using System;

using System.Collections.Generic;

using System.IO;

class Program

{

static void BubbleSort(List<double> arr)

{

int n = arr.Count;

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

{

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

{

if (arr[j] > arr[j + 1])

{

double temp = arr[j];

arr[j] = arr[j + 1];

arr[j + 1] = temp;

}

}

}

}

static void ShellSort(List<double> arr)

{

int n = arr.Count;

int gap = n / 2;

while (gap > 0)

{

for (int i = gap; i < n; ++i)

{

double temp = arr[i];

int j = i;

while (j >= gap && arr[j - gap] > temp)

{

arr[j] = arr[j - gap];

j -= gap;

}

arr[j] = temp;

}

gap /= 2;

}

}

static void SelectionSort(List<double> arr)

{

int n = arr.Count;

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

{

int minIndex = i;

for (int j = i + 1; j < n; ++j)

{

if (arr[j] < arr[minIndex])

{

minIndex = j;

}

}

double temp = arr[i];

arr[i] = arr[minIndex];

arr[minIndex] = temp;

}

}

static void InsertionSort(List<double> arr)

{

int n = arr.Count;

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

{

double key = arr[i];

int j = i - 1;

while (j >= 0 && arr[j] > key)

{

arr[j + 1] = arr[j];

j -= 1;

}

arr[j + 1] = key;

}

}

static void Main()

{

List<double> numbers = new List<double>();

double input;

Console.WriteLine("Enter 10 different numbers:");

try

{

for (int i = 0; i < 10; ++i)

{

Console.Write($"Enter number {i + 1}: ");

input = Convert.ToDouble(Console.ReadLine());

numbers.Add(input);

}

}

catch (FormatException)

{

Console.WriteLine("Invalid input. Please enter numeric values.");

return;

}

Console.WriteLine("\nSorting methods:");

Console.WriteLine("1. Bubble Sort");

Console.WriteLine("2. Shell Sort");

Console.WriteLine("3. Selection Sort");

Console.WriteLine("4. Insertion Sort");

int choice;

Console.Write("Choose a sorting method (1-4): ");

try

{

choice = Convert.ToInt32(Console.ReadLine());

if (choice < 1 || choice > 4)

{

throw new ArgumentOutOfRangeException();

}

}

catch (FormatException)

{

Console.WriteLine("Invalid choice. Please enter a number between 1 and 4.");

return;

}

catch (ArgumentOutOfRangeException)

{

Console.WriteLine("Invalid choice. Please enter a number between 1 and 4.");

return;

}

switch (choice)

{

case 1:

BubbleSort(numbers);

break;

case 2:

ShellSort(numbers);

break;

case 3:

SelectionSort(numbers);

break;

case 4:

InsertionSort(numbers);

break;

}

Console.WriteLine($"\nSorted numbers: {string.Join(" ", numbers)}");

Console.Write("Do you want to save the sorted numbers to a file? (y/n): ");

char saveChoice = Console.ReadLine().ToLower()[0];

if (saveChoice == 'y')

{

Console.Write("Enter a filename: ");

string filename = Console.ReadLine();

try

{

using (StreamWriter writer = new StreamWriter(filename))

{

writer.WriteLine($"Sorted numbers: {string.Join(" ", numbers)}");

}

Console.WriteLine($"Sorted numbers have been saved to {filename}");

}

catch (Exception e)

{

Console.WriteLine($"An error occurred while saving to the file: {e.Message}");

}

}

}

}