COS20007: Object Oriented Programming

Hurdle Task 1: Semester Test

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FileSystem.cs

```
namespace Task1
{
    public class FileSystem
    {
        // Field
        private List<Thing> _contents;

        // Constructor
        public FileSystem()
        {
            _contents = new List<Thing> { };
        }

        // Methods
        public void Add(Thing toAdd)
        {
            _contents.Add(toAdd);
        }

        public void PrintContents()
        {
            Console.WriteLine("This File System contains:");
            foreach (Thing item in _contents)
            {
                item.Print();
            }
        }

        // Properties
    }
}
```

Thing.cs

```
namespace Task1
{
    public abstract class Thing
    {
        // Fields
        private string _name;

        // Constructors
        public Thing(string name)
        {
            _name = name;
        }

        // Method
        public abstract int Size();
        public abstract void Print();

        // Properties
        public string Name
        {
            get { return _name; }
        }
    }
}
```

Folder.cs

```
namespace Task1
{
    public class Folder : Thing
    {
        // Field
        private List<Thing> _contents;

        // Constructor
        public Folder(string name)
            : base(name)
        {
            _contents = new List<Thing> { };
        }

        // Methods
        public void Add(Thing toAdd)
        {
            _contents.Add(toAdd);
        }

        public override int Size()
        {
            int totalSize = 0;
            foreach (Thing item in _contents)
            {
                totalSize += item.Size();
            }
            return totalSize;
        }

        public override void Print()
        {
            if (_contents.Count() == 0)
            {
                Console.WriteLine($"The Folder: '{Name}' is empty!");
                return;
            }

            // Couting folders and files
            int foldersCount = 0;
            int filesCount = 0;
            foreach (Thing item in _contents)
            {
                if (item.GetType() == typeof(Folder)) foldersCount++;
                else if (item.GetType() == typeof(File)) filesCount++;
            }

            string folderStatus = foldersCount > 1 ? $"{foldersCount} folders" : $"{foldersCount} folder";
            string fileStatus = filesCount > 1 ? $"{filesCount} files" : $"{filesCount} file";

            Console.WriteLine(
                $"The Folder: '{Name}' contains {folderStatus} and {fileStatus} totalling {Size()} bytes:"
            );
            foreach (Thing item in _contents)
            {
                item.Print();
            }
        }
    }
}
```

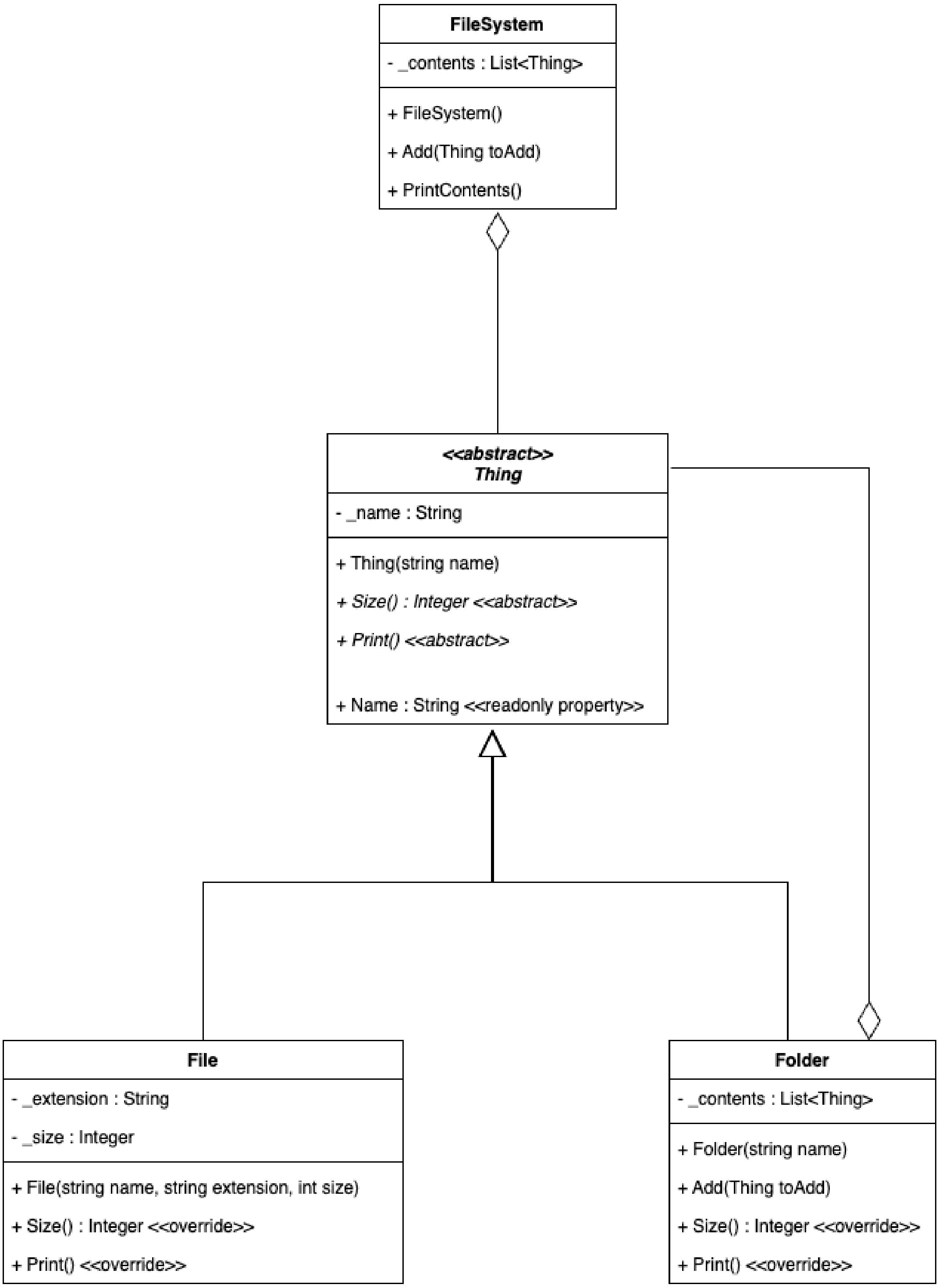
File.cs

```
namespace Task1
{
    public class File : Thing
    {
        // Fields
        private string _extension;
        private int _size;

        //Constructors
        public File(string name, string extension, int size)
            : base(name)
        {
            _extension = extension;
            _size = size;
        }

        // Methods
        public override int Size()
        {
            return _size;
        }

        public override void Print() {
          Console.WriteLine($"File '{Name}.{_extension}' Size: {Size()} bytes");
        }
    }
}
```

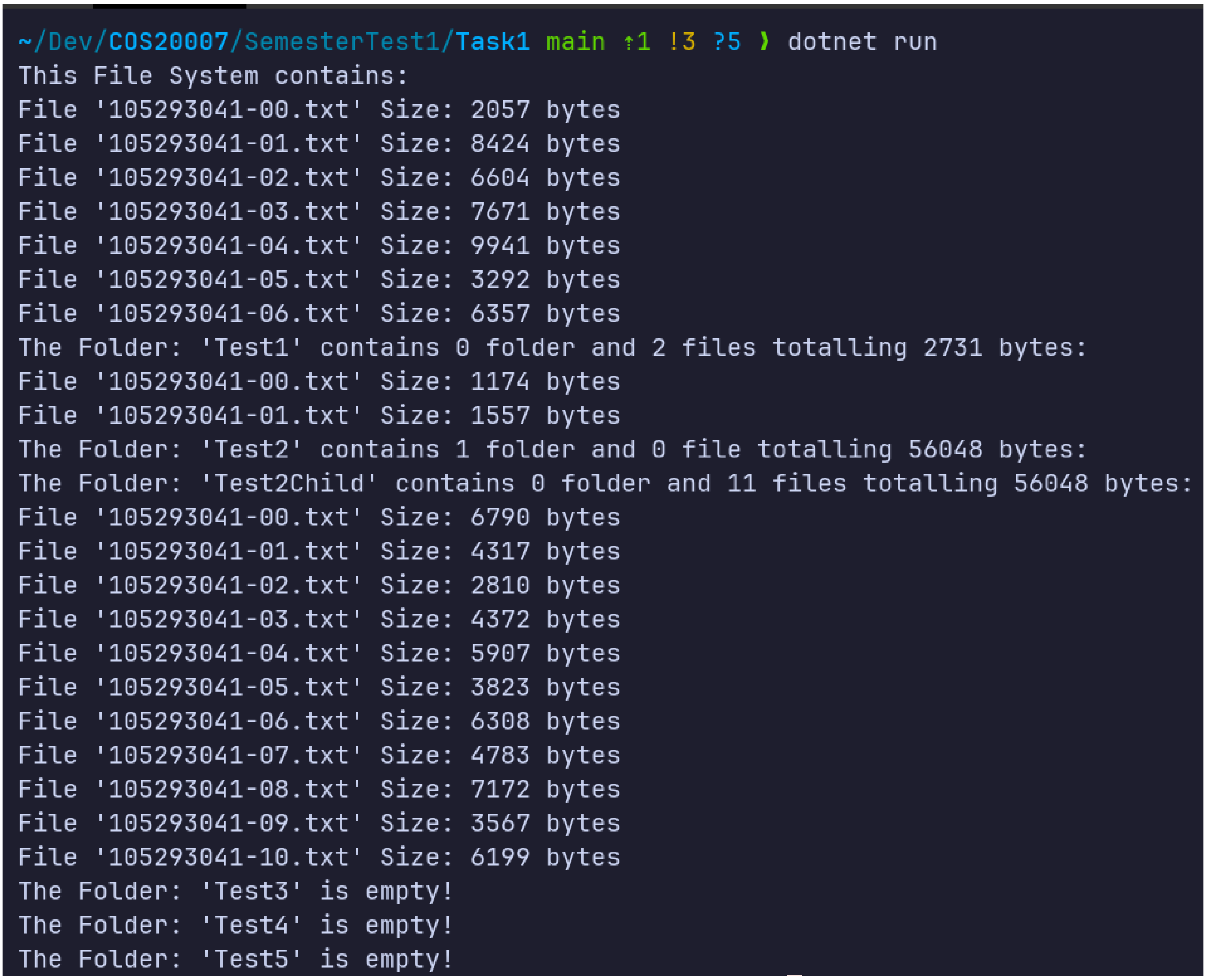
Program.cs

```
namespace Task1
{
    public class Program
    {
        public static void Main(string[] args)
        {
            // First 10 prime number
            int[] A = { 2, 3, 5, 7, 11, 13, 17, 19, 23, 29 };

            // Last four digit of my student id - 3041
            int[] B = { A[3], A[0], A[4], A[1] };

            // Create File Systems
            FileSystem midTest = new FileSystem();

            // Adding B[0] files to midTest
            string myStudentId = "105293041";

            for (int i = 0; i < B[0]; i++)
            {
                midTest.Add(
                    new File(
                        $"{myStudentId}-{i.ToString("D2")}",
                        "txt",
                        new Random().Next(1000, 10000)
                    )
                );
            }

            // Adding a folder that contains B[1] files to midTest
            Folder Test1 = new Folder("Test1");
            // Add B[1] files to Test1
            for (int i = 0; i < B[1]; i++)
            {
                Test1.Add(
                    new File(
                        $"{myStudentId}-{i.ToString("D2")}",
                        "txt",
                        new Random().Next(1000, 10000)
                    )
                );
            }
            midTest.Add(Test1); // Add that folder to midTest;

            // Adding a folder that contains a folder that contains B[2] files
            Folder Test2 = new Folder("Test2"); // Creating a parent folder
            Folder Test2Child = new Folder("Test2Child"); // Creating child folder of Parent
            // Add B[2] files to Test2Child
            for (int i = 0; i < B[2]; i++)
            {
                Test2Child.Add(
                    new File(
                        $"{myStudentId}-{i.ToString("D2")}",
                        "txt",
                        new Random().Next(1000, 10000)
                    )
                );
            }

            // Add Child folder to parent
            Test2.Add(Test2Child);
            // Add parent folder to midTest
            midTest.Add(Test2);

            // Adding a number of B[3] empty folders to the file system
            for (int i = 0; i < B[3]; i++)
            {
                midTest.Add(new Folder($"Test{i + 3}"));
            }

            midTest.PrintContents();
        }
    }
}
```

UML class diagram



A screenshot of the program output



```
~/Dev/COS20007/SemesterTest1/Task1 main ⇡1 !3 ?5 ❯ dotnet run
This File System contains:
File '105293041-00.txt' Size: 2057 bytes
File '105293041-01.txt' Size: 8424 bytes
File '105293041-02.txt' Size: 6604 bytes
File '105293041-03.txt' Size: 7671 bytes
File '105293041-04.txt' Size: 9941 bytes
File '105293041-05.txt' Size: 3292 bytes
File '105293041-06.txt' Size: 6357 bytes
The Folder: 'Test1' contains 0 folder and 2 files totalling 2731 bytes:
File '105293041-00.txt' Size: 1174 bytes
File '105293041-01.txt' Size: 1557 bytes
The Folder: 'Test2' contains 1 folder and 0 file totalling 56048 bytes:
The Folder: 'Test2Child' contains 0 folder and 11 files totalling 56048 bytes:
File '105293041-00.txt' Size: 6790 bytes
File '105293041-01.txt' Size: 4317 bytes
File '105293041-02.txt' Size: 2810 bytes
File '105293041-03.txt' Size: 4372 bytes
File '105293041-04.txt' Size: 5907 bytes
File '105293041-05.txt' Size: 3823 bytes
File '105293041-06.txt' Size: 6308 bytes
File '105293041-07.txt' Size: 4783 bytes
File '105293041-08.txt' Size: 7172 bytes
File '105293041-09.txt' Size: 3567 bytes
File '105293041-10.txt' Size: 6199 bytes
The Folder: 'Test3' is empty!
The Folder: 'Test4' is empty!
The Folder: 'Test5' is empty!
```