COS20007: Object Oriented Programming

Pass Task 3.1: Clock Class with your own hour format

Show Wai Yan/105293041

# Clock.cs

namespace ClockProgram

{

public class Clock

{

// Fields

private Counter \_hour;

private Counter \_minute;

private Counter \_second;

// Constructor

public Clock()

{

\_hour = new Counter("Hour");

\_minute = new Counter("Minute");

\_second = new Counter("Second");

}

// Methods

public void Tick()

{

this.IncrementSecond();

}

public void Reset()

{

\_second.Reset();

\_minute.Reset();

\_hour.Reset();

}

private void IncrementSecond()

{

\_second.Increment();

if (\_second.Ticks == 60)

{

\_second.Reset();

this.IncrementMinute();

}

}

private void IncrementMinute()

{

\_minute.Increment();

if (\_minute.Ticks == 60)

{

\_minute.Reset();

this.IncrementHour();

}

}

private void IncrementHour()

{

\_hour.Increment();

if (\_hour.Ticks == 13)

{

\_hour.Reset();

\_hour.Increment();

}

}

public string GetTime()

{

return $"{this.Hour}:{this.Minute}:{this.Second}";

}

// Properties

public string Hour

{

get { return \_hour.Ticks.ToString("D2"); }

}

public string Minute

{

get { return \_minute.Ticks.ToString("D2"); }

}

public string Second

{

get { return \_second.Ticks.ToString("D2"); }

}

}

}

# Program.cs

namespace ClockProgram

{

public class Program

{

public static void Main(string[] args)

{

int secondsInADay = 86400;

Clock myClock = new Clock();

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

{

myClock.Tick();

Console.WriteLine(myClock.GetTime());

}

}

}

}

# TestCounter.cs

using NUnit.Framework;

using NUnit.Framework.Legacy;

using ClockProgram;

namespace CounterTest

{

[TestFixture]

public class CounterTest

{

private Counter \_counter;

[SetUp]

public void Setup()

{

\_counter = new Counter("Test");

}

[Test]

public void TestInitialize()

{

// ClassicAssert.AreEqual(0, \_counter.Ticks);

Assert.That(\_counter.Ticks, Is.EqualTo(0));

}

[Test]

public void TestOneIncrement()

{

\_counter.Increment();

// ClassicAssert.AreEqual(1, \_counter.Ticks);

Assert.That(\_counter.Ticks, Is.EqualTo(1));

}

[Test]

public void TestNIncrement()

{

\_counter = new Counter("Test"); // create a new obj for testing

int nIncrement = 10;

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

{

\_counter.Increment();

}

// ClassicAssert.AreEqual(nIncrement, \_counter.Ticks);

Assert.That(\_counter.Ticks, Is.EqualTo(nIncrement));

}

public void TestReset()

{

\_counter.Reset();

Assert.That(\_counter.Ticks, Is.EqualTo(0));

}

}

}

# TestClock.cs

using NUnit.Framework;

using ClockProgram;

namespace ClockTest

{

[TestFixture]

public class Tests

{

private Clock clock;

[SetUp]

public void Setup()

{

clock = new Clock();

}

[Test]

public void TestOneSecond()

{

clock.Reset();

clock.Tick();

Assert.That(clock.GetTime(), Is.EqualTo("00:00:01"));

}

[Test]

public void TestNSecond()

{

clock.Reset();

int second = 49;

for (int i = 0; i < second; i++) clock.Tick();

Assert.That(clock.GetTime(), Is.EqualTo($"00:00:{second.ToString("D2")}"));

}

[Test]

public void TestOneMinute()

{

clock.Reset();

int second = 60;

for (int i = 0; i < second; i++) clock.Tick();

Assert.That(clock.GetTime(), Is.EqualTo("00:01:00"));

}

[Test]

public void TestNMinute()

{

clock.Reset();

int minute = 3;

int second = 60 \* minute;

for (int i = 0; i < second; i++) clock.Tick();

Assert.That(clock.GetTime(), Is.EqualTo($"00:{minute.ToString("D2")}:00"));

}

[Test]

public void TestSecondMinute()

{

clock.Reset();

int second = 190;

int minute = second / 60;

for (int i = 0; i < second; i++) clock.Tick();

Assert.That(clock.GetTime(), Is.EqualTo($"00:{minute.ToString("D2")}:{(second % 60).ToString("D2")}"));

}

[Test]

public void TestOneHour()

{

clock.Reset();

int second = 3600;

for (int i = 0; i < second; i++) clock.Tick();

Assert.That(clock.GetTime(), Is.EqualTo("01:00:00"));

}

[Test]

public void TestNHour()

{

clock.Reset();

int hour = 5;

int second = 3600 \* hour;

for (int i = 0; i < second; i++) clock.Tick();

Assert.That(clock.GetTime(), Is.EqualTo($"{hour.ToString("D2")}:00:00"));

}

[Test]

public void TestHourMinuteSecond()

{

clock.Reset();

int second = 5500;

int minute = (second % 3600) / 60;

int hour = second / 3600;

for (int i = 0; i < second; i++) clock.Tick();

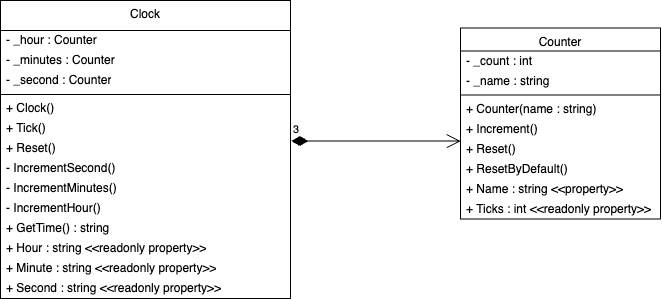
Assert.That(clock.GetTime(), Is.EqualTo($"{hour.ToString("D2")}:{minute.ToString("D2")}:{(second % 60).ToString("D2")}"));

}

}

}

# UML Class diagram



# Screenshot of the console output

# Screenshot of the Test Explorer showing your unit tests running

## For TestCounter.cs For TestClock.cs