**FILE NAME: BSCS2\_Marasigan\_Sorting.java && BSCS2\_Marasigan\_Sorting.pdf**

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| **SOURCE CODE**  package sorting;  import java.util.Scanner;  import java.util.concurrent.TimeUnit;  public class BSCS2\_Marasigan\_Sorting  {  static Scanner in = new Scanner(System.in);  public static void main(String[] args)  {  Tools.Head();  System.out.print(" Enter the size of an array:\t");  int size = in.nextInt();  int[] A= new int[size], B = new int[size];  //backup for sorting repetition  System.out.print(" Enter " + size + " values: ");  for (int count = 0; count<size; count++)  {  A[count] = in.nextInt();  B[count] = A[count];  }  Tools.Space();  OptionLoop(A, B);  in.close();  }    static void OptionLoop(int[] A, int[] B)  {  Tools.Menu();  int choice = in.nextInt();  Tools.Space();  switch (choice)  {  case 1: new Bubble(A); break;  case 2: new Insertion(A); break;  case 3: new Selection(A); break;  case 4: Tools.End(); break;  default: OptionLoop(A, B);  }  Tools.PrintInFormat1(2, A, "+--SORTED ARRAY--");  Tools.PrintInFormat3(A);  A = unsortedRetriever(A, B);  Tools.Space();  OptionLoop(A, B);  }  static int[] unsortedRetriever(int []sorted, int[]unsorted )  {  for (int i = 0; i<sorted.length; i++)  {  sorted[i] = unsorted[i];  }  return sorted;  }  }  /\*I apply using classes too as a matter of practicing what I learned  in Intermediate Programming ^\_^ \*/  //I separated the prints for neatness of the code  class Bubble  {  Bubble(int[] A)  {  int swap, j, n;  int pass = 1;  n = A.length;    Tools.PrintInFormat1(2, A, "+--[ BUBBLE ]----");  while (Tools.sortingChecker(A, 0, A.length-1))  {// originally, condition (i < n) is replaced for efficiency  Tools.PassFormat(pass, A);  for (j=0; j < n-1; j++)  {  if (A[j] > A[j+1])  {  swap = A[j];  A[j] = A[j+1];  A[j+1] = swap;  }  CustomFormat(A);  }  pass++;  }  Tools.PrintInFormat3(A);  }  static void CustomFormat(int[] array)  {  System.out.print("\t|");  Tools.PrintArray(array);  System.out.print("|");  Tools.Space();  }  }  class Insertion  {  Insertion(int[] A)  {  int temp = 0;  Tools.PrintInFormat1(2, A, "+--[ INSERTION ]-");  for (int range = 1;Tools.sortingChecker(A, 0, A.length-1); range++)  {//(range++) picks the next element for checking  if (Tools.sortingChecker(A, 0, range)) //checks if sorted  {  temp = A[range];  for (int a = 0; a<=range; a++)  {//comparison to all elements  if (temp<A[a])  {  A = Tools.shiftElements(A, a, range); //shifts the elements  A[a] = temp; //inserts the value  break;  }  }  }  Tools.PassFormat(range, A);  Tools.PrintInFormat2(A, range);  }  Tools.PrintInFormat3(A);  }  }  class Selection  {  Selection(int[] A)  {  int swap;  int n = A.length;  Tools.PrintInFormat1(2, A, "+--[ SELECTION ]-");  for (int i =0; Tools.sortingChecker(A, 0, n-1); i++)  {  int min = Tools.findMin(A, i, n-1);  int index = Tools.indexFinder(min, A, i, n-1);  swap = A[i];  A[i] = min;  A[index] = swap;    Tools.PassFormat(i+1, A);  Tools.PrintInFormat2(A, i+1);  }  Tools.PrintInFormat3(A);  }  }  class Tools  {  //Sorting Tools  static boolean sortingChecker(int[] array, int start, int end)  {  for (; start < end; start++)  {  if (array[start+1] < array[start] )  {  return true;//means it's not sorted yet  }  }  return false; //break  /\* Note: since this checker that is responsible for breaks is working properly  I decided to replace the algorithm a little to make use of its effectiveness\*/  }  static void passIndicator(int pass)  {  String s = Integer.toString(pass);  char last = s.charAt(s.length()-1); //uses the first digit as reference  //example: 21 ; 1 will be reference to make it "21st" instead of "21th"  if (last == '1' && pass != 11 )  {  System.out.print(pass + "st\tPASS");  }  else if (last == '2'&& pass != 12)  {  System.out.print(pass + "nd\tPASS");  }  else if (last == '3'&& pass != 13)  {  System.out.print(pass + "rd\tPASS");  }  else  {  System.out.print(pass + "th\tPASS");  }  }  static int indexFinder(int value, int[] Array, int start, int end)  {  int b;  for(b = start; b<end; b++)  {  if(value == Array[b])  {  break;  }  }  return b;  }  static int[] shiftElements(int[]Array, int start, int end)  {  for (; end>start; end--)  {  Array[end]=Array[end-1];  }  return Array;  }  static int findMin(int[] A, int start, int end)  {// controls the number of elements to be checked[start, end]  int min=0; int isLess=0;  for (int a = start; a<=end; a++)  {  for (int b = start; b<=end; b++)  {  if (A[a] < A[b])  {  isLess++;  }  }  if (isLess == (end-start))  {  min = A[a];  break;  }  else  {  isLess = 0;  }  }  return min;  }  //Designing Tools  static void PrintInFormat1(int start, int[] array, String name)  {  System.out.print("\t" +name);  Tools.PrintLine(array.length, start);  Tools.Space();  System.out.print("\t|");  Tools.PrintArray(array);  System.out.print("|");  Tools.Space();  // System.out.print("\t+");  // Tools.PrintLine(array.length, 0);  // Tools.Space();  }  static void PrintInFormat2(int[] array, int pass)  {  System.out.print("\t|");  Tools.PrintArray(array);  System.out.print("| ");  Tools.Space();  }  static void PassFormat(int pass, int[] array)  {  System.out.print("\t+--");  Tools.passIndicator(pass);  System.out.print("-----");  Tools.PrintLine(array.length, 2);  Tools.Space();  }  static void PrintInFormat3(int[] array)  {  System.out.print("\t+");  Tools.PrintLine(array.length, 0);  Tools.Space();  }  static void PrintArray(int[] array)  {  try  {  System.out.print("\t");  for (int i = 0; i < array.length; i++)  {  System.out.print(array[i] + "\t");  TimeUnit.MILLISECONDS.sleep(100);  }  }  catch (Exception e)  {    }  }  static void Space()  {  System.out.println();  }  static void PrintLine(int limit, int start)  {  try{  for (int i = start-1; i < limit; i++)  {  if (i == limit-1)  {  for (int count = 0; count<7;count++)  {  System.out.print("-");  TimeUnit.MILLISECONDS.sleep(25);  }  System.out.print("+");  }  else  {  for (int count = 0; count<8;count++)  {  System.out.print("-");  TimeUnit.MILLISECONDS.sleep(25);  }  }  }  }  catch(Exception e){    }  }  static void Head()  {//https://patorjk.com/software/taag/  String sorting = " \_\_\_ \_\_\_ \_\_\_ \_\_\_ \_\_\_ \_\_\_ \r\n"  + " /\\ \\ /\\ \\ /\\ \\ /\\ \\ \_\_\_ /\\\_\_\\ /\\ \\ \r\n"  + " /::\\ \\ /::\\ \\ /::\\ \\ \\:\\ \\ /\\ \\ /::| | /::\\ \\ \r\n"  + " /:/\\ \\ \\ /:/\\:\\ \\ /:/\\:\\ \\ \\:\\ \\ \\:\\ \\ /:|:| | /:/\\:\\ \\ \r\n"  + " \_\\:\\ \\ \\ \\ /:/ \\:\\ \\ /::\\ \\:\\ \\ /::\\ \\ /::\\\_\_\\/:/|:| |\_\_ /:/ \\:\\ \\ \r\n"  + " /\\ \\:\\ \\ \\\_\_\\/:/\_\_/ \\:\\\_\_\\/:/\\:\\ \\:\\\_\_\\/:/\\:\\\_\_\\\_\_/:/\\/\_\_/:/ |:| /\\\_\_\\/:/\_\_/\_\\:\\\_\_\\ \r\n"  + " \\:\\ \\:\\ \\/\_\_/\\:\\ \\ /:/ /\\/\_|::\\/:/ /:/ \\/\_\_/\\/:/ / \\/\_\_|:|/:/ /\\:\\ /\\ \\/\_\_/ \r\n"  + " \\:\\ \\:\\\_\_\\ \\:\\ /:/ / |:|::/ /:/ / \\::/\_\_/ |:/:/ / \\:\\ \\:\\\_\_\\ \r\n"  + " \\:\\/:/ / \\:\\/:/ / |:|\\/\_\_/\\/\_\_/ \\:\\\_\_\\ |::/ / \\:\\/:/ / \r\n"  + " \\::/ / \\::/ / |:| | \\/\_\_/ /:/ / \\::/ / \r\n"  + " \\/\_\_/ \\/\_\_/ \\|\_\_| \\/\_\_/ \\/\_\_/ ";  try {  for (int i = 0; i < sorting.length(); i++)  {  System.out.print(sorting.charAt(i));  TimeUnit.MILLISECONDS.sleep(1);  }  }  catch (Exception e){  }  Tools.Space();  System.out.print(" +");  Tools.PrintLine(11, 0);  Tools.Space();  }  static void Menu()  {  System.out.print("\tMenu\n\t\t1. Bubble\n"  + "\t\t2. Insertion\n\t\t3. Selection\n"  + "\t\t4. Exit\n\tEnter Option[1..4] ");  }  static void End()  {  System.out.print("\t\tThank you po for checking my program ^\_^\n"  + "\t\t\t-Marasigan, Vem Aiensi A.\n\t+");  Tools.PrintLine(6, 0);  System.out.println("\n\t Special Thanks also to: patorjk.com for the ASCII art"  + "\n\t\t https://patorjk.com/software/taag/");  System.exit(0);  }  } |
| **SCREENSHOTS**   |  |  | | --- | --- | | **Sample Input 1** | **Sample Input 2** | | **BUBBLE** | | |  |  | | **INSERTION** | | |  |  | | **SELECTION** | | |  |  | | **EXIT** | | |  | | |

**VIDEOS IN RUNNING**

**Drive Link:** [**https://drive.google.com/file/d/1e4VhkhnvK\_cSLtXVDsE-Eok8KzBqJQk-/view?usp=sharing**](https://drive.google.com/file/d/1e4VhkhnvK_cSLtXVDsE-Eok8KzBqJQk-/view?usp=sharing)