# Interface

- An Interface is defined using the `interface` keyword
- Interfaces are used only during compilation time to check types
- By convention, interface definitions start with an `I`, e.g. : `IPoint`
- Interfaces are used in classical object oriented programming as a design tool
- Interfaces don't contain implementations
- They provide definitions only
- When an object implements an interface, it must adhere to the contract defined by the interface
- An interface defines what properties and methods an object must implement
- If an object implements an interface, it must adhere to the contract. If it doesn't the compiler will let us know.
- Interfaces also define custom types

## Basic Interface

Below is an example of an Interface that defines two properties and three methods that implementers should provide implementations for:

```
interface IMyInterface {
  // some properties
  id: number;
  name: string;

  // some methods
  method(): void;
  methodWithReturnVal():number;
  sum(nums: number[]):number;
}
```

Using the interface above we can create an object that adheres to the interface:

```
let myObj: IMyInterface = {
  id: 2,
  name: 'some name',

  method() { console.log('hello'); },
  methodWithReturnVal () { return 2; },
  sum(numbers) {
    return numbers.reduce( (a,b) => { return a + b } );
  }
};
```

Notice that we had to provide values to **all** the properties defined by the Interface, and the implementations for **all** the methods defined by the Interface.

And then of course you can use your object methods to perform operations:

```
let sum = myObj.sum([1,2,3,4,5]); // -> 15
```

## Classes as Interfaces

Because classes define types as well, they can also be used as interfaces. If you have an interface you can extend it with a class for example:

```
class Point {
  x: number;
  y: number;
}
interface Point3d extends Point {
  z: number;
}
const point3d: Point3d = {x: 1, y: 2, z: 3};
console.log(point3d.x); // -> 1
```

First we are defining a class called `Point` that defines two fields. Then we define an interface called `Point3d` that extends the `Point` by adding a third field. An then we create a point of type `point3d` and assign a value to it. We read the value and it outputs `1`.