**HOMEWORK: Lab 2 – 6/9/2024**

**NAME: Đỗ Thành Đạt**

**CLASS: 21SE1**

**Ex1:**

**namespace Lab2**

**{**

**class Dice{**

**private int numberOfSides;**

**private Random random;**

**public Dice(int sides){**

**numberOfSides = sides;**

**random = new Random();**

**}**

**public int Roll()**

**{**

**return random.Next(1, numberOfSides + 1);**

**}**

**}**

**class Program**

**{**

**static void Main(string[] args)**

**{**

**Console.Write("Enter the number of sides for the dice: ");**

**int sides;**

**if (int.TryParse(Console.ReadLine(), out sides) && sides > 0)**

**{**

**Dice dice = new Dice(sides);**

**int result = dice.Roll();**

**Console.WriteLine($"You rolled a {result} on a {sides}-sided dice.");**

**}**

**else**

**{**

**Console.WriteLine("Please enter a valid positive integer for the number of sides.");**

**}**

**}**

**}**

**}**

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**Ex2:**

**namespace Lab2**

**{**

**class Person{**

**protected int age;**

**protected string name;**

**public int Age**

**{**

**get { return age; }**

**set { age = value; }**

**}**

**public string Name**

**{**

**get { return name; }**

**set { name = value; }**

**}**

**public Person()**

**{**

**age = 0;**

**name = "Unknown";**

**}**

**public Person(int age, string name)**

**{**

**this.age = age;**

**this.name = name;**

**}**

**public virtual void Input()**

**{**

**Console.Write("Enter name: ");**

**name = Console.ReadLine() ?? "Unknow";**

**Console.Write("Enter age: ");**

**age = int.Parse(Console.ReadLine() ?? "") ;**

**}**

**public virtual void DisplayPerson()**

**{**

**Console.WriteLine($"Name: {name}, Age: {age}");**

**}**

**public override string ToString()**

**{**

**return $"Person [Name: {name}, Age: {age}]";**

**}**

**}**

**class Student : Person**

**{**

**private double gpa;**

**public double Gpa**

**{**

**get { return gpa; }**

**set { gpa = value; }**

**}**

**public Student() : base()**

**{**

**gpa = 0.0;**

**}**

**public Student(int age, string name, double gpa) : base(age, name)**

**{**

**this.gpa = gpa;**

**}**

**public override void Input()**

**{**

**base.Input();**

**Console.Write("Enter GPA: ");**

**gpa = double.Parse(Console.ReadLine() ?? "" );**

**}**

**public void DisplayStudent()**

**{**

**base.DisplayPerson();**

**Console.WriteLine($"GPA: {gpa}");**

**}**

**public override string ToString()**

**{**

**return $"Student [Name: {name}, Age: {age}, GPA: {gpa}]";**

**}**

**}**

**class Ex2 {**

**public  void run(){**

**Student student = new Student();**

**student.Input();**

**student.DisplayStudent();**

**Console.WriteLine(student.ToString());**

**}**

**}**

**}**

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**namespace Lab2**

**{**

**class Song {**

**public String TypeList {get; set;}**

**public String Name {get; set;}**

**public String Time {get; set;}**

**public Song(String typeList,String name,String time)**

**{**

**TypeList = typeList;**

**Name = name;**

**Time = time;**

**}**

**}**

**class Ex3 {**

**public void run(){**

**int num = int.Parse(Console.ReadLine() ?? "0");**

**List<Song> list = new List<Song>();**

**while (num-- > 0)**

**{**

**string[] data = (Console.ReadLine() ?? "").Split('\_') ;**

**Song song = new Song(data[0], data[1], data[2]);**

**list.Add(song);**

**}**

**string TypeList = Console.ReadLine() ?? "";**

**if (TypeList.Equals("all"))**

**{**

**for(int i = 0; i < list.Count; ++i)**

**{**

**Console.WriteLine(list[i].Name);**

**}**

**}**

**else**

**{**

**for(int i = 0; i < list.Count; ++i)**

**{**

**if (list[i].TypeList == TypeList)**

**{**

**Console.WriteLine(list[i].Name);**

**}**

**}**

**}**

**Console.ReadKey();**

**}**

**}**

**}**

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**Ex4**

**namespace Lab2**

**{**

**internal class Fraction**

**{**

**public int Numerator { get; private set; }**

**public int Denominator { get; private set; }**

**public Fraction(int numerator, int denominator)**

**{**

**if (denominator == 0)**

**throw new ArgumentException("Mau so khong the la so 0");**

**Numerator = numerator;**

**Denominator = denominator;**

**Normalize();**

**}**

**private void Normalize()**

**{**

**int gcd = GCD(Numerator, Denominator);**

**Numerator /= gcd;**

**Denominator /= gcd;**

**if (Denominator < 0)**

**{**

**Denominator = -Denominator;**

**Numerator = -Numerator;**

**}**

**}**

**private int GCD(int a, int b)**

**{**

**if (b == 0)**

**return a;**

**return GCD(b, a % b);**

**}**

**public static Fraction Add(Fraction f1, Fraction f2)**

**{**

**int numerator = f1.Numerator \* f2.Denominator + f2.Numerator \* f1.Denominator;**

**int denominator = f1.Denominator \* f2.Denominator;**

**return new Fraction(numerator, denominator);**

**}**

**public static Fraction Subtract(Fraction f1, Fraction f2)**

**{**

**int numerator = f1.Numerator \* f2.Denominator - f2.Numerator \* f1.Denominator;**

**int denominator = f1.Denominator \* f2.Denominator;**

**return new Fraction(numerator, denominator);**

**}**

**public static Fraction Multiply(Fraction f1, Fraction f2)**

**{**

**int numerator = f1.Numerator \* f2.Numerator;**

**int denominator = f1.Denominator \* f2.Denominator;**

**return new Fraction(numerator, denominator);**

**}**

**public static Fraction Divide(Fraction f1, Fraction f2)**

**{**

**if (f2.Numerator == 0)**

**throw new DivideByZeroException("Khong the chia cho 0");**

**int numerator = f1.Numerator \* f2.Denominator;**

**int denominator = f1.Denominator \* f2.Numerator;**

**return new Fraction(numerator, denominator);**

**}**

**public void DisplayFraction()**

**{**

**Console.WriteLine($"({Numerator}/{Denominator})");**

**}**

**public void DisplayDecimal()**

**{**

**Console.WriteLine($"{(double)Numerator / Denominator}");**

**}**

**}**

**class Ex4**

**{**

**public static void run()**

**{**

**Console.WriteLine("Enter the first fraction: ");**

**int num1 = int.Parse(Console.ReadLine() ?? "0");**

**int denom1 = int.Parse(Console.ReadLine() ?? "1");**

**Console.WriteLine("Enter the second fraction: ");**

**int num2 = int.Parse(Console.ReadLine() ?? "0");**

**int denom2 = int.Parse(Console.ReadLine() ?? "1") ;**

**Fraction f1 = new Fraction(num1, denom1);**

**Fraction f2 = new Fraction(num2, denom2);**

**Console.WriteLine("\nFraction 1:");**

**f1.DisplayFraction();**

**f1.DisplayDecimal();**

**Console.WriteLine("\nFraction 2:");**

**f2.DisplayFraction();**

**f2.DisplayDecimal();**

**Console.WriteLine("\nAddition:");**

**Fraction resultAdd = Fraction.Add(f1, f2);**

**resultAdd.DisplayFraction();**

**resultAdd.DisplayDecimal();**

**Console.WriteLine("\nSubtraction:");**

**Fraction resultSubtract = Fraction.Subtract(f1, f2);**

**resultSubtract.DisplayFraction();**

**resultSubtract.DisplayDecimal();**

**Console.WriteLine("\nMultiplication:");**

**Fraction resultMultiply = Fraction.Multiply(f1, f2);**

**resultMultiply.DisplayFraction();**

**resultMultiply.DisplayDecimal();**

**Console.WriteLine("\nDivision:");**

**Fraction resultDivide = Fraction.Divide(f1, f2);**

**resultDivide.DisplayFraction();**

**resultDivide.DisplayDecimal();**

**}**

**}**

**}**

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