programming,Classes,Objects,Methods,Constructor

1. Create a class to calculate Area of circle with one data member to store the radius and another to store area value.

```
public class CircleArea
{ double
radius;
double area;
void setRadius(double r)
{ radius=r; } void
calculateArea()
{
area=Math.PI*radius*radius;
}
void displayArea()
{
System.out.println("Radius : "+radius);
System.out.println("Area of Circle : "+area);
} public static void main(String[]
args)
{
System.out.println("Mudit Billore");
System.out.println("Enrollment Number :
0873CS231069"); CircleArea circle=new CircleArea();
circle.setRadius(5.0); circle.calculateArea();
circle.displayArea();
}
}
```

```
Mudit Billore
Enrollment Number : 0873CS231069
Radius : 5.0
Area of Circle : 78.53981633974483
```

2. Create a class MathOpera on with two data member X and Y to store the operand and third data member R to store result of opera on.Create method members

- init - to input X and Y from user
- add - to add X and Y and store in R
- mul ply - to mul ply X and Y and store in R
- power - to calculate X Y and store in R
- display- to display Result R

```
import java.util.Scanner;
public class MathOperation
{ int x;
int y;
double r;
void
init()
{
Scanner sc=new Scanner(System.in);
System.out.print("Enter value of X: ");
x=sc.nextInt();
System.out.print("Enter value of Y: ");
y=sc.nextInt();
} void
add() {
r=x+y; }
void multiply()
{
r=x*y;
}
void power()
{
r=Math.pow(x,y);
}
void display()
{
System.out.println("Result: "+r);
} public static void main(String[]
args)
{
System.out.println("Mudit Billore");
System.out.println("Enrollment Number :
0873CS231069"); MathOperation mo=new
MathOperation(); mo.init(); mo.add(); mo.display();
mo.multiply(); mo.display(); mo.power(); mo.display();
}
```

```
}
```

```
Mudit Billore8
Enrollment Number : 0873CS231069
Enter value of X:
Enter value of Y:
Result: 8.0
Result: 15.0
Result: 125.0
```

3. Create a class MathOpera on containing method ‘mul ply’ to calculate mul plica on of following arguments.

a. two integers

b. three float

c. all elements of array

d. one double and one integer

```
public class MathOperation
{ void multiply(int a,int
b)
{
int result=a*b;
System.out.println("Multiplication of two integers:
"+result);
} void multiply(float a,float b,float
c)
{
float result=a*b*c;
System.out.println("Multiplication of three floats:
"+result);
} void multiply(int[]
arr)
{ int result=1; for(int
i=0;i<arr.length;i++)
{
result=result*arr[i];
}
System.out.println("Multiplication of array elements: "+result);
}
void multiply(double a,int b)
{
double result=a*b;
System.out.println("Multiplication of one double and one integer: "+result);
}
public static void main(String[] args)
{
System.out.println("Mudit Billore");
System.out.println("Enrollment Number :
0873CS231069"); MathOperation m=new
MathOperation(); m.multiply(5,4);
m.multiply(1.2f,3.4f,2.0f);
int[] arr={2,3,4};
m.multiply(arr);
m.multiply(5.5,3);
}
}
```

```
Mudit Billore
Enrollment Number : 0873CS231069
Multiplication of two integers: 20
Multiplication of three floats: 8.16
Multiplication of array elements: 24
Multiplication of one double and one integer: 16.5
```

4. Write a prog. to find prime numbers in an array.

```
public class PrimeInArray
{ boolean isPrime(int
n)
{ if(n<=1) return
false; for(int
i=2;i<=n/2;i++)
{ if(n%i==0) return false; } return
true; } public static void
main(String[] args)
{
System.out.println("Mudit Billore");
System.out.println("Enrollment Number :
0873CS231069"); int[] arr={3,4,5,6,7,8,9,11,13,15};
PrimeInArray obj=new PrimeInArray();
System.out.println("Prime numbers in the array:");
for(int i=0;i<arr.length;i++)
{
if(obj.isPrime(arr[i]))
System.out.println(arr[i]);
}
}
}
```

```
Mudit Billore
Enrollment Number : 0873CS231069
Prime numbers in the array:
3
5
7
11
13
```

Array List Programs

5. Write a Java program to create an ArrayList, add some colors (as strings), and print the collec on.

```
import java.util.ArrayList;
public class ColorList
{ public static void main(String[]
args)
{
System.out.println("Mudit Billore");
System.out.println("Enrollment Number :
0873CS231069"); ArrayList<String> colors=new
ArrayList<String>(); colors.add("Red");
colors.add("Blue"); colors.add("Green");
colors.add("Yellow"); colors.add("Purple");
System.out.println("Colors in the list:");
for(String color:colors)
{
System.out.println(color);
}
}
}
```

```
Mudit Billore
Enrollment Number : 0873CS231069
Colors in the list:
Red
Blue
Green
Yellow
Purple
```

6. Write a Java program to iterate through all elements in an ArrayList.

```
import java.util.ArrayList;
public class IterateArrayList
{ public static void main(String[]
args)
{
System.out.println("Mudit Billore");
System.out.println("Enrollment Number :
0873CS231069"); ArrayList<String> list=new
ArrayList<String>(); list.add("Apple"); list.add("Banana");

list.add("Cherry");
list.add("Date");
list.add("Elderberry");
System.out.println("Iterating through the ArrayList:");
for(String item:list)
{
System.out.println(item);
}
}
}
```

```
Mudit Billore
Enrollment Number : 0873CS231069
Iterating through the ArrayList:
Apple
Banana
Cherry
Date
Elderberry
```

7. Write a Java program to insert an element into the ArrayList at the first posi on.

```
import java.util.ArrayList;
public class
InsertAtFirstPosition
{ public static void main(String[]
args)
{
System.out.println("Mudit Billore");
System.out.println("Enrollment Number :
0873CS231069"); ArrayList<String> list=new
ArrayList<String>(); list.add("Banana");
list.add("Cherry"); list.add("Date"); list.add("Elderberry");
list.add(0,"Apple");
System.out.println("ArrayList after insertion at first position:");
for(String item:list)
{
System.out.println(item);
}
}
}
```

```
Mudit Billore
Enrollment Number : 0873CS231069
ArrayList after insertion at first position:
Apple
Banana
Cherry
Date
Elderberry
```

8. Write a Java program to retrieve an element at a specified index from a given ArrayList.

```
import java.util.ArrayList;
public class RetrieveElement
{ public static void main(String[]
args)
{
System.out.println("Mudit Billore");
System.out.println("Enrollment Number :
0873CS231069"); ArrayList<String> list=new
ArrayList<String>(); list.add("Apple"); list.add("Banana");
list.add("Cherry"); list.add("Date"); list.add("Elderberry");
int index=2;
String element=list.get(index);
System.out.println("Element at index "+index+": "+element);
}
}
```

```
Mudit Billore
Enrollment Number : 0873CS231069
Element at index 2: Cherry
```

9. Write a Java program to update an ArrayList element by a given element.

```
import java.util.ArrayList;
public class UpdateElement
{ public static void main(String[]
args)
{
System.out.println("Mudit Billore");
System.out.println("Enrollment Number :
0873CS231069"); ArrayList<String> list=new
ArrayList<String>(); list.add("Apple"); list.add("Banana");
list.add("Cherry"); list.add("Date"); list.add("Elderberry");
int index=1;
String newElement="Blueberry";
list.set(index,newElement);
System.out.println("ArrayList after update:");
for(String item:list)
{
System.out.println(item);
}
}
```

```
Mudit Billore
Enrollment Number : 0873CS231069
ArrayList after update:
Apple
Blueberry
Cherry
Date
Elderberry
```

10. Write a Java program to remove the third element from an ArrayList.

```
import java.util.ArrayList; public
class RemoveThirdElement
{ public static void main(String[]
args)
{
System.out.println("Mudit Billore");
System.out.println("Enrollment Number :
0873CS231069"); ArrayList<String> list=new
ArrayList<String>();

list.add("Apple");
list.add("Banana");
list.add("Cherry");
list.add("Date");
list.add("Elderberry");
list.remove(2);
System.out.println("ArrayList after removing third element:");
for(String item:list)
{
System.out.println(item);
}
}
}
```

```
Mudit Billore
Enrollment Number : 0873CS231069
ArrayList after removing third element:
Apple
Banana
Date
Elderberry
```

11. Write a Java program to search for an element in an ArrayList.

```
import java.util.ArrayList;
public class SearchElement
{
public static void main(String[] args)
{
System.out.println("Mudit Billore");
System.out.println("Enrollment Number :
0873CS231069"); ArrayList<String> list=new
ArrayList<String>(); list.add("Apple"); list.add("Banana");
list.add("Cherry"); list.add("Date"); list.add("Elderberry");
String searchElement="Cherry";
if(list.contains(searchElement))
System.out.println(searchElement+" is found in the ArrayList.");
else
System.out.println(searchElement+" is not found in the ArrayList.");
}
}
```

```
Mudit Billore
Enrollment Number : 0873CS231069
Cherry is found in the ArrayList.
```

12. Write a Java program to sort a given ArrayList.

```
import java.util.ArrayList;
import java.util.Collections;
public class SortArrayList
{ public static void main(String[]
args)
{
System.out.println("Mudit Billore");
System.out.println("Enrollment Number :
0873CS231069"); ArrayList<String> list=new
ArrayList<String>(); list.add("Banana"); list.add("Apple");
list.add("Date"); list.add("Cherry"); list.add("Elderberry");
Collections.sort(list);
System.out.println("Sorted ArrayList:");
for(String item:list)
{
System.out.println(item);
}
}
}
```

```
Mudit Billore
Enrollment Number : 0873CS231069
Sorted ArrayList:
Apple
Banana
Cherry
Date
Elderberry
```

13. Write a Java program to copy one array list into another.

```
import java.util.ArrayList;
public class CopyArrayList
{ public static void main(String[]
args)
{
System.out.println("Mudit Billore");
System.out.println("Enrollment Number :
0873CS231069"); ArrayList<String> list1=new
ArrayList<String>(); list1.add("Apple");
list1.add("Banana"); list1.add("Cherry");
ArrayList<String> list2=new ArrayList<String>(list1);
System.out.println("Elements of copied ArrayList:");
for(String item:list2)
{
System.out.println(item);
}
}
}
```

```
Mudit Billore
Enrollment Number : 0873CS231069
Elements of copied ArrayList:
Apple
Banana
Cherry
```

14. Write a Java program to shuffle elements in an array list.

```
import java.util.ArrayList;
import java.util.Collections;
public class ShuffleArrayList
{ public static void main(String[]
args)
{
System.out.println("Mudit Billore");
System.out.println("Enrollment Number :
0873CS231069"); ArrayList<String> list=new
ArrayList<String>(); list.add("Apple"); list.add("Banana");
list.add("Cherry"); list.add("Date"); list.add("Elderberry");
Collections.shuffle(list);
System.out.println("Shuffled ArrayList:");
for(String item:list)
{
System.out.println(item);
}
}
}
```

```
Mudit Billore
Enrollment Number : 0873CS231069
Shuffled ArrayList:
Cherry
Elderberry
Apple
Date
Banana
```

15. Write a Java program to reverse elements in an array list.

```
import java.util.ArrayList;
import java.util.Collections;
public class ReverseArrayList
{ public static void main(String[]
args)
{
System.out.println("Mudit Billore");
System.out.println("Enrollment Number :
0873CS231069"); ArrayList<String> list=new
ArrayList<String>(); list.add("Apple"); list.add("Banana");
list.add("Cherry"); list.add("Date"); list.add("Elderberry");
Collections.reverse(list);
System.out.println("Reversed ArrayList:");
for(String item:list)
{
System.out.println(item);
}
}
}
```

```
Mudit Billore
Enrollment Number : 0873CS231069
Reversed ArrayList:
Elderberry
Date
Cherry
Banana
Apple
```

16. Write a Java program to extract a por on of an array list.

```
import java.util.ArrayList;
import java.util.List;
public class ExtractPortion
{ public static void main(String[]
args)
{
System.out.println("Mudit Billore");
System.out.println("Enrollment Number :
0873CS231069"); ArrayList<String> list=new
ArrayList<String>(); list.add("Apple"); list.add("Banana");
list.add("Cherry"); list.add("Date"); list.add("Elderberry");
List<String> subList=list.subList(1,4);
System.out.println("Extracted portion of ArrayList:");
for(String item:subList)
{
System.out.println(item);
}
}
}
```

```
Mudit Billore
Enrollment Number : 0873CS231069
Extracted portion of ArrayList:
Banana
Cherry
Date
```

17. Write a Java program to compare two array lists.

```
import java.util.ArrayList;
public class CompareArrayLists
{ public static void main(String[]
args)
{
System.out.println("Mudit Billore");
System.out.println("Enrollment Number :
0873CS231069"); ArrayList<String> list1=new
ArrayList<String>(); list1.add("Apple");
list1.add("Banana"); list1.add("Cherry");
ArrayList<String> list2=new
ArrayList<String>(); list2.add("Apple");
list2.add("Banana"); list2.add("Cherry");
if(list1.equals(list2))
System.out.println("Both ArrayLists are equal.");
else
System.out.println("ArrayLists are not equal.");
}
}
```

```
Mudit Billore
Enrollment Number : 0873CS231069
Extracted portion of ArrayList:
Banana
Cherry
Date
```

18. Write a Java program that swaps two elements in an array list.

```
import java.util.ArrayList;
import java.util.Collections;
public class SwapElements
{ public static void main(String[]
args)
{
System.out.println("Mudit Billore");
System.out.println("Enrollment Number :
0873CS231069"); ArrayList<String> list=new
ArrayList<String>(); list.add("Apple"); list.add("Banana");
list.add("Cherry"); list.add("Date");
System.out.println("Before swapping:");
for(String item:list)
{
System.out.println(item);
}
Collections.swap(list,1,3);
System.out.println("After swapping elements at index 1 and 3:");
for(String item:list)
{
System.out.println(item);
}
}
}
```

```
Mudit Billore
Enrollment Number : 0873CS231069
Before swapping:
Apple
Banana
Cherry
Date
After swapping elements at index 1 and 3:
Apple
Date
Cherry
Banana
```

19. Write a Java program to join two array lists.

```
import java.util.ArrayList;
public class JoinArrayLists
{ public static void main(String[]
args)
{
System.out.println("Mudit Billore");
System.out.println("Enrollment Number :
0873CS231069"); ArrayList<String> list1=new
ArrayList<String>(); list1.add("Apple");
list1.add("Banana");
ArrayList<String> list2=new
ArrayList<String>(); list2.add("Cherry");
list2.add("Date"); list1.addAll(list2);
System.out.println("Joined ArrayList:");
for(String item:list1)
{
System.out.println(item);
}
}
}
```

```
Mudit Billore
Enrollment Number : 0873CS231069
Joined ArrayList:
Apple
Banana
Cherry
Date
```

20. Write a Java program to clone an array list to another array list.

```
import java.util.ArrayList;
public class CloneArrayList
{ public static void main(String[]
args)
{
System.out.println("Mudit Billore");
System.out.println("Enrollment Number :
0873CS231069"); ArrayList<String> list1=new
ArrayList<String>(); list1.add("Apple");
list1.add("Banana"); list1.add("Cherry");
ArrayList<String>
list2=(ArrayList<String>)list1.clone();
System.out.println("Cloned ArrayList:"); for(String
item:list2)
{
System.out.println(item);
}
}
}
```

```
Mudit Billore
Enrollment Number : 0873CS231069
Cloned ArrayList:
Apple
Banana
Cherry
```

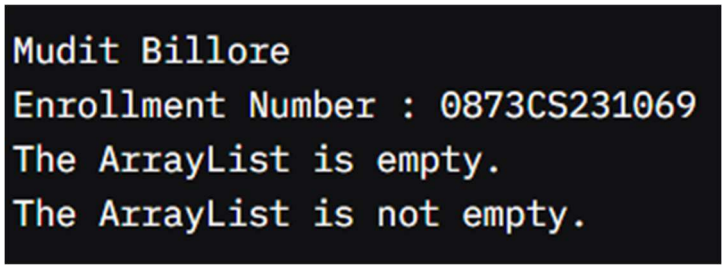
21. Write a Java program to empty an array list.

```
import java.util.ArrayList;
public class EmptyArrayList
{ public static void main(String[]
args)
{
System.out.println("Mudit Billore");
System.out.println("Enrollment Number :
0873CS231069"); ArrayList<String> list=new
ArrayList<String>(); list.add("Apple"); list.add("Banana");
list.add("Cherry");
System.out.println("ArrayList before emptying:");
for(String item:list)
{
System.out.println(item);
}
list.clear();
System.out.println("ArrayList after emptying:");
for(String item:list)
{
System.out.println(item);
}
}
}
```

```
Mudit Billore
Enrollment Number : 0873CS231069
ArrayList before emptying:
Apple
Banana
Cherry
ArrayList after emptying:
```

22. Write a Java program to test whether an array list is empty or not.

```
import java.util.ArrayList;
public class CheckEmpty
{ public static void main(String[]
args)
{
System.out.println("Mudit Billore");
System.out.println("Enrollment Number :
0873CS231069"); ArrayList<String> list=new
ArrayList<String>(); if(list.isEmpty())
System.out.println("The ArrayList is empty.");
else
System.out.println("The ArrayList is not
empty."); list.add("Apple"); if(list.isEmpty())
System.out.println("The ArrayList is empty.");
else
System.out.println("The ArrayList is not empty.");
}
}
```



23. Write a Java program for trimming the capacity of an array list.

```
import java.util.ArrayList;
public class TrimArrayList
{ public static void main(String[]
args)
{
System.out.println("Mudit Billore");
System.out.println("Enrollment Number :
0873CS231069"); ArrayList<String> list=new
ArrayList<String>(20); list.add("Apple");
list.add("Banana"); list.add("Cherry");
System.out.println("Size before trim: "+list.size());
list.trimToSize();
System.out.println("Size after trim: "+list.size());
for(String item:list)
{
System.out.println(item);
}
}
}
```

```
Mudit Billore
Enrollment Number : 0873CS231069
Size before trim: 3
Size after trim: 3
Apple
Banana
Cherry
```

24. Write a Java program to increase an array list size.

```
import java.util.ArrayList; public
class IncreaseArrayListSize
{ public static void main(String[]
args)
{
System.out.println("Mudit Billore");
System.out.println("Enrollment Number :
0873CS231069"); ArrayList<String> list=new
ArrayList<String>(); list.add("Apple"); list.add("Banana");
list.add("Cherry"); list.ensureCapacity(10);
list.add("Date"); list.add("Elderberry");
System.out.println("ArrayList after increasing capacity and adding elements:");
for(String item:list)
{
System.out.println(item);
}
}
}
```

```
Mudit Billore
Enrollment Number : 0873CS231069
ArrayList after increasing capacity and adding elements:
Apple
Banana
Cherry
Date
Elderberry
```

25. Write a Java program to replace the second element of an ArrayList with the specified element.

```
import java.util.ArrayList; public
class ReplaceSecondElement
{ public static void main(String[]
args)
{
System.out.println("Mudit Billore");
System.out.println("Enrollment Number :
0873CS231069"); ArrayList<String> list=new
ArrayList<String>(); list.add("Apple"); list.add("Banana");
list.add("Cherry");
System.out.println("Before replacing:");
for(String item:list)
{
System.out.println(item);
}
list.set(1,"Blueberry");
System.out.println("After replacing second element:");
for(String item:list)
{
System.out.println(item);
}
}
}
```

```
Mudit Billore
Enrollment Number : 0873CS231069
Before replacing:
Apple
Banana
Cherry
After replacing second element:
Apple
Blueberry
Cherry
```

26. Write a Java program to print all the elements of an ArrayList using the elements' posi on.

```
import java.util.ArrayList;
public class PrintUsingIndex
{ public static void main(String[]
args)
{
System.out.println("Mudit Billore");
System.out.println("Enrollment Number :
0873CS231069"); ArrayList<String> list=new
ArrayList<String>(); list.add("Apple"); list.add("Banana");
list.add("Cherry"); list.add("Date"); list.add("Elderberry");
System.out.println("Elements using index positions:");
for(int i=0;i<list.size();i++)
{
System.out.println("Element at index "+i+": "+list.get(i));
}
}
}
```

```
Mudit Billore
Enrollment Number : 0873CS231069
Elements using index positions:
Element at index 0: Apple
Element at index 1: Banana
Element at index 2: Cherry
Element at index 3: Date
Element at index 4: Elderberry
```

Linked List Programs

27. Write a Java program to append a specified element to the end of a linked list.

```
import java.util.LinkedList;
public class AppendElement
{ public static void main(String[]
args)
{
System.out.println("Mudit Billore");
System.out.println("Enrollment Number :
0873CS231069"); LinkedList<String> list=new
LinkedList<String>(); list.add("Apple");
list.add("Banana"); list.add("Cherry");
list.addLast("Date");
System.out.println("LinkedList after appending an element:");
for(String item:list)
{
System.out.println(item);
}
}
}
```

```
Mudit Billore
Enrollment Number : 0873CS231069
LinkedList after appending an element:
Apple
Banana
Cherry
Date
```

28. Write a Java program to iterate through all elements in a linked list.

```
import java.util.LinkedList;
public class IterateLinkedList
{ public static void main(String[]
args)
{
System.out.println("Mudit Billore");
System.out.println("Enrollment Number :
0873CS231069"); LinkedList<String> list=new
LinkedList<String>(); list.add("Apple");
list.add("Banana"); list.add("Cherry"); list.add("Date");
list.add("Elderberry");
System.out.println("Iterating through the LinkedList:");
for(String item:list)
{
System.out.println(item);
}
}
}
```

```
Mudit Billore
Enrollment Number : 0873CS231069
Iterating through the LinkedList:
Apple
Banana
Cherry
Date
Elderberry
```

29. Write a Java program to iterate through all elements star ng from a specified posi on in a linked list.

```
import java.util.LinkedList;
public class IterateFromPosition
{ public static void main(String[]
args)
{
System.out.println("Mudit Billore");
System.out.println("Enrollment Number :
0873CS231069"); LinkedList<String> list=new
LinkedList<String>(); list.add("Apple");
list.add("Banana"); list.add("Cherry"); list.add("Date");
list.add("Elderberry"); int startIndex=2;
System.out.println("Iterating from index "+startIndex+":");
for(int i=startIndex;i<list.size();i++)
{
System.out.println(list.get(i));
}
}
}
```

```
Mudit Billore
Enrollment Number : 0873CS231069
Iterating from index 2:
Cherry
Date
Elderberry
```

30. Write a Java program to iterate a linked list in reverse order.

```
import java.util.LinkedList;
import java.util.Iterator;
public class ReverseIterate
{ public static void main(String[]
args)
{
System.out.println("Mudit Billore");
System.out.println("Enrollment Number :
0873CS231069"); LinkedList<String> list=new
LinkedList<String>(); list.add("Apple");
list.add("Banana"); list.add("Cherry"); list.add("Date");
list.add("Elderberry");
Iterator<String> itr=list.descendingIterator();
System.out.println("LinkedList in reverse order:");
while(itr.hasNext())
{
System.out.println(itr.next());
}
}
}
```

```
Mudit Billore
Enrollment Number : 0873CS231069
LinkedList in reverse order:
Elderberry
Date
Cherry
Banana
Apple
```

31. Write a Java program to insert a specified element at a given posi on in a linked list.

```
import java.util.LinkedList;
public class InsertAtPosition
{ public static void main(String[]
args)
{
System.out.println("Mudit Billore");
System.out.println("Enrollment Number :
0873CS231069"); LinkedList<String> list=new
LinkedList<String>(); list.add("Apple");
list.add("Banana"); list.add("Cherry"); int position=1;
String element="Date"; list.add(position,element);
System.out.println("LinkedList after insertion:");
for(String item:list)
{
System.out.println(item);
}
}
}
```

```
Mudit Billore
Enrollment Number : 0873CS231069
LinkedList after insertion:
Apple
Date
Banana
Cherry
```

32. Write a Java program to insert elements at the first and last posi ons of a linked list.

```
import java.util.LinkedList;
public class InsertFirstLast
{ public static void main(String[]
args)
{
System.out.println("Mudit Billore");
System.out.println("Enrollment Number :
0873CS231069"); LinkedList<String> list=new
LinkedList<String>(); list.add("Banana");
list.add("Cherry"); list.addFirst("Apple");
list.addLast("Date");
System.out.println("LinkedList after inserting at first and last positions:");
for(String item:list)
{
System.out.println(item);
}
}
}
```

```
Mudit Billore
Enrollment Number : 0873CS231069
LinkedList after inserting at first and last positions:
Apple
Banana
Cherry
Date
```

Tree-Set Programs

33. Write a Java program to add all elements from one TreeSet to another TreeSet.

```
import java.util.TreeSet;
public class AddAllTreeSet
{ public static void main(String[]
args)
{
System.out.println("Mudit Billore");
System.out.println("Enrollment Number :
0873CS231069"); TreeSet<String> set1=new
TreeSet<String>(); set1.add("Apple"); set1.add("Banana");
set1.add("Cherry");
TreeSet<String> set2=new
TreeSet<String>(); set2.add("Date");
set2.add("Elderberry"); set2.addAll(set1);
System.out.println("Elements of second TreeSet after adding all from first:");
for(String item:set2)
{
System.out.println(item);
```

```
}
}
}
```

```
Mudit Billore
Enrollment Number : 0873CS231069
Elements of second TreeSet after adding all from first:
Apple
Banana
Cherry
Date
Elderberry
```

34. Write a Java program to display the elements of a TreeSet in reverse order.

```
import java.util.TreeSet;
import java.util.NavigableSet;
public class ReverseTreeSet
{ public static void main(String[]
args)
{
System.out.println("Mudit Billore");
System.out.println("Enrollment Number :
0873CS231069"); TreeSet<String> set=new
TreeSet<String>(); set.add("Apple"); set.add("Banana");
set.add("Cherry"); set.add("Date"); set.add("Elderberry");
NavigableSet<String> reverseSet=set.descendingSet();
System.out.println("TreeSet elements in reverse order:");
for(String item:reverseSet)
{
System.out.println(item);
}
}
}
```

```
Mudit Billore
Enrollment Number : 0873CS231069
TreeSet elements in reverse order:
Elderberry
Date
Cherry
Banana
Apple
```

35. Write a Java program to retrieve the first and last elements from a TreeSet.

```
import java.util.TreeSet;
public class FirstLastElement
{ public static void main(String[]
args)
{
System.out.println("Mudit Billore");
System.out.println("Enrollment Number :
0873CS231069"); TreeSet<String> set=new
TreeSet<String>(); set.add("Apple"); set.add("Banana");
set.add("Cherry"); set.add("Date"); set.add("Elderberry");
String first=set.first();
String last=set.last();
System.out.println("First element: "+first);
System.out.println("Last element: "+last);
}
}
```

```
Mudit Billore
Enrollment Number : 0873CS231069
First element: Apple
Last element: Elderberry
```

36. Write a Java program to clone a TreeSet into another TreeSet

```
import java.util.TreeSet;
public class CloneTreeSet
{ public static void main(String[]
args)
{
System.out.println("Mudit Billore");
System.out.println("Enrollment Number :
0873CS231069"); TreeSet<String> set1=new
TreeSet<String>(); set1.add("Apple"); set1.add("Banana");
set1.add("Cherry");
TreeSet<String> set2=(TreeSet<String>)set1.clone();
System.out.println("Cloned TreeSet elements:");
for(String item:set2)
{
System.out.println(item);
}
}
}
```

```
Mudit Billore
Enrollment Number : 0873CS231069
Cloned TreeSet elements:
Apple
Banana
Cherry
```

37. Write a Java program to count the number of elements in a TreeSet.

```
import java.util.TreeSet;
public class CountElements
{ public static void main(String[]
args)
{
System.out.println("Mudit Billore");
System.out.println("Enrollment Number :
0873CS231069"); TreeSet<String> set=new
TreeSet<String>(); set.add("Apple"); set.add("Banana");
set.add("Cherry"); set.add("Date"); set.add("Elderberry");
int count=set.size();
System.out.println("Number of elements in the TreeSet: "+count);
}
}
```

```
Mudit Billore
Enrollment Number : 0873CS231069
Number of elements in the TreeSet: 5
```

38. Write a Java program to compare two TreeSets.

```
import java.util.TreeSet;
public class CompareTreeSets
{ public static void main(String[]
args)
{
System.out.println("Mudit Billore");
System.out.println("Enrollment Number :
0873CS231069"); TreeSet<String> set1=new
TreeSet<String>(); set1.add("Apple"); set1.add("Banana");
set1.add("Cherry");
TreeSet<String> set2=new
TreeSet<String>(); set2.add("Apple");
set2.add("Banana"); set2.add("Cherry");
if(set1.equals(set2))
System.out.println("Both TreeSets are equal.");
else
System.out.println("TreeSets are not equal.");
}
}
```

```
Mudit Billore
Enrollment Number : 0873CS231069
Both TreeSets are equal.
```

Hash-Set Programs

39. Write a Java program to clone one HashSet into another.

```
import java.util.HashSet;
public class CloneHashSet
{ public static void main(String[]
args)
{
System.out.println("Mudit Billore");
System.out.println("Enrollment Number :
0873CS231069"); HashSet<String> set1=new
HashSet<String>(); set1.add("Apple");
set1.add("Banana"); set1.add("Cherry");
HashSet<String> set2=(HashSet<String>)set1.clone();
System.out.println("Cloned HashSet elements:");
for(String item:set2)
{
System.out.println(item);
}
}
}
```

```
Mudit Billore
Enrollment Number : 0873CS231069
Cloned HashSet elements:
Apple
Banana
Cherry
```

40. Write a Java program to convert a HashSet into an array.

```
import java.util.HashSet;
public class HashSetToArray
{ public static void main(String[]
args)
{
System.out.println("Mudit Billore");
System.out.println("Enrollment Number :
0873CS231069"); HashSet<String> set=new
HashSet<String>(); set.add("Apple"); set.add("Banana");
set.add("Cherry");
String[] array=new String[set.size()];
set.toArray(array);
System.out.println("Array elements from HashSet:");
for(String item:array)
{
System.out.println(item);
}
}
}
```

```
Mudit Billore
Enrollment Number : 0873CS231069
Array elements from HashSet:
Apple
Banana
Cherry
```

41. Write a Java program to convert a HashSet into a TreeSet.

```
import java.util.HashSet;
import java.util.TreeSet;
public class
HashSetToTreeSet
{ public static void main(String[]
args)
{
System.out.println("Mudit Billore");
System.out.println("Enrollment Number :
0873CS231069"); HashSet<String> hashSet=new
HashSet<String>(); hashSet.add("Banana");
hashSet.add("Apple"); hashSet.add("Cherry");
TreeSet<String> treeSet=new TreeSet<String>(hashSet);
System.out.println("Elements of TreeSet (sorted):");
for(String item:treeSet)
{
System.out.println(item);
}
}
}
```

```
Mudit Billore
Enrollment Number : 0873CS231069
Elements of TreeSet (sorted):
Apple
Banana
Cherry
```

42. Write a Java program to find numbers less than 7 in a TreeSet.

```
import java.util.TreeSet; public
class FindLessThanSeven
{ public static void main(String[]
args)
{
System.out.println("Mudit Billore");
System.out.println("Enrollment Number :
0873CS231069"); TreeSet<Integer> set=new
TreeSet<Integer>(); set.add(1); set.add(4); set.add(6);
set.add(8); set.add(10);
TreeSet<Integer> result=(TreeSet<Integer>)set.headSet(7);
System.out.println("Numbers less than 7 in the TreeSet:");
for(Integer num:result)
{
System.out.println(num);
}
}
}
```

```
Mudit Billore
Enrollment Number : 0873CS231069
Numbers less than 7 in the TreeSet:
1
4
6
```

43. Write a Java program to compare two HashSets.

```
import java.util.HashSet;
public class CompareHashSets
{ public static void main(String[]
args)
{
System.out.println("Mudit Billore");
System.out.println("Enrollment Number :
0873CS231069"); HashSet<String> set1=new
HashSet<String>(); set1.add("Apple");
set1.add("Banana"); set1.add("Cherry");
HashSet<String> set2=new
HashSet<String>(); set2.add("Apple");
set2.add("Banana"); set2.add("Cherry");
if(set1.equals(set2))
System.out.println("Both HashSets are equal.");
else
System.out.println("HashSets are not equal.");
}
}
```

```
Mudit Billore
Enrollment Number : 0873CS231069
Both HashSets are equal.
```

44. Write a Java program to retain common elements from two sets.

```
import java.util.HashSet; public
class RetainCommonElements
{ public static void main(String[]
args)
{
System.out.println("Mudit Billore");
System.out.println("Enrollment Number :
0873CS231069"); HashSet<String> set1=new
HashSet<String>(); set1.add("Apple");
set1.add("Banana"); set1.add("Cherry");
HashSet<String> set2=new
HashSet<String>(); set2.add("Banana");
set2.add("Cherry"); set2.add("Date");
set1.retainAll(set2);
System.out.println("Common elements:");
for(String item:set1)
{
System.out.println(item);
}
}
}
```

```
Mudit Billore
Enrollment Number : 0873CS231069
Common elements:
Banana
Cherry
```

45. Write a Java program to remove all elements from a HashSet.

```
import java.util.HashSet; public
class RemoveAllElements
{ public static void main(String[]
args)
{
System.out.println("Mudit Billore");
System.out.println("Enrollment Number :
0873CS231069"); HashSet<String> set=new
HashSet<String>(); set.add("Apple"); set.add("Banana");
set.add("Cherry");
System.out.println("HashSet before removing all elements:");
for(String item:set)
{
System.out.println(item);
}
set.clear();
System.out.println("HashSet after removing all
elements:"); if(set.isEmpty())
{
System.out.println("HashSet is empty.");
} else { for(String
item:set)
{
System.out.println(item);
}
}
}
}
```

```
Mudit Billore
Enrollment Number : 0873CS231069
HashSet before removing all elements:
Apple
Banana
Cherry
HashSet after removing all elements:
HashSet is empty.
```

Hash-Map Programs

46. Write a Java program to copy all mappings from one map to another.

```
import java.util.HashMap;
public class CopyMap
{ public static void main(String[]
args)
{
System.out.println("Mudit Billore");
System.out.println("Enrollment Number :0873CS231069");
HashMap<Integer,String> map1=new
HashMap<Integer,String>(); map1.put(1,"Apple");
map1.put(2,"Banana"); map1.put(3,"Cherry");
HashMap<Integer,String> map2=new HashMap<Integer,String>();
map2.putAll(map1);
System.out.println("Contents of second map after copying:");
for(Integer key:map2.keySet())
{
System.out.println(key+" : "+map2.get(key));
}
}
}
```

```
Mudit Billore
Enrollment Number : 0873CS231069
Contents of second map after copying:
1 : Apple
2 : Banana
3 : Cherry
```

47. Write a Java program to remove all key-value pairs from a map.

```
import java.util.HashMap;
public class ClearMap
{ public static void main(String[]
args)
{
System.out.println("Mudit Billore");
System.out.println("Enrollment Number : 0873CS231069");
HashMap<Integer,String> map=new
HashMap<Integer,String>(); map.put(1,"Apple");
map.put(2,"Banana"); map.put(3,"Cherry");
System.out.println("Map before clearing:");
for(Integer key:map.keySet())
{
System.out.println(key+" : "+map.get(key));
}
map.clear();
System.out.println("Map after clearing:");
if(map.isEmpty())
{
System.out.println("Map is empty.");
```

```
} else { for(Integer
key:map.keySet())
{
System.out.println(key+" : "+map.get(key));
}
}
}
}
```

```
Mudit Billore
Enrollment Number : 0873CS231069
Map before clearing:
1 : Apple
2 : Banana
3 : Cherry
Map after clearing:
Map is empty.
```

48. Write a Java program to check if a map is empty or contains key-value mappings.

```
import java.util.HashMap;
public class CheckMapEmpty
{ public static void main(String[]
args)
{
System.out.println("Mudit Billore");
System.out.println("Enrollment Number : 0873CS231069");
HashMap<Integer,String> map=new HashMap<Integer,String>();
if(map.isEmpty())
System.out.println("Map is empty.");
else
System.out.println("Map contains key-value
mappings."); map.put(1,"Apple"); if(map.isEmpty())
System.out.println("Map is empty.");
else
System.out.println("Map contains key-value mappings.");
}
}
```

```
Mudit Billore
Enrollment Number : 0873CS231069
Map is empty.
Map contains key-value mappings.
```

49. Write a Java program to create a shallow copy of a HashMap instance.

```
import java.u l.HashMap;
public class ShallowCopyHashMap
{
public sta c void main(String[] args)
{
System.out.println("Mudit Billore");
System.out.println("Enrollment Number : 0873CS231069");
HashMap<Integer,String> map1=new
HashMap<Integer,String>(); map1.put(1,"Apple");
map1.put(2,"Banana"); map1.put(3,"Cherry");
HashMap<Integer,String>
map2=(HashMap<Integer,String>)map1.clone();
System.out.println("Original HashMap:"); for(Integer
key:map1.keySet())
{
System.out.println(key+" : "+map1.get(key));
}
```

```
System.out.println("Shallow copied HashMap:");
for(Integer key:map2.keySet())
{
System.out.println(key+" : "+map2.get(key));
}
}
}
```

```
Mudit Billore
Enrollment Number : 0873CS231069
Original HashMap:
1 : Apple
2 : Banana
3 : Cherry
Shallow copied HashMap:
1 : Apple
2 : Banana
3 : Cherry
```

50. Write a Java program to test whether a specified key exists in the map.

```
import java.util.HashMap;
public class TestKeyExists
{ public static void main(String[]
args)
{
System.out.println("Mudit Billore");
System.out.println("Enrollment Number : 0873CS231069");
HashMap<Integer,String> map=new
HashMap<Integer,String>(); map.put(1,"Apple");
map.put(2,"Banana"); map.put(3,"Cherry"); int keyToTest=2;
if(map.containsKey(keyToTest))
System.out.println("Key "+keyToTest+" exists in the
map."); else
System.out.println("Key "+keyToTest+" does not exist in the map.");
}
}
```

```
Mudit Billore
Enrollment Number : 0873CS231069
Key 2 exists in the map.
```

Basic Java Programs

51. Find the result of following (accept values for variables used in right side of expression)

a. y=x 2 +3x-7 (print value of Z)

b. y=x++ + ++x (print value of x and y)

c. z= x++ - --y - --x + x++ (print value of x ,y and z)

d. z = x && y || !(x||y) (print value of Z)

```
import java.util.Scanner;
public class ExpressionResults
{ public static void main(String[]
args)
{
System.out.println("Mudit Billore");
System.out.println("Enrollment Number :
0873CS231069");
Scanner sc=new Scanner(System.in);
// a. y = x^2 + 3x - 7
```

```
System.out.println("Enter value for x (expression
a):"); int x1=sc.nextInt(); int z1=x1*x1 + 3*x1 - 7;
System.out.println("Z (expression a) : "+z1);
// b. y = x++ + ++x
System.out.println("Enter value for x (expression
b):"); int x2=sc.nextInt(); int y2=x2++ + ++x2;
System.out.println("x (expression b) : "+x2);
System.out.println("y (expression b) : "+y2);
// c. z = x++ - --y - --x + x++
System.out.println("Enter value for x (expression c):");
int x3=sc.nextInt();
System.out.println("Enter value for y (expression c):");
int y3=sc.nextInt();
int z3=x3++ - --y3 - --x3 + x3++;
System.out.println("x (expression c) : "+x3);
System.out.println("y (expression c) : "+y3);
System.out.println("z (expression c) : "+z3);
// d. z = x && y || !(x || y)
System.out.println("Enter boolean value for x (true/false) (expression d):");
boolean xb=sc.nextBoolean();
System.out.println("Enter boolean value for y (true/false) (expression
d):"); boolean yb=sc.nextBoolean(); boolean zb=xb && yb || !(xb || yb);
System.out.println("Z (expression d) : "+zb);
}
}
```

```
Mudit Billore
Enrollment Number : 0873CS231069
Enter value for x (expression a):
Z (expression a) : 33
Enter value for x (expression b):
x (expression b) : 7
y (expression b) : 12
Enter value for x (expression c):
Enter value for y (expression c):
x (expression c) : 6
y (expression c) : 2
z (expression c) : 2
Enter boolean value for x (true/false) (expression d):
Enter boolean value for y (true/false) (expression d):
Z (expression d) : false
```

52. In a company an employee is paid as under:
If his basic salary is less than Rs. 1500, then HRA = 10% of basic salary and DA=90% of basic salary. If his salary is either equal to or above Rs. 1500, then HRA = Rs. 500 and DA=98% of basic salary. If the employee's salary is input by the user write a program to find his gross salary. GS=Basic+DA+HRA

```
import java.util.Scanner;
public class GrossSalary
{ public static void main(String[]
args)
{
System.out.println("Mudit Billore");
System.out.println("Enrollment Number :
0873CS231069");
Scanner sc=new Scanner(System.in);
System.out.println("Enter basic
salary:"); double basic=sc.nextDouble();
double hra,da,gs; if(basic<1500)
{
hra=0.10*basic;
da=0.90*basic;
} else {
hra=500;
da=0.98*basic
;
}
gs=basic+hra+da;
System.out.println("Gross Salary : "+gs);
}
```

```
}
```

```
Mudit Billore
Enrollment Number : 0873CS231069
Enter basic salary:
Gross Salary : 4460.0
```