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(“Gunjan Jaiswal”);
System.out.println(“Enrollment Number : 0873CS231038”);
CircleArea circle=new CircleArea();
circle.setRadius(5.0);
circle.calculateArea();
circle.displayArea();
}
}
```

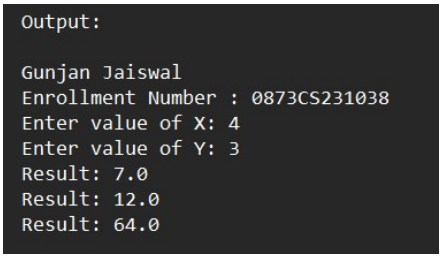
```
Output:

Gunjan Jaiswal
Enrollment Number : 0873CS231038
Radius : 5.0
Area of Circle : 78.53981633974483
```

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

- **init - to input X and Y from user**
- **add - to add X and Y and store in R**
- **multiply - to multiply 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("Gunjan Jaiswal");
System.out.println("Enrollment Number : 0873CS231038");
MathOperation mo=new MathOperation();
mo.init();
mo.add();
mo.display();
mo.multiply();
mo.display();
mo.power();
mo.display();
}
}
```



3. Create a class MathOperation containing method 'multiply' to calculate multiplication 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("Gunjan Jaiswal");
System.out.println("Enrollment Number : 0873CS231038");
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);
}
}
```

```
Output:

Gunjan Jaiswal
Enrollment Number : 0873CS231038
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(“Gunjan Jaiswal”);
System.out.println(“Enrollment Number : 0873CS231038”);
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]);
}
}
}
```

```
Output:

Gunjan Jaiswal
Enrollment Number : 0873CS231038
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 collection.

```
import java.util.ArrayList;
public class ColorList
{
public static void main(String[] args)
{
System.out.println(“Gunjan Jaiswal”);
System.out.println(“Enrollment Number : 0873CS231038”);
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);
}
}
}
```

```
Output:

Gunjan Jaiswal
Enrollment Number : 0873CS231038
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(“Gunjan Jaiswal”);
System.out.println(“Enrollment Number : 0873CS231038”);
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);
}
}
}
```

```
Output:

Gunjan Jaiswal
Enrollment Number : 0873CS231038
Iterating through the ArrayList:
Apple
Banana
Cherry
Date
Elderberry
```

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

```
import java.util.ArrayList;
public class InsertAtFirstPosition
{
public static void main(String[] args)
{
System.out.println(“Gunjan Jaiswal”);
System.out.println(“Enrollment Number : 0873CS231038”);
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);
}
}
}
```

```
Output:

Gunjan Jaiswal
Enrollment Number : 0873CS231038
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(“Gunjan Jaiswal”);
System.out.println(“Enrollment Number : 0873CS231038”);
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);
}
}
```

```
Output:

Gunjan Jaiswal
Enrollment Number : 0873CS231038
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(“Gunjan Jaiswal”);
System.out.println(“Enrollment Number : 0873CS231038”);
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);
}
}
```

```
Output:

Gunjan Jaiswal
Enrollment Number : 0873CS231038
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(“Gunjan Jaiswal”);
System.out.println(“Enrollment Number : 0873CS231038”);
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);
}
}
}
```

```
Output:

Gunjan Jaiswal
Enrollment Number : 0873CS231038
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(“Gunjan Jaiswal”);
System.out.println(“Enrollment Number : 0873CS231038”);
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.");
}
}
```

```
Output:

Gunjan Jaiswal
Enrollment Number : 0873CS231038
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(“Gunjan Jaiswal”);
System.out.println(“Enrollment Number : 0873CS231038”);
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);
}
}
}
```

```
Gunjan Jaiswal
Enrollment Number : 0873CS231038
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(“Gunjan Jaiswal”);
System.out.println(“Enrollment Number : 0873CS231038”);
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);
}
}
}
```

```
Gunjan Jaiswal
Enrollment Number : 0873CS231038
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(“Gunjan Jaiswal”);
System.out.println(“Enrollment Number : 0873CS231038”);
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);
}
}
}
```

```
Gunjan Jaiswal
Enrollment Number : 0873CS231038
Shuffled ArrayList:
Banana
Elderberry
Apple
Date
Cherry
```

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(“Gunjan Jaiswal”);
System.out.println(“Enrollment Number : 0873CS231038”);
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);
}
}
}
```

```
Gunjan Jaiswal
Enrollment Number : 0873CS231038
Reversed ArrayList:
Elderberry
Date
Cherry
Banana
Apple
```

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

```
import java.util.ArrayList;
import java.util.List;
public class ExtractPortion
{
public static void main(String[] args)
{
System.out.println(“Gunjan Jaiswal”);
System.out.println(“Enrollment Number : 0873CS231038”);
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);
}
}
}
```

```
Gunjan Jaiswal
Enrollment Number : 0873CS231038
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(“Gunjan Jaiswal”);
System.out.println(“Enrollment Number : 0873CS231038”);
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.");
}
}
```

```
Gunjan Jaiswal
Enrollment Number : 0873CS231038
Both ArrayLists are equal.
```

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(“Gunjan Jaiswal”);
System.out.println(“Enrollment Number : 0873CS231038”);
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);
}
}
}
```

```
Gunjan Jaiswal
Enrollment Number : 0873CS231038
Before swapping:
Apple
Banana
Cherry
Date
After swapping elements at index 1 and 3:
Apple
Date
Cherry
Banana
```

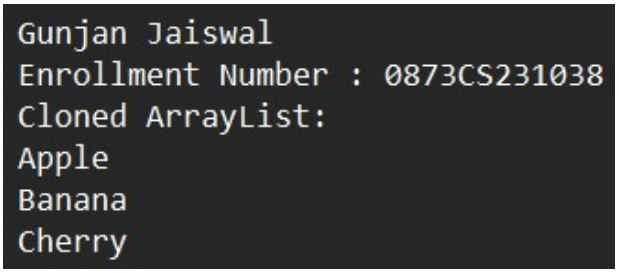
19. Write a Java program to join two array lists.

```
import java.util.ArrayList;
public class JoinArrayLists
{
public static void main(String[] args)
{
System.out.println(“Gunjan Jaiswal”);
System.out.println(“Enrollment Number : 0873CS231038”);
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);
}
}
}
```

```
Gunjan Jaiswal
Enrollment Number : 0873CS231038
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(“Gunjan Jaiswal”);
System.out.println(“Enrollment Number : 0873CS231038”);
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);
}
}
}
```



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(“Gunjan Jaiswal”);
System.out.println(“Enrollment Number : 0873CS231038”);
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);
}
}
}
```

```
Gunjan Jaiswal
Enrollment Number : 0873CS231038
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(“Gunjan Jaiswal”);
System.out.println(“Enrollment Number : 0873CS231038”);
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.");
}
}
```

```
Gunjan Jaiswal
Enrollment Number : 0873CS231038
The ArrayList is empty.
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(“Gunjan Jaiswal”);
System.out.println(“Enrollment Number : 0873CS231038”);
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);
}
}
}
```

```
Gunjan Jaiswal
Enrollment Number : 0873CS231038
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(“Gunjan Jaiswal”);
System.out.println(“Enrollment Number : 0873CS231038”);
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);
}
}
}
```

```
Gunjan Jaiswal
Enrollment Number : 0873CS231038
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(“Gunjan Jaiswal”);
System.out.println(“Enrollment Number : 0873CS231038”);
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);
}
}
}
```

```
Gunjan Jaiswal
Enrollment Number : 0873CS231038
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' position.

```
import java.util.ArrayList;
public class PrintUsingIndex
{
public static void main(String[] args)
{
System.out.println(“Gunjan Jaiswal”);
System.out.println(“Enrollment Number : 0873CS231038”);
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));
}
}
}
```

```
Gunjan Jaiswal
Enrollment Number : 0873CS231038
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
```

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(“Gunjan Jaiswal”);
System.out.println(“Enrollment Number : 0873CS231038”);
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);
}
}
}
```

```
Gunjan Jaiswal
Enrollment Number : 0873CS231038
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(“Gunjan Jaiswal”);
System.out.println(“Enrollment Number : 0873CS231038”);
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);
}
}
}
```

```
Gunjan Jaiswal
Enrollment Number : 0873CS231038
Iterating through the LinkedList:
Apple
Banana
Cherry
Date
Elderberry
```

29. Write a Java program to iterate through all elements starting from a specified position in a linked list.

```
import java.util.LinkedList;
public class IterateFromPosition
{
public static void main(String[] args)
{
System.out.println(“Gunjan Jaiswal”);
System.out.println(“Enrollment Number : 0873CS231038”);
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));
}
}
}
```

```
Gunjan Jaiswal
Enrollment Number : 0873CS231038
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(“Gunjan Jaiswal”);
System.out.println(“Enrollment Number : 0873CS231038”);
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());
}
}
}
```

```
Gunjan Jaiswal
Enrollment Number : 0873CS231038
LinkedList in reverse order:
Elderberry
Date
Cherry
Banana
Apple
```

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

```
import java.util.LinkedList;
public class InsertAtPosition
{
public static void main(String[] args)
{
System.out.println(“Gunjan Jaiswal”);
System.out.println(“Enrollment Number : 0873CS231038”);
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);
}
}
}
```

```
Gunjan Jaiswal
Enrollment Number : 0873CS231038
LinkedList after insertion:
Apple
Date
Banana
Cherry
```

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

```
import java.util.LinkedList;
public class InsertFirstLast
{
public static void main(String[] args)
{
System.out.println(“Gunjan Jaiswal”);
System.out.println(“Enrollment Number : 0873CS231038”);
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);
}
}
}
```

```
Gunjan Jaiswal
Enrollment Number : 0873CS231038
LinkedList after inserting at first and last positions:
Apple
Banana
Cherry
Date
```

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(“Gunjan Jaiswal”);
System.out.println(“Enrollment Number : 0873CS231038”);
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);
}
}
}
```

```
Gunjan Jaiswal
Enrollment Number : 0873CS231038
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(“Gunjan Jaiswal”);
System.out.println(“Enrollment Number : 0873CS231038”);
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);
}
}
}
```

```
Gunjan Jaiswal
Enrollment Number : 0873CS231038
TreeSet elements in reverse order:
Elderberry
Date
Cherry
Banana
Apple
```

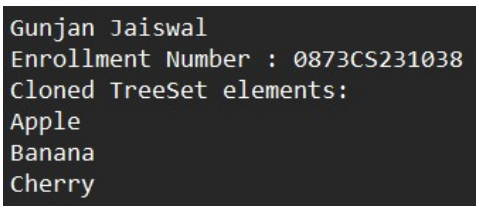
35. Write a Java program to retrieve the first and last elements from a TreeSet.

```
import java.util.TreeSet;
public class FirstLastElement
{
public static void main(String[] args)
{
System.out.println(“Gunjan Jaiswal”);
System.out.println(“Enrollment Number : 0873CS231038”);
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);
}
}
```

```
Gunjan Jaiswal
Enrollment Number : 0873CS231038
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(“Gunjan Jaiswal”);
System.out.println(“Enrollment Number : 0873CS231038”);
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);
}
}
}
```



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(“Gunjan Jaiswal”);
System.out.println(“Enrollment Number : 0873CS231038”);
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);
}
}
```

```
Gunjan Jaiswal
Enrollment Number : 0873CS231038
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(“Gunjan Jaiswal”);
System.out.println(“Enrollment Number : 0873CS231038”);
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.");
}
}
```

```
Gunjan Jaiswal
Enrollment Number : 0873CS231038
Both TreeSets are equal.
```

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(“Gunjan Jaiswal”);
System.out.println(“Enrollment Number : 0873CS231038”);
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);
}
}
}
```

```
Gunjan Jaiswal
Enrollment Number : 0873CS231038
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(“Gunjan Jaiswal”);
System.out.println(“Enrollment Number : 0873CS231038”);
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);
}
}
}
```

```
Gunjan Jaiswal
Enrollment Number : 0873CS231038
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(“Gunjan Jaiswal”);
System.out.println(“Enrollment Number : 0873CS231038”);
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);
}
}
}
```

```
Gunjan Jaiswal
Enrollment Number : 0873CS231038
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(“Gunjan Jaiswal”);
System.out.println(“Enrollment Number : 0873CS231038”);
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);
}
}
}
```

```
Gunjan Jaiswal
Enrollment Number : 0873CS231038
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(“Gunjan Jaiswal”);
System.out.println(“Enrollment Number : 0873CS231038”);
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.");
}
}
```

```
Gunjan Jaiswal
Enrollment Number : 0873CS231038
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(“Gunjan Jaiswal”);
System.out.println(“Enrollment Number : 0873CS231038”);
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);
}
}
}
```

```
Gunjan Jaiswal
Enrollment Number : 0873CS231038
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(“Gunjan Jaiswal”);
System.out.println(“Enrollment Number : 0873CS231038”);
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);
}
}
}
}
```

```
Gunjan Jaiswal
Enrollment Number : 0873CS231038
HashSet before removing all elements:
Apple
Banana
Cherry
HashSet after removing all elements:
HashSet is empty.
```

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(“Gunjan Jaiswal”);
System.out.println(“Enrollment Number : 0873CS231038”);
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));
}
}
}
```

```
Gunjan Jaiswal
Enrollment Number : 0873CS231038
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(“Gunjan Jaiswal”);
System.out.println(“Enrollment Number : 0873CS231038”);
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));
}
}
}
}
```

```
Gunjan Jaiswal
Enrollment Number : 0873CS231038
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(“Gunjan Jaiswal”);
System.out.println(“Enrollment Number : 0873CS231038”);
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.");
}
}
```

```
Gunjan Jaiswal
Enrollment Number : 0873CS231038
Map is empty.
Map contains key-value mappings.
```

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

```
import java.util.HashMap;
public class ShallowCopyHashMap
{
public static void main(String[] args)
{
System.out.println(“Gunjan Jaiswal”);
System.out.println(“Enrollment Number : 0873CS231038”);
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));
}
}
}
```

```
Gunjan Jaiswal
Enrollment Number : 0873CS231038
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(“Gunjan Jaiswal”);
System.out.println(“Enrollment Number : 0873CS231038”);
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.");
}
}
```

```
Gunjan Jaiswal
Enrollment Number : 0873CS231038
Key 2 exists in the map.
```

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("Gunjan Jaiswal");
System.out.println("Enrollment Number : 0873CS231038");
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);
```

```
}
}
```

```
Mayank Aylani
Enrollment No : 0873CS231065
Enter value for x (expression a):
2
Z (expression a) : 3
Enter value for x (expression b):
5
x (expression b) : 7
y (expression b) : 12
Enter value for x (expression c):
6
Enter value for y (expression c):
4
x (expression c) : 7
y (expression c) : 3
z (expression c) : 3
Enter boolean value for x (true/false) (expression d):
false
Enter boolean value for y (true/false) (expression d):
false
Z (expression d) : true
```

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(“Gunjan Jaiswal”);
System.out.println(“Enrollment Number : 0873CS231038”);
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);
}
}
```

```
Mayank Aylani
Enrollment No : 0873CS231065
Enter basic salary:
50000
Gross Salary : 99500.0
```