CS162 LAB 8

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CODE:

import java.lang.Math;  
public class Main{  
  
 //Merge sort  
 public static void divide(int arr[], int si, int ei)  
 {  
 if(si>=ei)  
 return;  
  
 int mid=si+(ei-si)/2;  
 *divide*(arr, si, mid);  
 *divide*(arr,mid+1, ei);  
 *conquer*(arr,si,mid,ei);  
 }  
 public static void conquer(int[] arr, int si, int mid, int ei)  
 {  
 int[] merged=new int[ei-si+1];  
  
 int idx1=si;  
 int idx2=mid+1;  
 int x=0;  
  
 while(idx1<=mid && idx2<=ei)  
 {  
 if(arr[idx1]<=arr[idx2])  
 merged[x++]=arr[idx1++];  
 else  
 merged[x++]=arr[idx2++];  
 }  
 while(idx1<=mid)  
 merged[x++]=arr[idx1++];  
 while(idx2<=ei)  
 merged[x++]=arr[idx2++];  
  
 for(int i=0,j=si;i<merged.length;i++,j++)  
 arr[j]=merged[i];  
 }  
  
 //Quick Sort  
 public static void quickSort(int[] arr, int low, int high)  
 {  
 if(low<high)  
 {  
 int pivIndex=*partition*(arr,low,high);  
  
 *quickSort*(arr,low,pivIndex-1);  
 *quickSort*(arr, pivIndex+1, high);  
 }  
 }  
 public static int partition(int[] arr, int low, int high)  
 {  
 int pivot=arr[high];  
 int i=low-1;  
  
 for(int j=low;j<high;j++)  
 {  
 if(arr[j]<pivot)  
 {  
 i++;  
 //swap  
 int temp=arr[i];  
 arr[i]=arr[j];  
 arr[j]=temp;  
 }  
 }  
  
 i++;  
 int temp=arr[i];  
 arr[i]=pivot;  
 arr[high]=temp;  
 return i;  
 }

public static void main(String[] args)  
 {  
 int[] arr=new int[100];  
 int range=100; //bcoz I want to generate random numbers between 1 to 100(both inclusive)  
// long totalTime=0;  
// for(int count=1;count<=10;count++) {  
// for (int i = 0; i < 100; i++)  
// arr[i] = (int) (Math.random() \* range); //min=0, max=100  
//  
// long start=System.nanoTime();  
// //merged sort  
// divide(arr, 0, arr.length - 1);  
// long end=System.nanoTime();  
// long elapsedTime=end-start;  
// System.out.println(elapsedTime);  
// totalTime +=elapsedTime;  
//  
// for (int it : arr)  
// System.out.print(it + " ");  
// System.out.println();  
// }  
// long averageTime=totalTime/10;  
// System.out.println("average time taken(in ns): "+averageTime);  
  
 long totalTime=0;  
 for(int count=1;count<=10;count++)  
 {  
 for(int i=0;i<100;i++)  
 arr[i]=(int)(Math.*random*()\*range);  
  
 long start=System.*nanoTime*();  
 //quick sort  
 *quickSort*(arr,0, arr.length-1);  
 long end=System.*nanoTime*();  
 long timeElapsed=end-start;  
 System.*out*.println(timeElapsed);  
 totalTime+=timeElapsed;  
 for(int it:arr)  
 System.*out*.print(it+" ");  
 System.*out*.println();  
 }  
 long averageTime=totalTime/10;  
 System.*out*.println("average time taken(in ns): "+averageTime);  
  
 }  
}



