# Swinburne University of Technology

Faculty of Science, Engineering and Technology

COS20007 OBJECT ORIENTED PROGRAMMING

Semester 1-2024

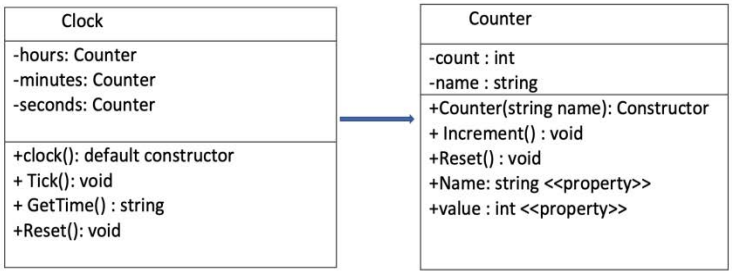

MD SHEKH SADI AL ASAD
ID-103798971

# 3.1P Clock Class

Program Class

```
using System;
using ClockClass;



class Program
{
   static void Main(string[] args)
   {
      Clock clock = new Clock();


      for (int i = 0; i < 100; i++)
      {
         clock.Tick();
         Console.WriteLine(clock.GetTime());
      }


      clock.Reset();
      Console.WriteLine(clock.GetTime());


      Console.ReadLine();
   }
}
```

Class UML diagram



Clock Class

```
using System;
using System.Collections.Generic;
using System.Linq;
using System.Text;
using System.Threading.Tasks;
namespace ClockClass
{
   public class Clock
   {
      private Counter hoursCounter;
      private Counter minutesCounter;
      private Counter secondsCounter;

      public Clock()
      {
         hoursCounter = new Counter("hours");
         minutesCounter = new Counter("minutes");
         secondsCounter = new Counter("seconds");
      }

      public void Tick()
      {
         secondsCounter.Increment();
         if (secondsCounter.Ticks == 60)
         {
            secondsCounter.Reset();
            minutesCounter.Increment();
         }
         if (minutesCounter.Ticks == 60)
         {
            minutesCounter.Reset();
            hoursCounter.Increment();
         }
         if (hoursCounter.Ticks == 24)
         {
            hoursCounter.Reset();
         }
      }

      public void Reset()
      {
         hoursCounter.Reset();
         minutesCounter.Reset();
         secondsCounter.Reset();
      }
```

```
        public string GetTime()
        {
            return $"{hoursCounter.Ticks:00}:{minutesCounter.Ticks:00}:{secondsCounter.Ticks:00}";
        }
    }


}
```

Counter Class

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

public class Counter
{
    private int _count;
    private string _name;
    public Counter(string name)
    {
        _count = 0;
        _name = name;
    }
    public int Increment()
    {
        _count++;
        return _count;
    }
    public int Reset()
    {
        _count = 0;
        return _count;
    }
    public string Name
    {
        get
        {
            return _name;
        }
        set
        {
            _name = value;
        }
    }
    public int Ticks
    {
        get
        {
            return _count;
        }
    }
}
```

Clock Test

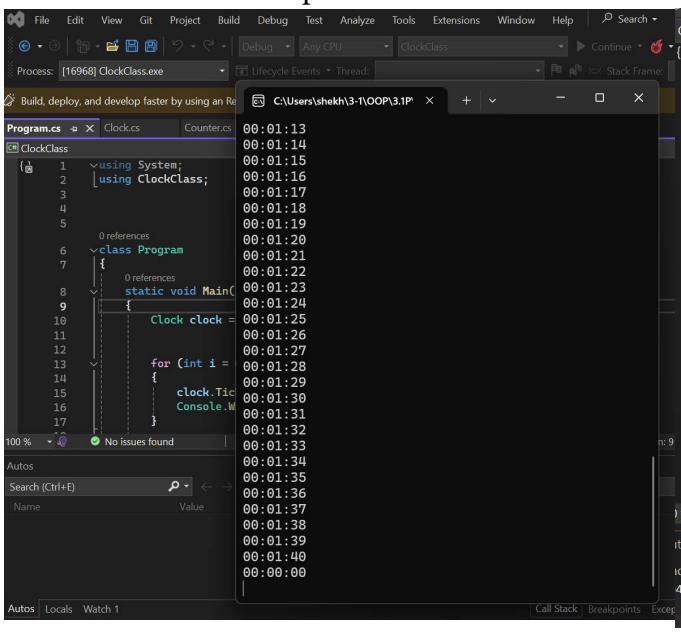
```
using ClockClass;

namespace ClockClass;
public class ClockTests
{
    [Test]
    public void Clock_Initialises_At_Zero()
    {

        Clock clock = new Clock();


        string time = clock.GetTime();


        Assert.That(time, Is.EqualTo("00:00:00"));
    }

    [Test]
    public void Clock_Tick_Increases_Seconds_By_One()
    {

        Clock clock = new Clock();


        clock.Tick();
        string time = clock.GetTime();


        Assert.That(time, Is.EqualTo("00:00:01"));
    }

    [Test]
    public void Clock_Tick_60_Times_Increases_Minutes_By_One()
    {

        Clock clock = new Clock();


        for (int i = 0; i < 60; i++)
        {
            clock.Tick();
        }
        string time = clock.GetTime();


        Assert.That(time, Is.EqualTo("00:01:00"));
    }
```

```
    [Test]
    public void Clock_Tick_3600_Times_Increases_Hours_By_One()
    {

        Clock clock = new Clock();


        for (int i = 0; i < 3600; i++)
        {
            clock.Tick();
        }
        string time = clock.GetTime();


        Assert.That(time, Is.EqualTo("01:00:00"));
    }

    [Test]
    public void Clock_Reset_Sets_Time_To_Zero()
    {

        Clock clock = new Clock();
        clock.Tick();
        clock.Tick();
        clock.Tick();


        clock.Reset();
        string time = clock.GetTime();


        Assert.That(time, Is.EqualTo("00:00:00"));
    }
}
```

Counter Test

```
using NUnit.Framework;
using System.Diagnostics.Metrics;

namespace ClockClass;

public class CounterTests
{
    [Test]
    public void Counter_Initialises_At_Zero()
    {
        Counter counter = new Counter("testCounter");

        int count = counter.Ticks;

        Assert.That(count, Is.EqualTo(0));
    }

    [Test]
    public void Counter_Increment_Adds_One_To_Count()
    {
        Counter counter = new Counter("testCounter");
        counter.Increment();
        int count = counter.Ticks;

        Assert.That(count, Is.EqualTo(1));
    }

    [Test]
    public void Counter_Increment_Multiple_Times_Increases_Count_To_Match()
    {
        Counter counter = new Counter("testCounter");
        counter.Increment();
        counter.Increment();
        counter.Increment();
        int count = counter.Ticks;

        Assert.That(count, Is.EqualTo(3));
    }

    [Test]
    public void Counter_Reset_Sets_Count_To_Zero()
    {
        Counter counter = new Counter("testCounter");
        counter.Increment();
        counter.Increment();
        counter.Reset();
        int count = counter.Ticks;

        Assert.That(count, Is.EqualTo(0));
    }
}
```

Clock Output




Test Results