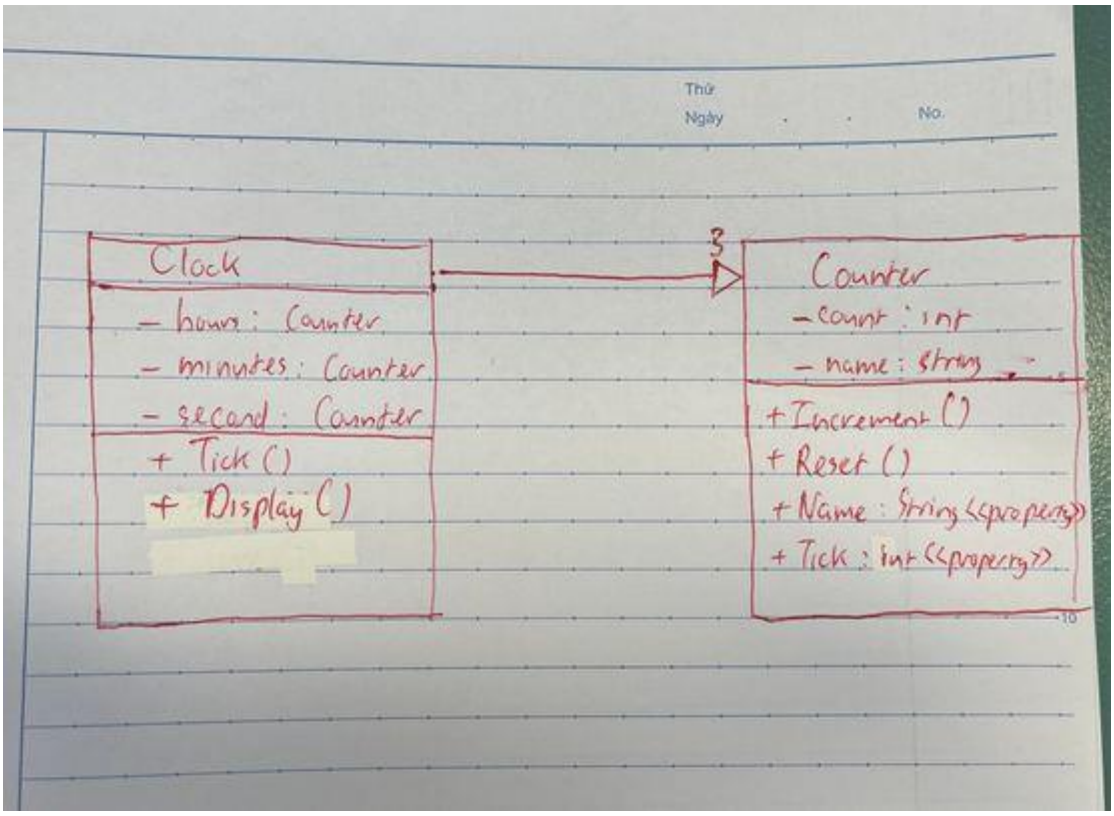
3.1P

UML Diagram



Program file

```
namespace _3._1
{
    internal class Program
    {
        static void Main(string[] args)
        {
            Clock clock = new Clock();

            for (int i = 0; i < 86400; i++)
            {
                clock.Tick();
                clock.Display();
            }
        }
    }
}
```

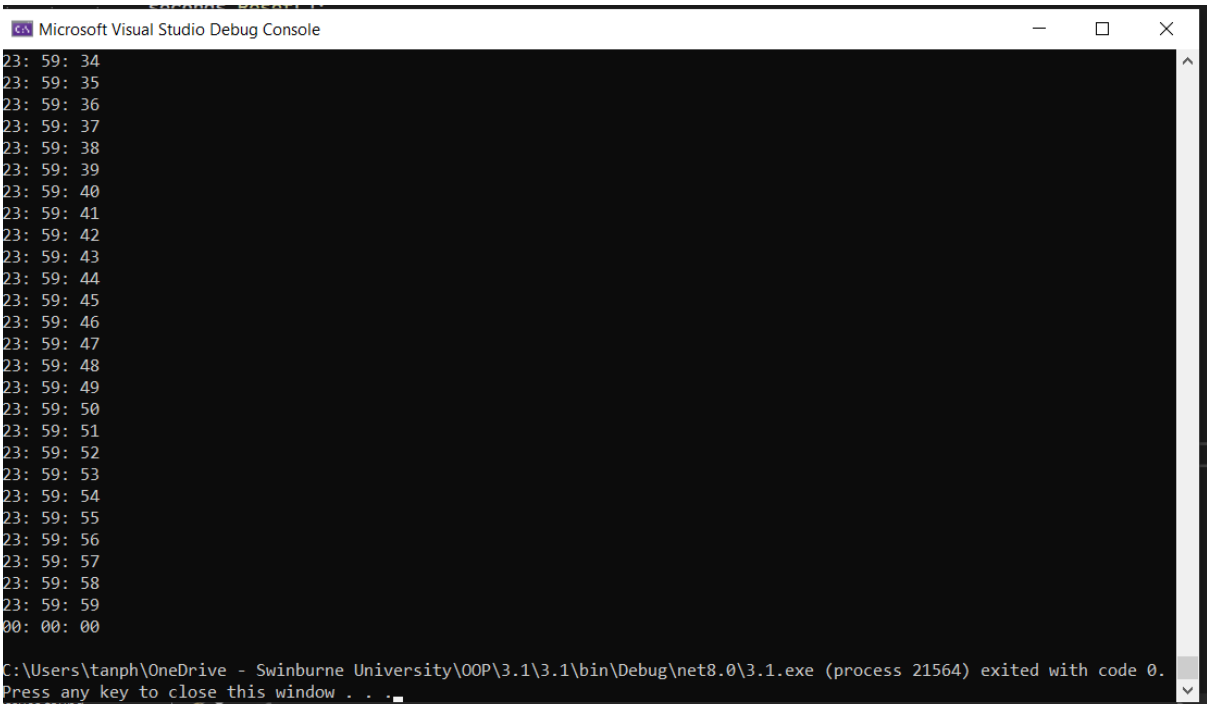
Counter class

```
using System;
using System.Collections.Generic;
using System.Linq;
using System.Text;
using System.Threading.Tasks;

namespace _3._1
{
    public class Counter
    {
        private int _count;
        private string _name;

        public Counter(string name)
        {
            _name = name;
            _count = 0;
        }

        public void Increment()
        {
            _count++;
        }

        public void Reset()
        {
            _count = 0;
        }

        public string Name
        {
            get { return _name; }
            set { _name = value; }
        }

        public int Ticks
        {
            get { return _count; }
        }
    }
}
```

Clock class

```
using System;
using System.Collections.Generic;
using System.Linq;
using System.Text;
using System.Threading.Tasks;

namespace _3._1
{
    public class Clock
    {
        private Counter _hours;
        private Counter _minutes;
        private Counter _seconds;

        public Clock()
        {
            _hours = new Counter("Hours");
            _minutes = new Counter("Minutes");
            _seconds = new Counter("Seconds");
        }

        public void Tick()
        {
            _seconds.Increment();
            if (_seconds.Ticks == 60)
            {
                _seconds.Reset();
                _minutes.Increment();
                if (_minutes.Ticks == 60)
                {
                    _minutes.Reset();
                    _hours.Increment();
                    if (_hours.Ticks == 24)
                    {
                        _hours.Reset();

                    }
                }
            }
        }

        public void Reset()
        {
            _hours.Reset();
            _minutes.Reset();
            _seconds.Reset();
        }

        public void Display()
        {
           Console.WriteLine($"{ _hours.Ticks:D2}: {_minutes.Ticks:D2}:
{_seconds.Ticks:D2}");
        }
    }
}
```

Output



```
23: 59: 34
23: 59: 35
23: 59: 36
23: 59: 37
23: 59: 38
23: 59: 39
23: 59: 40
23: 59: 41
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23: 59: 53
23: 59: 54
23: 59: 55
23: 59: 56
23: 59: 57
23: 59: 58
23: 59: 59
00: 00: 00

C:\Users\tanph\OneDrive - Swinburne University\OOP\3.1\3.1\bin\Debug\net8.0\3.1.exe (process 21564) exited with code 0.
Press any key to close this window . . .
```
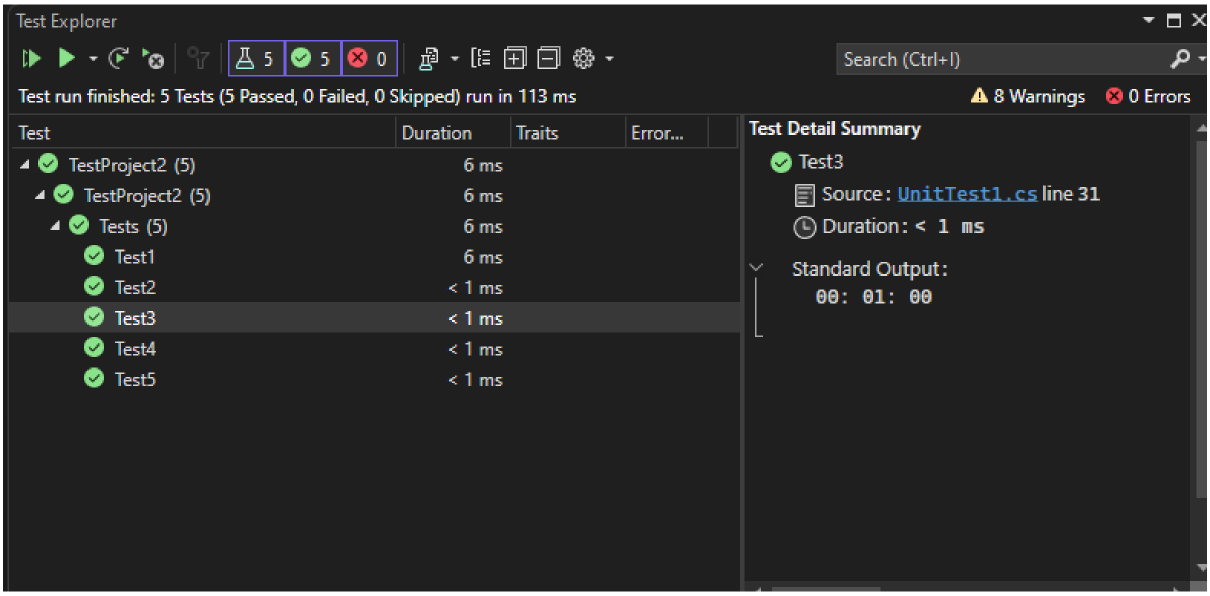

The clock runs till it hits 0:0:0 then stops

Test File

```
using _3._1;


namespace TestProject2
{
    public class Tests
    {
        [SetUp]
        public void Setup()
        {
        }

        Clock clock = new Clock();

        [Test]
        public void Test1()
        {
            clock.Reset();
            Assert.That(clock.Display, Is.EqualTo("00: 00: 00"));
        }

        [Test]
        public void Test2()
        {
            clock.Reset();
            clock.Tick();
            Assert.That(clock.Display, Is.EqualTo("00: 00: 01"));
        }

        [Test]
        public void Test3()
        {
            clock.Reset();
            for (int i = 0; i < 60; i++)
            {
                clock.Tick();
            }
            Assert.That(clock.Display, Is.EqualTo("00: 01: 00"));
        }

        [Test]
        public void Test4()
        {
            clock.Reset();
            for (int i = 0; i < 3600; i++)
            {
                clock.Tick();
            }
            Assert.That(clock.Display, Is.EqualTo("01: 00: 00"));
        }

        [Test]
        public void Test5()
        {
            clock.Reset();
            for (int i = 0; i < 86400; i++)
            {
                clock.Tick();
            }
            Assert.That(clock.Display, Is.EqualTo("00: 00: 00"));
            }
        }
}
```

Test Result



Test run finished: 5 Tests (5 Passed, 0 Failed, 0 Skipped) run in 113 ms

⚠ 8 Warnings ⊗ 0 Errors

```
Test                           Duration   Traits   Error...
◢ ✓ TestProject2 (5)               6 ms
  ◢ ✓ TestProject2 (5)             6 ms
    ◢ ✓ Tests (5)                  6 ms
        ✓ Test1                    6 ms
        ✓ Test2                  < 1 ms
        ✓ Test3                  < 1 ms
        ✓ Test4                  < 1 ms
        ✓ Test5                  < 1 ms
```

Test Detail Summary

✓ Test3

Source: UnitTest1.cs line 31

Duration: < 1 ms

Standard Output:

```
00: 01: 00
```