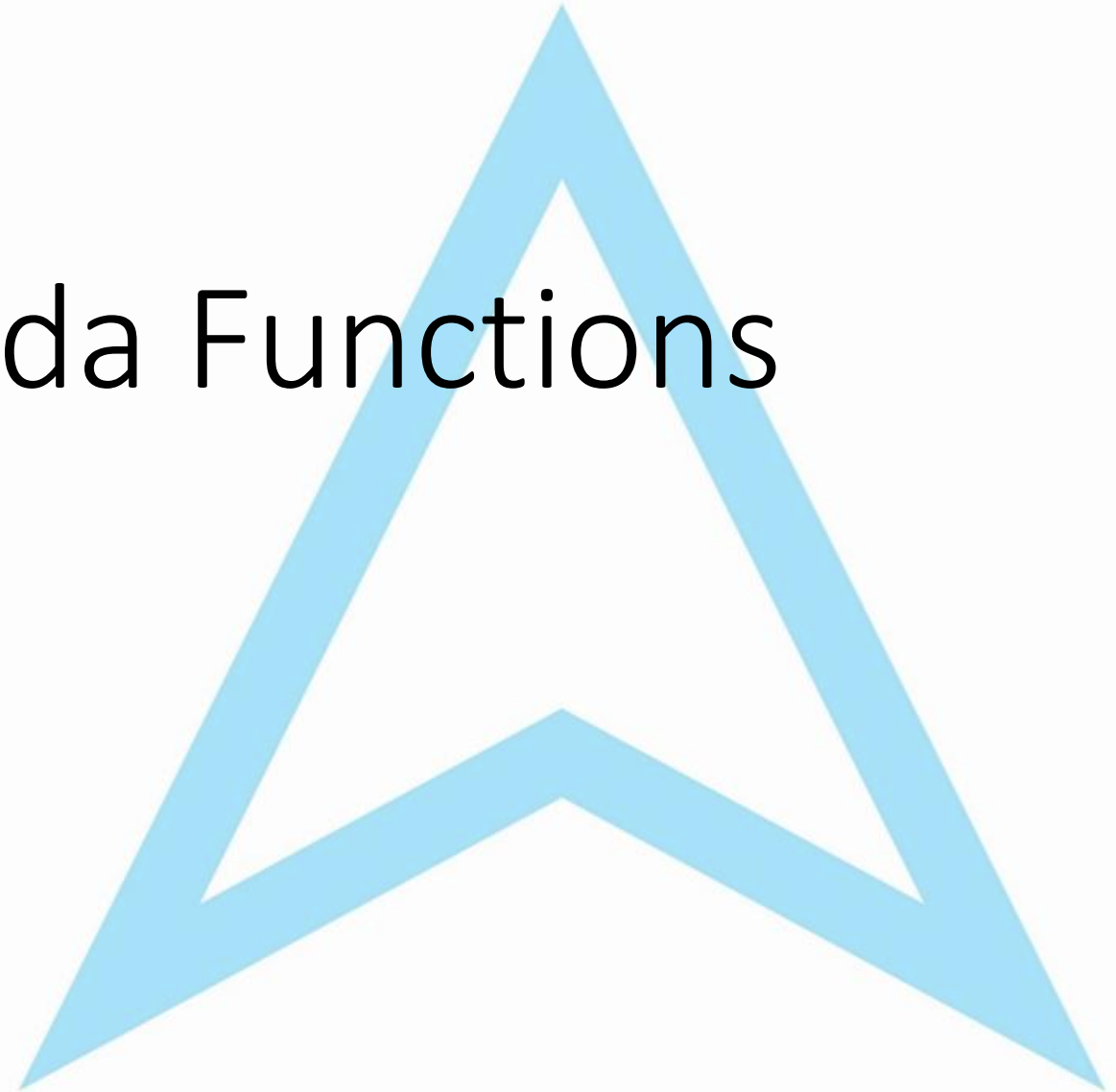
LINQ – Lambda Functions



Anonymous Functions

- Functions are data, too!
- Demo

Problem

- When dealing with collections
- We write the same boilerplate code over and over to do different things:
  - Find a count of items meeting some criteria
  - Find the sum or other aggregate of a property
  - Selecting a subgroup of items based on some criteria

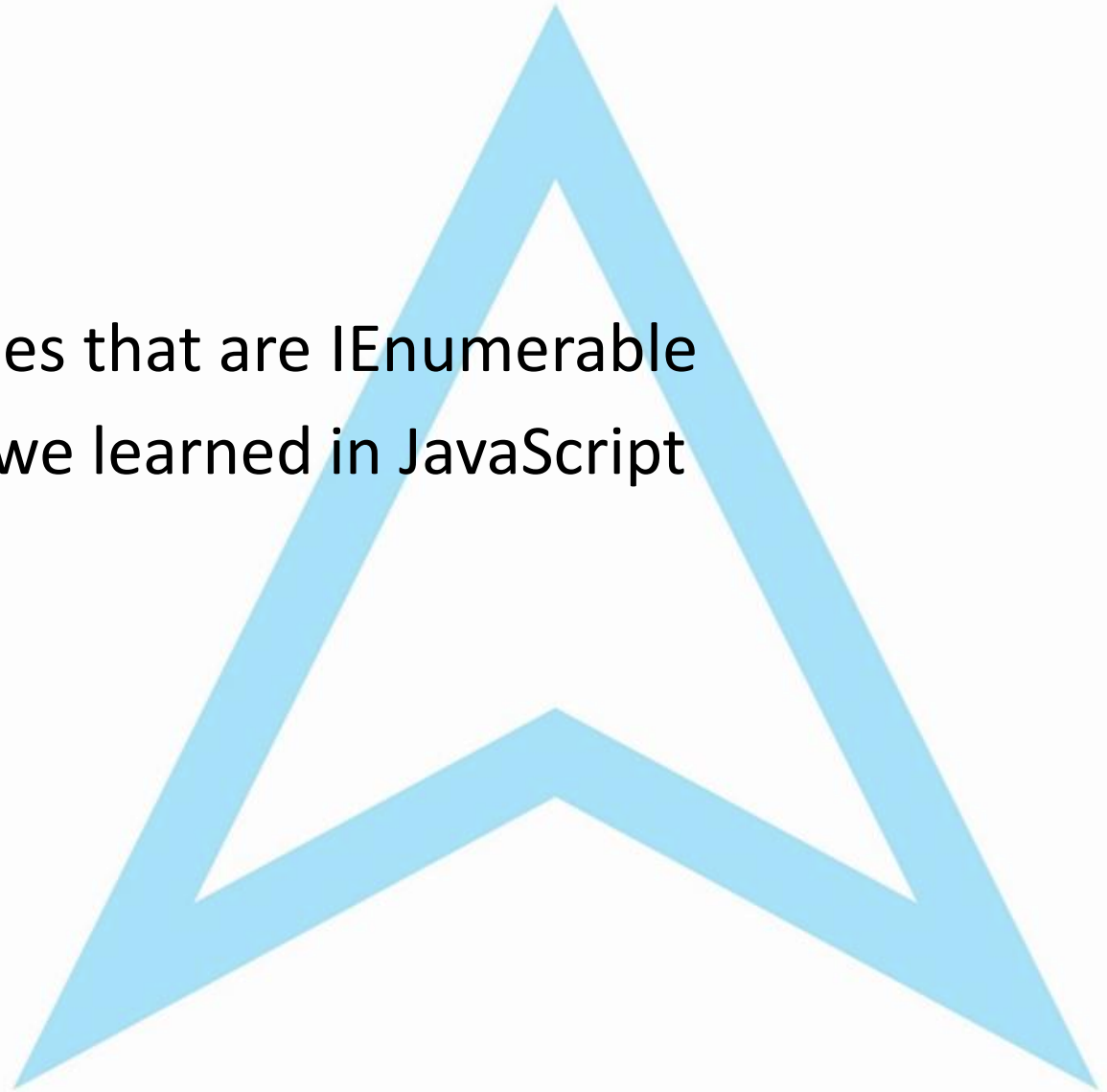
```
// Get a count of people taller than minHeight
int count = 0;
foreach (Person p in People)
{
    if (p.Height > minHeight)
    {
        count++;
    }
}
return count;
```

```
// Get the length of people end-to-end
int sum = 0;
foreach (Person p in People)
{
    sum += p.Height;
}
return sum;
```

```
// Filter by height
List<Person> list = new List<Person>();
foreach (Person p in People)
{
    if (p.Height > minHeight)
    {
        list.Add(p);
    }
}
return list;
```

LINQ

- Language Integrated Query
- System.Linq namespace
- A set of shortcut methods for classes that are IEnumerable
- Similar to the array functions that we learned in JavaScript



Array functions (js vs. LINQ)

JS Function	Parameters	Returns	C# Linq
forEach	Item	Executes the code iteratively, for each element in the array. No return value.	
filter	Item	Array of the same type (<= original size), filtered by the function	Where
map	Item	Array of same size, original elements "mapped" to something new	Select
sort	Item1, Item2	Array of same size and type, with elements sorted. Return 1 if Item1 > Item2, -1 if item1 < item2, 0 otherwise	OrderBy, OrderByDescending
reduce	Accum, Item	A single value, allows calculating a running value	Sum, Aggregate
every	Item	Boolean, true if every item meets the condition	All
some	Item	Boolean, true if at least one item meets the condition	Any

LINQ Syntax

- Uses Lambda Expressions, allowing short syntax to write anonymous methods
- Func is another word for Function.
  - This function will be applied against each item in the collection.
- Func<Person, bool> is the method signature indicating two things:
  - The function will receive one argument, a reference to a Person in the list
  - The expression will resolve to a single bool value. (this is a predicate)