Лабораторная работа №3:

Уровень 1:

№6:

using System;

using static System.Console;

using static System.Math;

namespace LaboratoryWorkNo3

{

class Program

{

static void Main(string[] args)

{

double[] vector = new double[5] { 5, 9, -4, 8, 0 };

for (int i = 0; i < vector.Length; i++)

WriteLine($"{i + 1}-й элемент = {vector[i]}");

double sum = 0;

for (int i = 0; i < vector.Length; i++)

sum += vector[i] \* vector[i];

double length = Sqrt(sum);

WriteLine($"L = {length}");

}

}

}

№10:

using System;

using static System.Console;

namespace L1\_task10

{

class Program

{

static void Main(string[] args)

{

double[] array = new double[10] { 3, 8, 9, 4, 0, 12, 6, 15, 29, 1 };

for (int i = 0; i < array.Length; i++)

WriteLine($"{i + 1}-й элемент = {array[i]}");

Write("Введите значение P: ");

double p = double.Parse(ReadLine());

Write("Введите значение Q: ");

double q = double.Parse(ReadLine());

int count = 0;

for (int i = 0; i < array.Length; i++)

if (array[i] > p && array[i] < q) count++;

WriteLine($"Кол-во чисел между P и Q = {count}");

}

}

}

№11:

using System;

using static System.Console;

namespace L1\_task11

{

class Program

{

static void Main(string[] args)

{

double[] allNumbers = new double[10] { 3, 4, 91, -7, 0, 18, 11, -99, 19, 0 };

int count = 0;

for (int i = 0; i < allNumbers.Length; i++)

if (allNumbers[i] > 0) count++;

double[] positiveNumbers = new double[count];

int index = -1;

for (int i = 0; i < allNumbers.Length; i++)

{

if (allNumbers[i] > 0)

{

index++;

positiveNumbers[index] = allNumbers[i];

}

}

for (int i = 0; i < positiveNumbers.Length; i++)

WriteLine($"{i + 1}-й элемент = {positiveNumbers[i]}");

}

}

}

№12:

using System;

using static System.Console;

namespace L1\_task12

{

class Program

{

static void Main(string[] args)

{

double[] numbers = new double[10] { 7, 8, -90, 25, 9, 12, -6, 11, 24, 0 };

for (int i = 0; i < numbers.Length; i++)

WriteLine($"[{i}] = {numbers[i]}");

int lastNegativeIndex = -1;

for (int i = numbers.Length - 1; i >= 0; i--)

{

if (numbers[i] < 0)

{

lastNegativeIndex = i;

break;

}

}

WriteLine($"Индекс последнего отриц. числа = {lastNegativeIndex}");

}

}

}

№13:

using System;

using static System.Console;

namespace L1\_task13

{

class Program

{

static void Main(string[] args)

{

//Индекс соответствует значению

double[] baseArray = new double[10] { 0, 1, 2, 3, 4, 5, 6, 7, 8, 9 };

for (int i = 0; i < baseArray.Length; i++)

WriteLine($"[{i}] элемент = {baseArray[i]}");

double[] evenArray = new double[5];

double[] oddArray = new double[5];

for (int i = 1; i < baseArray.Length; i += 2)

{

evenArray[i / 2] = baseArray[i - 1];

oddArray[i / 2] = baseArray[i];

}

WriteLine("\nМассив чётных индексов:");

for (int i = 0; i < evenArray.Length; i++)

WriteLine($"[{i}] элемент = {evenArray[i]}");

WriteLine("\nМассив НЕчётных индексов:");

for (int i = 0; i < oddArray.Length; i++)

WriteLine($"[{i}] элемент = {oddArray[i]}");

}

}

}

Уровень 2:

№5:

using System;

using static System.Console;

namespace L2\_task05

{

class Program

{

static void Main(string[] args)

{

const int count = 12;

double[] array = new double[count] { 2, -99, 8, 4, -5, 9, -13, -7, 99, 10, 11, 5 };

WriteLine("Исходный массив: ");

for (int i = 0; i < array.Length; i++)

WriteLine($"[{i}] = {array[i]}");

int minValueIndex = 0;

int maxValueIndex = 0;

for (int i = 0; i < array.Length; i++)

{

if (array[i] < array[minValueIndex]) minValueIndex = i;

if (array[i] > array[maxValueIndex]) maxValueIndex = i;

}

int negativeCount = 0;

for (int i = minValueIndex + 1; i < maxValueIndex; i++)

if (array[i] < 0) negativeCount++;

double[] negativeNumbers = new double[negativeCount];

int index = -1;

for (int i = minValueIndex + 1; i < maxValueIndex; i++)

if (array[i] < 0) negativeNumbers[++index] = array[i];

WriteLine("\nМассив с отриц. числами: ");

for (int i = 0; i < negativeCount; i++)

WriteLine($"[{i}] = {negativeNumbers[i]}");

}

}

}

№6:

using System;

using static System.Console;

using static System.Math;

namespace L2\_task06

{

class Program

{

static void Main(string[] args)

{

const int count = 10;

double[] numbers = new double[count] { 1, 6, 8, 3, 5, 7, 2, 1, 9, 0 };

for (int i = 0; i < count - 1; i++)

WriteLine($"[{i}] = {numbers[i]}");

Write("Введите число P, которое необходимо вставить в массив: ");

double p = double.Parse(ReadLine());

double elementSum = 0;

for (int i = 0; i < numbers.Length; i++)

elementSum += numbers[i];

double averageValue = elementSum / numbers.Length;

int nearestToAverageIndex = 0;

int offset = 1;

for (int i = 0; i < numbers.Length; i++)

if (Abs(numbers[i] - averageValue) < Abs(numbers[nearestToAverageIndex] - averageValue))

nearestToAverageIndex = i;

for (int i = count -1; i >= 0; i--)

{

if (i == nearestToAverageIndex + 1)

{

offset--;

numbers[i] = p;

continue;

}

numbers[i] = numbers[i - offset];

}

WriteLine("\nМассив с вставленным P:");

for (int i = 0; i < count; i++)

WriteLine($"[{i}] = {numbers[i]}");

}

}

}

№9:

using System;

using static System.Console;

namespace L2\_task09

{

class Program

{

static void Main(string[] args)

{

const int count = 10;

double[] array = new double[count] { 5, 7, -99, 1, 2, 3, 4, 5, 99, 6 };

int minValueIndex = 0;

int maxValueIndex = 0;

for (int i = 0; i < count; i++)

{

if (array[i] < array[minValueIndex]) minValueIndex = i;

if (array[i] > array[maxValueIndex]) maxValueIndex = i;

}

double summ = 0;

int numCount = 0;

for (int i = minValueIndex + 1; i < maxValueIndex; i++)

{

summ += array[i];

numCount += 1;

}

double average = summ / numCount;

WriteLine($"Ср. арифметическое = {average}");

}

}

}

№10:

using System;

using static System.Console;

namespace L2\_task10

{

class Program

{

static void Main(string[] args)

{

const int count = 12;

double[] array = new double[count] { -5, -9, 2, 7, 5, 4, -9, -1, 6, 8, 3, -8 };

WriteLine("Базовый массив:");

for (int i = 0; i < count; i++)

WriteLine($"[{i}] = {array[i]}");

int minPositiveIndex = -1;

for (int i = 0; i < count; i++)

if (array[i] > 0)

if ((minPositiveIndex == -1) || array[i] < array[minPositiveIndex])

minPositiveIndex = i;

for (int i = minPositiveIndex; i < count - 1; i++)

array[i] = array[i + 1];

array[count - 1] = 0;

WriteLine("\nМассив без мин. поз. числа:");

for (int i = 0; i < count - 1; i++)

WriteLine($"[{i}] = {array[i]}");

}

}

}

№11:

using System;

using static System.Console;

namespace L2\_task11

{

class Program

{

static void Main(string[] args)

{

const int count = 10;

double[] array = new double[count] { 4, 6, 5, -7, 9, 1, 4, -6, -1, 0};

for (int i = 0; i < count - 1; i++)

WriteLine($"[{i}] = {array[i]}");

Write("Введите число P, которое необходимо включить в массив: ");

double p = double.Parse(ReadLine());

int index = -1;

for (int i = count -1; i >= 0; i--)

if (array[i] > 0) { index = i; break; }

for (int i = count -2; i > index; i--)

array[i + 1] = array[i];

array[index + 1] = p;

WriteLine("\nМассив с включённым P:");

for (int i = 0; i < count; i++)

WriteLine($"[{i}] = {array[i]}");

}

}

}

№13:

using System;

using static System.Console;

namespace L2\_task13

{

class Program

{

static void Main(string[] args)

{

const int count = 10;

double[] array = new double[count] { 4, 8, 6, 7, 5, 99, 23, 3, 4, 9 };

WriteLine("Входной массив:");

for (int i = 0; i < count; i++)

WriteLine($"[{i}] = {array[i]}");

int maxIndex = 0;

for (int i = 0; i < array.Length; i += 2)

if (array[i] > array[maxIndex]) maxIndex = i;

array[maxIndex] = maxIndex;

WriteLine("Итоговый массив:");

for (int i = 0; i < count; i++)

WriteLine($"[{i}] = {array[i]}");

}

}

}

№15:

using System;

using static System.Console;

namespace L2\_task15

{

class Program

{

static void Main(string[] args)

{

const int n = 6, m = 4;

double[] a = new double[n] { 1, 2, 3, 4, 5, 6 };

double[] b = new double[m] { 111, 222, 333, 444 };

WriteLine("Массив A:");

for (int i = 0; i < n; i++) WriteLine($"[{i}] = {a[i]}");

WriteLine("\nМассив B:");

for (int i = 0; i < m; i++) WriteLine($"[{i}] = {b[i]}");

Write("\nВведите K (индекс вставки массива B в A): ");

int k = int.Parse(ReadLine());

double[] c = new double[n + m];

for (int i = 0; i <= k; i++) c[i] = a[i];

for (int i = 0; i < b.Length; i++) c[k + 1 + i] = b[i];

for (int i = k + 1; i < a.Length; i++)

{

int index = i + b.Length;

c[index] = a[i];

}

WriteLine("Единый массив:");

for (int i = 0; i < n + m; i++) WriteLine($"[{i}] = {c[i]}");

}

}

}

Уровень 3:

№1:

using System;

using static System.Console;

namespace L3\_task01

{

class Program

{

static void Main(string[] args)

{

const int count = 10;

double[] array = new double[count] { 1, 2, 99, 5, 8, 99, 99, 3, 7, 11 };

WriteLine("Входной массив:");

for (int i = 0; i < count; i++)

WriteLine($"[{i}] = {array[i]}");

double maxValue = array[0];

int maxCount = 1;

for (int i = 1; i < count; i++)

{

if (array[i] == maxValue) maxCount++;

if (array[i] > maxValue) { maxValue = array[i]; maxCount = 1; }

}

int[] maxIndexArray = new int[maxCount];

int index = -1;

for (int i = 0; i < count; i++)

if (array[i] == maxValue) maxIndexArray[++index] = i;

WriteLine("\nМассив индексов с макс. числом:");

for (int i = 0; i < maxCount; i++)

WriteLine($"[{i}] = {maxIndexArray[i]}");

}

}

}

№5:

using System;

using static System.Console;

namespace L3\_task05

{

class Program

{

static void Main(string[] args)

{

const int count = 10;

double[] array = new double[count] { 9, 9, 7, 7, 8, 8, 9, 9, 6, 6 };

WriteLine("Входной массив:");

for (int i = 0; i < count; i++)

WriteLine($"[{i}] = {array[i]}");

for (int i = 0; i < array.Length; i += 2)

for (int j = 0; j < array.Length - 2; j += 2)

if (((array.Length - j) >= 2) && (array[j] > array[j + 2]))

{

double temp = array[j + 2];

array[j + 2] = array[j];

array[j] = temp;

}

WriteLine("Массив с упорядоченными чётными индексами:");

for (int i = 0; i < count; i++)

WriteLine($"[{i}] = {array[i]}");

}

}

}

№8:

using System;

using static System.Console;

namespace L3\_task08

{

class Program

{

static void Main(string[] args)

{

const int count = 10;

double[] array = new double[count] { 3, -1, 3, -2, -7, -7, 3, -5, -4, 3 };

WriteLine("Входной массив:");

for (int i = 0; i < count; i++)

WriteLine($"[{i}] = {array[i]}");

int negativeNumberCount = 0;

for (int i = 0; i < array.Length; i++)

if (array[i] < 0) negativeNumberCount++;

int[] negativeNumberIndexes = new int[negativeNumberCount];

int index = -1;

for (int i = 0; i < array.Length; i++)

if (array[i] < 0) negativeNumberIndexes[++index] = i;

for (int i = 0; i < negativeNumberIndexes.Length; i += 1)

for (int j = 0; j < negativeNumberIndexes.Length - 1; j += 1)

if (array[negativeNumberIndexes[j]] > array[negativeNumberIndexes[j + 1]])

{

double temp = array[negativeNumberIndexes[j + 1]];

array[negativeNumberIndexes[j + 1]] = array[negativeNumberIndexes[j]];

array[negativeNumberIndexes[j]] = temp;

}

WriteLine("Упорядоченный массив:");

for (int i = 0; i < count; i++)

WriteLine($"[{i}] = {array[i]}");

}

}

}

№9:

using System;

using static System.Console;

using static System.Math;

namespace L3\_task09

{

class Program

{

static void Main(string[] args)

{

const int count = 10;

double[] array = new double[count] { 4, 8, 2, 3, 0, 7, 8, 9, 1, 3 };

WriteLine("Входной массив:");

for (int i = 0; i < count; i++)

WriteLine($"[{i}] = {array[i]}");

int orderLength = 1, maxOrderLength = 1;

for (int i = 1; i < array.Length; i++)

{

if (array[i] >= array[i - 1])

{

orderLength++;

}

else

{

maxOrderLength = Max(orderLength, maxOrderLength);

orderLength = 1;

}

}

maxOrderLength = Max(orderLength, maxOrderLength);

WriteLine($"Длина самой длинной упор. последовательности = {maxOrderLength}");

}

}

}

№12:

using System;

using static System.Console;

namespace L3\_task12

{

class Program

{

static void Main(string[] args)

{

const int count = 12;

double[] array = new double[count] { 6, 9, -2, 0, 1, 19, 7 -6, -1, 9, 4, 3, 11 };

WriteLine("Входной массив:");

for (int i = 0; i < count; i++)

WriteLine($"[{i}] = {array[i]}");

array = Array.FindAll(array, x => x >= 0);

WriteLine("Массив без отриц. чисел:");

for (int i = 0; i < array.Length; i++)

WriteLine($"[{i}] = {array[i]}");

}

}

}

№13:

using System;

using System.Linq;

using static System.Console;

namespace L3\_task13

{

class Program

{

static void Main(string[] args)

{

const int count = 12;

double[] array = new double[count] { 6, 9, 2, 0, 1, 9, 7 - 6, 1, 9, 4, 9, 11 };

WriteLine("Входной массив:");

for (int i = 0; i < count; i++)

WriteLine($"[{i}] = {array[i]}");

array = array.Distinct().ToArray();

WriteLine("Массив дубликатов:");

for (int i = 0; i < array.Length; i++)

WriteLine($"[{i}] = {array[i]}");

}

}

}