31st Morning Assignment

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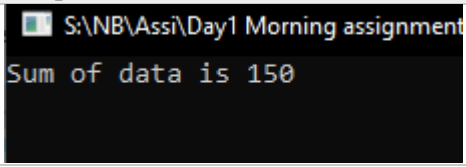
1. Create a simple program to declare ArrayList and assign some values and find sum.

Code:

```
using System;
using System.Collections;

namespace SumUsingArrayList
{
    internal class Program
    {
        static void Main(string[] args)
        {
            int sum = 0;
            ArrayList data = new ArrayList();

            data.Add(10);
            data.Add(20);
            data.Add(30);
            data.Add(40);
            data.Add(50);

            foreach(var item in data)
            {
                sum = sum + Convert.ToInt32(item);
            }

            Console.WriteLine($"Sum of data is {sum}");

            Console.ReadLine();
        }
    }
}
```

Output:



2. Research and find how the values of ArrayList are stored in the memory.

A System.Collections.ArrayList object is a sophisticated version of an array. The ArrayList class provide some features that are offered in most System.Collections classes but that are not in the Array class. For example:

The capacity of an Array is fixed, whereas the capacity of an ArrayList is automatically expanded as required. If the capacity of an ArrayList is changed, the memory reallocation and copying of elements are automatically done.

ArrayList provide methods that add, insert, or remove a range of elements. In Array, you can get or set the value of only one element at a time.

ArrayList is a Reference Type, but not Typesafe and less efficient

ArrayList is array-based structures. Therefore they will have a size something like: Capacity*sizeof(T). Since ArrayList stores things internally in an object[] it will have an additional pointer reference for each item.

3. What are the dis-advantages of ArrayList (Collections ArrayList)

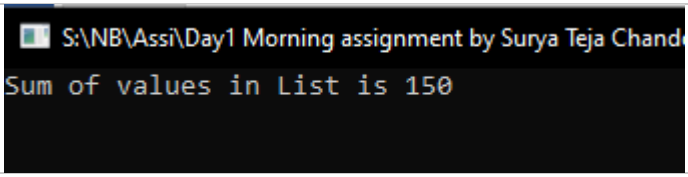
- ArrayList is that it holds only object types.
- We need to un-box the variables every time.
- ArrayList has more Run time error.

4. Create a simple program to declare List<int> and assign some values and find sum

Code:

```
using System;
using System.Collections.Generic;

namespace SumUsingList
{
    internal class Program
    {
        static void Main(string[] args)
        {
            int sum = 0;
            List<int> data = new List<int>();

            data.Add(10);
            data.Add(20);
            data.Add(30);
            data.Add(40);
            data.Add(50);

            foreach (int l in data)
            {
                sum = sum + l;
            }

            Console.WriteLine($"Sum of values in List is {sum}");

            Console.ReadLine();
        }
    }
}
```

Output:



5. In a tabular format write the differences between Collections and generics.

	Collection	Generic
Name space	System.Collections.ArrayList	System.Collections.Generic.List
Element type	Object	Primitive data type(Ex: int, string,…)
Type Casting	Yes	No
Example	ArrayList data = new ArrayList();	List<int> data = new List<int>();

6. Research and find how the values of List<T> are stored in the memory.

A System.Collections.Generic.List<T> object is a sophisticated version of an array. The List<T> generic class provide some features that are offered in most System.Collections classes but that are not in the Array class. For example:

The capacity of an Array is fixed, whereas the capacity of a List<T> is automatically expanded as required. If the capacity of a List<T> is changed, the memory reallocation and copying of elements are automatically done.

List<T> provide methods that add, insert, or remove a range of elements. In Array, you can get or set the value of only one element at a time.

List<T> or Generic list is a Reference Type,but is Type Safe and efficient

List<T> is array-based structures. Therefore they will have a size something like: Capacity*sizeof(T). Since ArrayList stores things internally in an object[] it will have an additional pointer reference for each item (if the T is a value type).

7. WACP to declare List<String> and add 5 values and print the values using

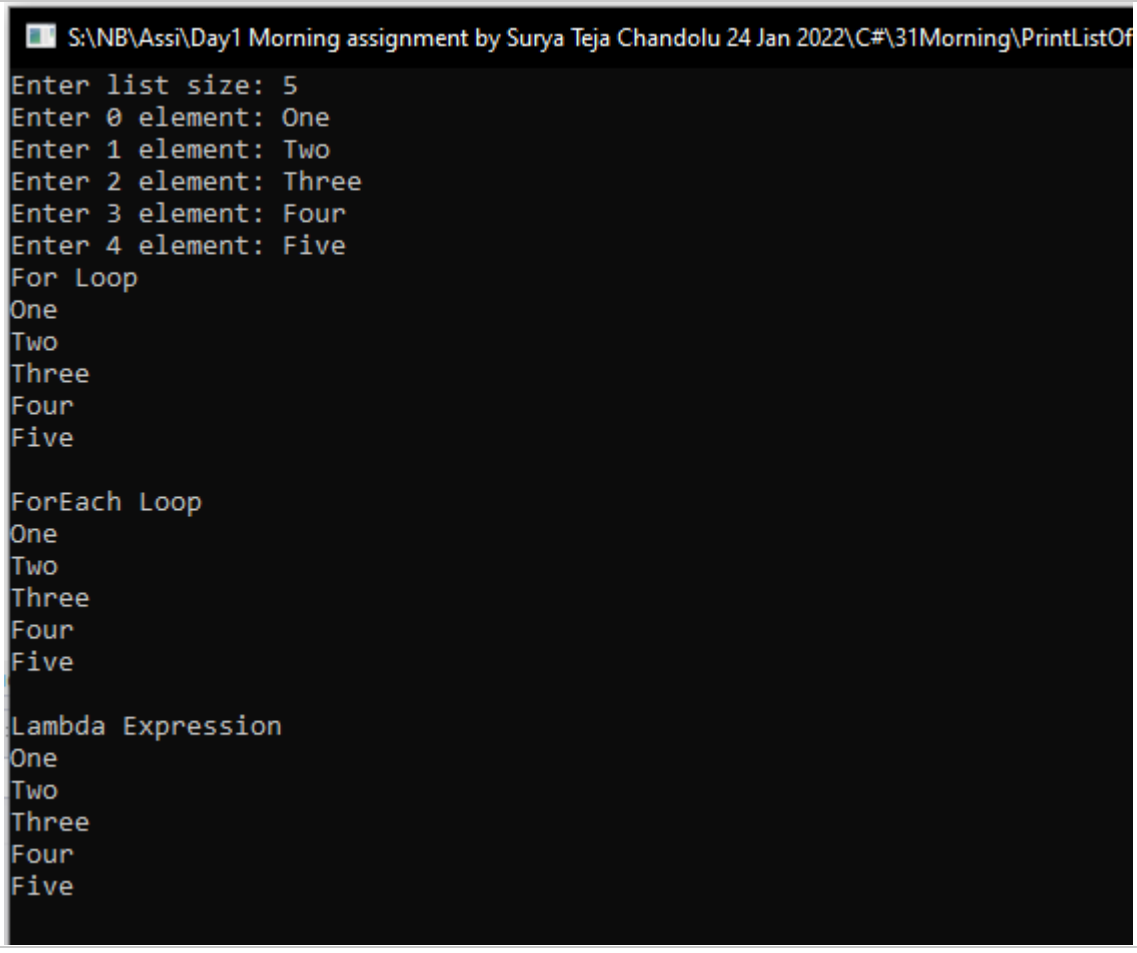
a. for loop
b. foreach loop
c. Lambda Expression

Code:

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

namespace PrintListOfString
{
    internal class Program
    {
        static void Main(string[] args)
        {
            int size;
            List<string> data = new List<string>();
```

```
            Console.Write("Enter list size: ");
            size = Convert.ToInt32(Console.ReadLine());

            for (int i = 0; i < size; i++)
            {
                Console.Write($"Enter {i} element: ");
                data.Add(Console.ReadLine());
            }


            Console.WriteLine("For Loop");
            for (int i = 0; i < data.Count; i++)
                Console.WriteLine(data[i]);

            Console.WriteLine("\nForEach Loop");
            foreach (string s in data)
                Console.WriteLine(s);

            Console.WriteLine("\nLambda Expression");
            data.ForEach(p => Console.WriteLine(p));

            Console.ReadLine();
        }
    }
}
```

Output:

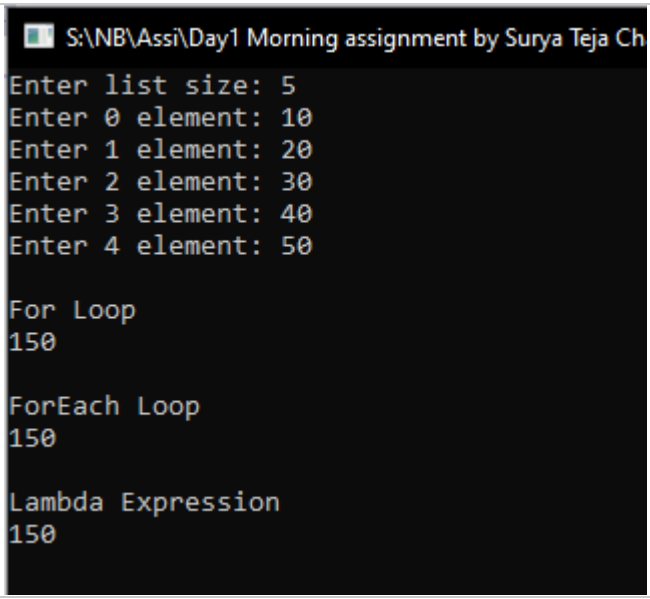


8. WACP to declare List<int> and read 5 values from user and find sum using
a. for loop
b. foreach loop
c. Lamdba Expression

Code:

```
using System;
using System.Collections.Generic;

namespace SumOfListInt
{
    internal class Program
    {
        static void Main(string[] args)
        {
            int size, num, sum  = 0, sum1 = 0, sum2 = 0;
            List<int> data = new List<int>();

            Console.Write("Enter list size: ");
            size = Convert.ToInt32(Console.ReadLine());



            for (int i = 0; i < size; i++)
            {
                Console.Write($"Enter {i} element: ");
                data.Add(Convert.ToInt32(Console.ReadLine()));
            }


            //For Loop
            for (int i = 0; i < data.Count; i++)
                sum = sum + data[i];

            //ForEach Loop
            foreach (int n in data)
                sum1 = sum1 + n;

            //Lambda Expression
            data.ForEach(x => sum2 = sum2 + x);

            Console.WriteLine("\nFor Loop");
            Console.WriteLine(sum);
            Console.WriteLine("\nForEach Loop");
            Console.WriteLine(sum1);
            Console.WriteLine("\nLambda Expression");
            Console.WriteLine(sum2);

            Console.ReadLine();
        }
    }
}
```

Output:



9. In a tabular format write all data types in C# and write the respective alias name

Data Type	Alias Name
byte	Byte
ushort	UInt16
uint	UInt32
ulong	UInt64
sbyte	sByte
short	Int16
int	Int32
long	Int64
float	Single
double	Double
decimal	Decimal
bool	Boolean
char	Char
string	String

10. Write example programs for implicit and explicit type casting.

Code:

```
using System;

namespace ImplicitAndExplicit
{
    internal class Program
    {
        static void Main(string[] args)
        {
            //Implicit type casting
            short shortValue = 10;
            int intValue = shortValue;
            Console.WriteLine($"Short Value is {shortValue} and Integer Value
is {intValue}.");

            //Explicit type casting
            double doubleValue = 5.7;
```

```
            float floatValue = Convert.ToSingle(doubleValue);
            Console.WriteLine($"Double Value is {doubleValue} and Float Value
is {floatValue}.");

            Console.ReadLine();
        }
    }
}
```

Output: