using System;

/\*

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\* Programming I - Test 3 (Version D)

\* Name: Xuan Tri Nguyen

\* Date:April 17th 2024

\* Student #:301388576

\* Solution: VersionD.exe

\* Test 3 - 25% of final grade

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\*/

namespace XuanTriNguyen\_versionD

{

class VerD

{

static void Main(string[] args)

{

int choice;

do

{

Display();

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

switch (choice)

{

case 3:

DemoQuestion3();

break;

case 4:

DemoQuestion4();

break;

case 5:

DemoQuestion5();

break;

case 6:

DemoQuestion6();

break;

default:

Console.WriteLine("You enter the wrong number");

break;

}

}

while (choice != 0);

}

static void Display()

{

Console.WriteLine("|==================Xuan Tri Nguyen=====================|");

Console.WriteLine("| 3. Working with array of integer |");

Console.WriteLine("| 4. Volume Conversion |");

Console.WriteLine("| 5. Simple pendulum |");

Console.WriteLine("| 6. Calculate Ontario Tax |");

Console.WriteLine("| |");

Console.WriteLine("| X. To exit the program |");

Console.WriteLine("|======================================================|");

Console.Write("Press the letter corresponding to your choice-> ");

}

static void DisplayMultiplesOfThree(int[] array)

{

foreach (int num in array)

{

if (num % 3 == 0)

{

Console.Write($"{num} ");

}

}

}

static void DisplayIntArray(int[] array)

{

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

{

Console.Write(array[i].ToString("D2"));

if (i < array.Length - 1)

{

Console.Write(" ");

}

}

Console.WriteLine();

}

public static int[] GenerateIntArray(int size)

{

Random random = new Random();

int[] resultArray = new int[size];

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

{

resultArray[i] = random.Next(100);

}

return resultArray;

}

static void DemoQuestion3()

{

Console.WriteLine("\n\n\*\*\*\*\*\*\*\*\*\*Begin Question 3 \*\*\*\*\*\*\*\*\*\*");

int[] numbers = GenerateIntArray(30);

DisplayIntArray(numbers);

Console.WriteLine();

DisplayMultiplesOfThree(numbers);

Console.WriteLine("\n\*\*\*\*\*\*\*\*\*\*End Question 3 \*\*\*\*\*\*\*\*\*\*\n\n");

}

static void VolumeConversion(double liters, out double gallons, out double ounces, out double milliliters)

{

gallons = liters \* 0.2642;

ounces = liters \* 33.8135;

milliliters = liters \* 1000;

}

static void DemoQuestion4()

{

Console.WriteLine("\n\n\*\*\*\*\*\*\*\*\*\*Begin Question 4 \*\*\*\*\*\*\*\*\*\*");

double liters = 0.5;

double gallons, ounces, milliliters;

VolumeConversion(liters, out gallons, out ounces, out milliliters);

Console.WriteLine($"{liters}L is equivalent to {gallons}gal or {ounces}oz, or {milliliters}ml");

liters = 1.0;

VolumeConversion(liters, out gallons, out ounces, out milliliters);

Console.WriteLine($"{liters}L is equivalent to {gallons}gal or {ounces}oz, or {milliliters}ml");

Console.WriteLine("\n\*\*\*\*\*\*\*\*\*\*End Question 4 \*\*\*\*\*\*\*\*\*\*\n\n");

}

static double SimplePendulum(double length)

{

return Math.Sqrt(length / 9.81);

}

static void DemoQuestion5()

{

Console.WriteLine("\n\n\*\*\*\*\*\*\*\*\*\*Begin Question 5 \*\*\*\*\*\*\*\*\*\*");

double length1 = 0.5;

double period1 = SimplePendulum(length1);

Console.WriteLine($"A length {length1}m will give a time {period1}s");

double length2 = 0.9;

double period2 = SimplePendulum(length2);

Console.WriteLine($"A length {length2}m will give a time {period2}s");

Console.WriteLine();

Console.WriteLine("\n\*\*\*\*\*\*\*\*\*\*End Question 5 \*\*\*\*\*\*\*\*\*\*\n\n");

}

const double TaxRate1 = 0.0505;

const double TaxRate2 = 0.0915;

const double TaxRate3 = 0.1316;

const double TaxThreshold1 = 41536.0;

const double TaxThreshold2 = 83075.0;

public static double CalculateOntarioTax(double income)

{

double tax = 0.0;

if (income <= TaxThreshold1)

{

tax = income \* TaxRate1;

}

else if (income <= TaxThreshold2)

{

tax = TaxThreshold1 \* TaxRate1 + (income - TaxThreshold1) \* TaxRate2;

}

else

{

tax = TaxThreshold1 \* TaxRate1 + (TaxThreshold2 - TaxThreshold1) \* TaxRate2 + (income - TaxThreshold2) \* TaxRate3;

}

return tax;

}

static void DemoQuestion6()

{

Console.WriteLine("\n\n\*\*\*\*\*\*\*\*\*\*Begin Question 6 \*\*\*\*\*\*\*\*\*\*");

double income = 30000.0;

double taxOwed;

while (income <= 90000.0)

{

taxOwed = CalculateOntarioTax(income);

Console.WriteLine($"{income:C2} will result in {taxOwed:C2} of tax");

income += 30000.0;

}

Console.WriteLine();

Console.WriteLine("\n\*\*\*\*\*\*\*\*\*\*End Question 6 \*\*\*\*\*\*\*\*\*\*\n\n");

}

}

}