

W10_COMPUTER PROGRAMMING 2019 SPRING

W10 Advanced data structures: String tokeniser, StringBuffer, list, arraylist, vector, linkedlist, que classes

We will use the class IO

```
import java.util.*;
import javax.swing.*;
import java.awt.Font;
class IO
{ static Scanner input = new Scanner( System.in );
  //change font and size for JOptionPane class, //example font "Arial"
  //example size 14
  public static void setOptionPane(String font,int size)
  { UIManager.put("OptionPane.messageFont", new Font(font, Font.PLAIN, size)); }
  //array input
  public static double[] Dinput()
  { String s1=JOptionPane.showInputDialog("input double vector");
    StringTokenizer token=new StringTokenizer(s1);
    int n=token.countTokens()-1;
    int m=n+1;
    double a[]=new double[m];
    int j=0;
    while(token.hasMoreTokens())
    {
      Double ax=new Double(token.nextToken());
      a[j++]=ax.doubleValue();
    }
    return a;
  }

  public static double[][] Dinput(int n)
  { double c[][]=new double[n][];
    for(int i=0;i<n;i++)
    { c[i]=Dinput(); }
    return c;
  }

  public static int[] Iinput()
  { String s1=JOptionPane.showInputDialog("input int vector");
    StringTokenizer token=new StringTokenizer(s1);
    int n=token.countTokens()-1;
    int m=n+1;
    int a[]=new int[m];
    int j=0;
    while(token.hasMoreTokens())
    {
      Integer ax=new Integer(token.nextToken());
      a[j++]=ax.intValue();
    }
    return a;
  }

  public static int[][] Iinput(int n)
  { int c[][]=new int[n][];
    for(int i=0;i<n;i++)
    { c[i]=Iinput(); }
    return c;
  }

  public static String[] input()
  { String s1=JOptionPane.showInputDialog("input String vector");
    StringTokenizer token=new StringTokenizer(s1);
    int n=token.countTokens()-1;
    int m=n+1;
    String a[]=new String[m];
    int j=0;
    while(token.hasMoreTokens())
    {
      String ax=new String(token.nextToken());
      a[j++]=ax;
    }
    return a;
  }

  public static String[][] input(int n)
  { String c[][]=new String[n][];
    for(int i=0;i<n;i++)
```

```

{c[i]=input();}
return c;
}
public static String toString(double a[],int n)
{ Locale us=new Locale("us");
String s1="[";
for(int i=0;i<a.length;i++)
{ s1+=String.format(us,"%"+n+"f",a[i]);}
s1+="]\n";
return s1;
}
public static String toString(int a[],int n)
{String s1="[";
for(int i=0;i<a.length;i++)
{ s1+=String.format("%"+n+"d",a[i]);}
s1+="]\n";
return s1;
}

public static String toString(String a[],int n)
{String s1="[";
for(int i=0;i<a.length;i++)
{ s1+=String.format("%"+n+"s",a[i]);}
s1+="]\n";
return s1;
}

public static String toString(double a[][],int n)
{ String s1="";
for(int i=0;i<a.length;i++)
{ s1+=toString(a[i],n);}
return s1;
}

public static String toString(int a[][],int n)
{ String s1="";
for(int i=0;i<a.length;i++)
{ s1+=toString(a[i],n);}
return s1;
}

public static String toString(String a[][],int n)
{ String s1="";
for(int i=0;i<a.length;i++)
{ s1+=toString(a[i],n);}
return s1;
}

public static<E> String toString(Collection<E> c)
{ String s="";
Iterator<E> i=c.iterator();
while(i.hasNext()) {s+=i.next()+"\n";}
return s;
}

public static void print(String s)
{JOptionPane.showMessageDialog(null,s);}

public static void Cprint(String s)
{System.out.print(s);}

public static void Cprintln(String s)
{System.out.println(s);}

public static double DCinput(String s)
{ System.out.print(s);
return Double.parseDouble(input.next());}

public static int ICinput(String s)
{ Cprint(s);return input.nextInt();}

public static String Cinput(String s)
{ Cprint(s);return input.next();}

public static double Dinput(String s)

```

```

{ double x=0;
try{
x=Double.parseDouble(JOptionPane.showInputDialog(s));
} catch(NumberFormatException e) {System.out.println("number format exception");}
return x;
}
public static int linput(String s)
{ int x=0;
try{
x=Integer.parseInt(JOptionPane.showInputDialog(s));
} catch(NumberFormatException e) {System.out.println("number format exception");}
return x;
}

public static String input(String s)
{ return JOptionPane.showInputDialog(s);}
}

```

EX 1: using IO with StringTokenizer

```

public class W10E1
{public static void main(String arg[])
{double a[]=IO.Dinput();
IO.print(IO.toString(a,10));
}}

```

```

public class W10E1b
{public static void main(String arg[])
{String a[]=IO.input();
IO.print(IO.toString(a,10));
}
}

```

```

public class W10E1c
{//input a matrix
public static void main(String arg[])
{double a[][]=IO.Dinput(2);
IO.print(IO.toString(a,10));
}
}

```

EX2: StringTokenizer

```

import java.io.*;
import java.util.*;
public class W10E2
{ public static void main(String arg[])
{
String s="Once upon a time in a country far far away";
String s1="";
s1+="sentence : "+s+"\n";
StringTokenizer t=new StringTokenizer(s);
s1+="word count : "+t.countTokens()+"\n";
int i=0;
while(t.hasMoreTokens())
{s1+="word index : "+(i++)+" word : "+t.nextToken()+"\n";}
IO.print(s1);
}
}

```

EX2a: Your own program similar to StringTokenizer class

```

public class W10E2a
{
public static int countcharacters(char a,String s)
{
int n=s.length();
int number=0;
for(int i=0;i<n;i++)
{if(s.charAt(i)==a) number++;}
return number;
}
public static String[] word(char a,String s)
{
int nn=countcharacters(a,s);
}
}

```

```

int n=s.length();
String s1[]=new String[nn+1];
String s2="";
int j=0;
for(int i=0;i<n;i++)
{if(s.charAt(i)==a) {s1[j]=s2;s2="";j++;}
else {s2+=s.charAt(i);}
}
s1[nn]=s2;
return s1;
}

public static String[] word(String s)
{
char a=' ';
return word(a,s);
}

public static String toString(String s[])
{int n=s.length;
String ss="";
for(int i=0;i<n;i++)
{ss+="i = "+i+" "+s[i]+"n";}
return ss;
}

public static void main(String arg[])
{
String s="Once upon a time in a country far far away";
String s1="sentence : "+s+"n";
s1+="number of characters = "+countcharacters(' ',s)+"n";
String s2[]=word(s);
s1+=toString(s2);
IO.print(s1);
}
}

```

EX3 STRINGBUFFER CLASS

```

public class W10E3
{
    public static String reverseIt(String source) {
        int i, len = source.length();
        StringBuffer dest = new StringBuffer(len);
        for (i = (len - 1); i >= 0; i--) {
            dest.append(source.charAt(i));
        }
        return dest.toString();
    }

    public static void main(String arg[])
    { String s=IO.input("enter a string");
      IO.print(reverseIt(s));
    }
}

```

EX4 Array List and Collections

```

import java.util.*;
public class W10E4
{
    public static void main(String args[])
    {
        ArrayList<Integer> a=new ArrayList<Integer>();
        for(int i=0;i<5;i++)
        {int sayi=((int)(Math.random()*100));
          a.add(new Integer(sayi));
        }
        String s1="Array List class";
        String s=IO.toString(a);
        s+="sorted listn";
        Collections.sort(a);
        s+=IO.toString(a);
    }
}

```

```

s+="reverse list\n";
Collections.reverse(a);
s+=IO.toString(a);
s+="mixed list\n";
Collections.shuffle(a);
s+=IO.toString(a);
IO.print(s);
}}

```

```

import java.util.*;

public class W10E4a
{
    public static void main(String args[])
    {
        ArrayList<Double> a=new ArrayList<Double>();
        for(int i=0;i<5;i++)
        {double sayi=(int)(Math.random()*100);
        a.add(new Double(sayi));
        }
        String s1="Array List class";
        String s="";
        for (int i=0, n=a.size(); i < n; i++) {s+=a.get(i)+"\n";};
        IO.print(s);
    }
}

```

```

import java.util.*;
import java.util.function.Predicate;

public class W10E4c
{
    public static void main(String [] arg) {
        ArrayList<Integer> list =new ArrayList<Integer>();
        int sayi;
        for(int i=0;i<10;i++)
        {sayi=(int)(20*Math.random());
        list.add(new Integer(sayi));
        }
        String s="Print all numbers:\n";
        s+=evaluate(list, (n)->true)+"\n";
        s+="Print no numbers:";
        s+=evaluate(list, (n)->false)+"\n";
        s+="Print even numbers:\n";
        s+=evaluate(list, (n)-> n%2 == 0 )+"\n";
        s+="Print odd numbers:\n";
        s+=evaluate(list, (n)-> n%2 == 1 )+"\n";
        s+="Print numbers greater than 5:\n";
        s+=evaluate(list, (n)-> n > 5 );
        IO.print(s);
    }

    public static String evaluate(ArrayList<Integer> list, Predicate<Integer> predicate) {
        String s="";
        for(Integer n: list)
        {if(predicate.test(n)) {s+=n + " ";}}
        return s;
    }
}

```

EX5 TreeSet

```

import java.util.*;
import javax.swing.JOptionPane;
//Tree structure
public class W10E5
{ public static void main(String args[])
{
    TreeSet<Integer> tree=new TreeSet<Integer>();
    int sayi;
    for(int i=0;i<10;i++)
    {sayi=(int)(20*Math.random());
    tree.add(new Integer(sayi));
    }
}
}

```

```
String s=IO.toString(tree);
IO.print(s);
}
}
```

```
import java.util.*;
//Tree structure
public class W10E5a
{ public static void main(String args[])
{
    TreeSet<String> tree=new TreeSet<String>();
    String s[]={"Once","upon","a","time","in","a","country","far","far","away"};
    for(int i=0;i<s.length;i++)
    {tree.add(s[i]);}
    String s1=IO.toString(tree);
    IO.print(s1);
}
}
```

EX6 TreeMap

```
import java.util.*;

public class W10E6{
    public static void main(String[] args) {
        System.out.println("Tree Map Example!\n");
        TreeMap <Integer, String>tMap = new TreeMap<Integer, String>();
        //Adding data to a tree map
        tMap.put(1, "Sunday");
        tMap.put(2, "Monday");
        tMap.put(3, "Tuesday");
        tMap.put(4, "Wednesday");
        tMap.put(5, "Thursday");
        tMap.put(6, "Friday");
        tMap.put(7, "Saturday");
        //Relieving all keys
        System.out.println("Keys of tree map: " + tMap.keySet());
        //Relieving all values
        System.out.println("Values of tree map: " + tMap.values());
        //Relieving the value from key with key number 5
        System.out.println("Key: 5 value: " + tMap.get(5)+ "\n");
        //Relieving the First key and its value
        System.out.println("First key: " + tMap.firstKey() + " Value: "
            + tMap.get(tMap.firstKey()) + "\n");
        //Retrieving the Last key and value
        System.out.println("Last key: " + tMap.lastKey() + " Value: "
            + tMap.get(tMap.lastKey()) + "\n");
        //Removing the first key and value
        System.out.println("Removing first data: " + tMap.remove(tMap.firstKey()));
        System.out.println("Now the tree map Keys: " + tMap.keySet());
        System.out.println("Now the tree map contain: " + tMap.values() + "\n");
        //Removing the last key and value
        System.out.println("Removing last data: " + tMap.remove(tMap.lastKey()));
        System.out.println("Now the tree map Keys: " + tMap.keySet());
        System.out.println("Now the tree map contain: " + tMap.values());
    }
}
```

HOMEWORK EXERCISES

Homework exercises will be done at home and will bring to next Thursday class printed no late exercises will be excepted. Each code should include student name id#, code plus results should be given. Homeworks will be accepted in written format plus a computer copy in pdf format will be sent to computer_programming@turhancoban.com adress your file name should be "group"+"week#"+studentname+studentid#.pdf

A W1_turhan_coban_0101333.pdf

B W3_ali_veli_02335646.pdf

W9HW1 :

```
public class book
{ public String name,author;
  int year;
  public book(String namei,String authori,int yeari)
  { name=namei;author=authori;year=yeari;}
  public book(book bi)
  { name=bi.name;author=bi.author;year=bi.year;}
  public String toString()
  {String s="book name = "+name+" book author = "+author+" publication year = "+year+"\n";
   return s;
  }
}
```

```
import java.util.*;

public class library
{
String name;
int number_of_books;
TreeMap <String, book> book_name = new TreeMap<String, book>();
TreeMap <String, book> author_name = new TreeMap<String, book>();

public library(String kname)
{ name=kname;
  number_of_books=0;
}

public void add(book b)
{
book_name.put(b.name,b);
author_name.put(b.author,b);
number_of_books=book_name.size();
}

public void remove(book b)
{
number_of_books--;
book_name.remove(b.name);
author_name.remove(b.author);
number_of_books=book_name.size();
}

public String list_with_name()
{String s=book_name.values().toString();
return s;
}

public String list_with_author()
{String s=author_name.values().toString();
return s;
}

public String get_with_name(String name)
{String s=book_name.get(name).toString();
return s;
}

public String toString_with_name()
{
String s="Library name : "+name+"\n";
s+="Total number of books : "+number_of_books+"\n";
s+=list_with_name()+"\n";
return s;
}

public String toString_with_author()
{
String s="Library name : "+name+"\n";
s+="Total number of books : "+number_of_books+"\n\n";
s+=list_with_author();
return s;
}}
}
```

Add books to the library and print them out according to authors and according to names

```
class booktest1
{
public static void main(String args[])
```

```

{
library l=new library("Library of congress");
book magazine=new book("Bilim ve Teknik","TÜBİTAK",1978);
book r1=new book("It is all quiet in the westen front ","Erich Maria Reamarque",1920);
book r2=new book("The God Delusion","Richard Dawkins",2010);
book s1=new book("Human lanscapes from my country","Nazım Hikmet",1935);
.....
.....}
}

```

W10HW2

```

public class car
{ public String brand,model;
  int year;
  public car(String brandi,String modeli,int yeari)
  {brand=brandi;model=modeli;year=yeari;}
  public String toString()
  {String s="car brand = "+brand+" model = "+model+" year = "+year+"\n";
   return s;
  }
}

```

```

public class mercedes extends car
{ public mercedes(String modeli,int yeari)
  {super("mercedes",modeli,yeari);}
}

```

```

public class ford extends car
{ public ford(String modeli,int yeari)
  {super("ford",modeli,yeari);}
}

```

```

public class car_registry1
{ String registry_name;
  int number_of_cars;
  TreeMap <String, car> car_brand = new TreeMap<String, car>();
  TreeMap <String, car> car_model = new TreeMap<String, car>();
  TreeMap <Integer, car> car_year = new TreeMap<Integer, car>();
  public car_registry1(String namei,car ci[])
  {registry_name=namei;
   int n=ci.length;
   for(int i=0;i<n;i++)
   { car_brand.put(ci[i].brand,ci[i]);
     car_model.put(ci[i].model,ci[i]);
     car_year.put(ci[i].year,ci[i]);
     number_of_cars=car_brand.size();
   }
  }
  public void add(car c)
  {
   car_brand.put(c.brand,c);
   car_model.put(c.model,c);
   car_year.put(c.year,c);
   number_of_cars=car_brand.size();
  }
  public void remove(car c)
  {
   car_brand.remove(c.brand);
   car_model.remove(c.model);
   car_year.remove(c.year);
   number_of_cars=car_brand.size();
  }
  public String toString(String s)
  { String s1="Registry name : "+registry_name+"\n";
    s1+="Total number of cars : "+number_of_cars+"\n\n";
    if(s.equals("brand"))
    {s1+=car_brand.values().toString();    }
    else if(s.equals("model"))
    {s1+=car_model.values().toString();    }
    else if(s.equals("year"))
    {s1+=car_year.values().toString();    }
    else {};
  }
}

```



```
return s1;
}
}
```

```
import javax.swing.*;
class cartest1
{
public static void main(String args[])
{
car c1=new car("ford","mustang",1957);
car c2=new car("toyota","corolla",1987);
car c3=new car("volswagen","passat",2019);
ford c4=new ford("fiesta",2017);
car c5=new car("mercedes","C200",2017);
mercedes c6=new mercedes("CLA",2019);
car c[]={c1,c2,c3,c4,c5};
car_registry1 r1=new car_registry1("izmir car registry",c);
.....
IO.print(s);
}
}
```

List cars according to brand then model then year