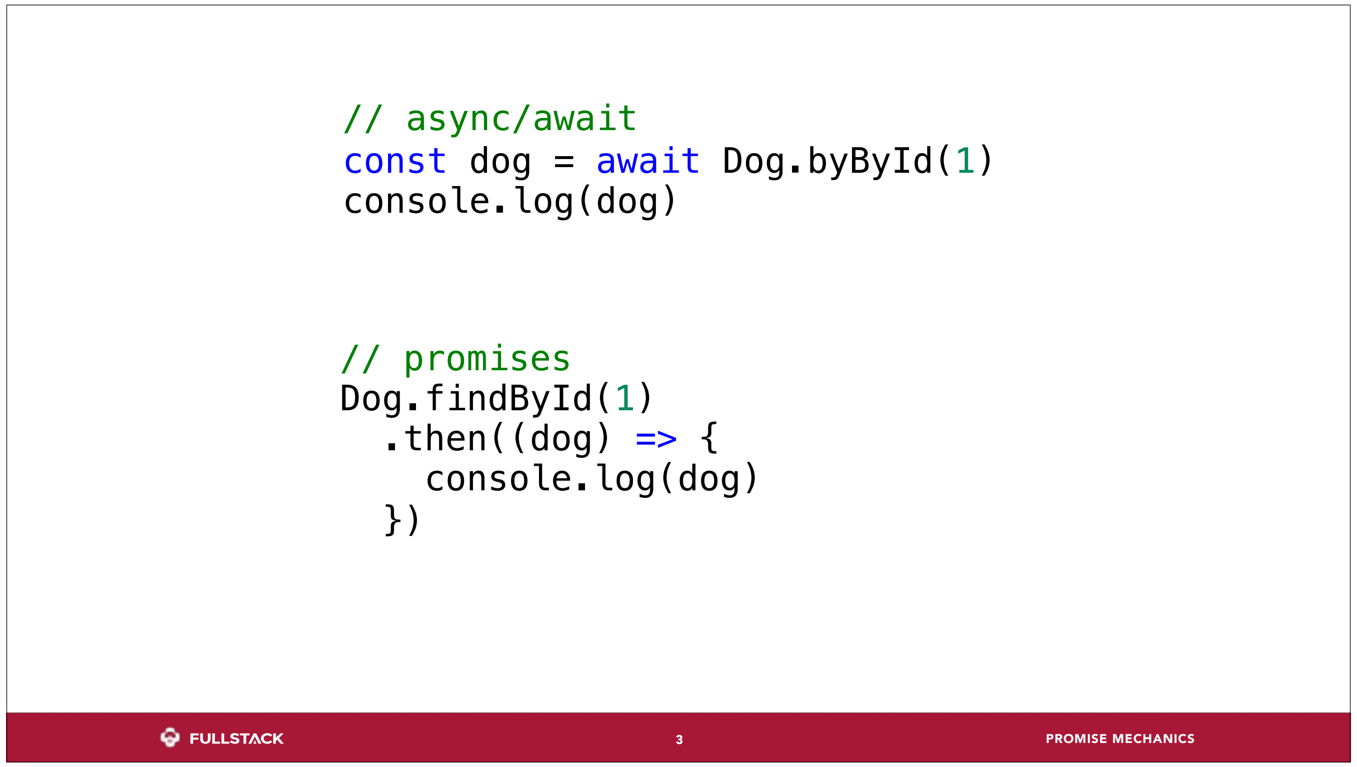
Promise Structure

```
// async/await
const dog = await Dog.byById(1)
console.log(dog)
```



```
// async/await
const dog = await Dog.byById(1)
console.log(dog)


// promises
Dog.findById(1)
  .then((dog) => {
    console.log(dog)
  })
```

Need to use .then and the callback to unwrap the value

```
// async/await
try {
  const dog = await Dog.byById(1)
  console.log(dog)
} catch (err) {
  console.log(err)
}
```

```
// async/await
try {
  const dog = await Dog.byById(1)
  console.log(dog)
} catch (err) {
  console.log(err)
}


// promises
Dog.findById(1)
  .then(
    (dog) => console.log(dog), // success
    (err) => console.log(err)  // err
  )
```

.then

- **Accepts two arguments**
  - “Success” callback
  - “Error” callback
- **If the promise resolves (succeeds)**
  - “Success” callback is invoked with the value
- **If the promise rejects (fails)**
  - “Error” callback is invoked with the value

.then

- You can attach as many of these at you want, whenever you want

```
const promiseForDog = Dog.findAll()

promiseForDog.then((dog) => {
  console.log('Got a dog over here: ', dog)
})

promiseForDog.then((dog) => {
  console.log('Dog once again: ', dog)
})
```

Promise “chaining”

Promise chaining

- **What if we want to do things in order?**
  - I want to *this thing*, and **then** I want to do this other thing!
- **Achieved by chaining promises**
- **The trick: every call to .then returns a new promise!**

```
const p1 = Dog.findById(1)
const p1 = Dog.findById(1)
p1.then(dog => {

})
```

```
const p1 = Dog.findById(1)
const p2 = p1.then(dog => {

           })
```

```
const p1 = Dog.findById(1)
const p2 = p1.then(dog => {

          })

// q: what is p2 a promise for?
```

```
const p1 = Dog.findById(1)
const p2 = p1.then(dog => {
                    // a: whatever we return
              })          from this callback!
```

```
const p1 = Dog.findById(1)
const p2 = p1.then(dog => {
                 return 5
             })

p2.then(result => {
  console.log(result)) // 5
}
```

```
const p1 = Dog.findById(1)
const p2 = p1.then(dog => {
                 return dog.update()
             })

p2.then(result => {
  console.log(result)) // ?
}
```

```
const p1 = Dog.findById(1)
const p2 = p1.then(dog => {
                return dog.update()
           })

p2.then(result => {
  console.log(result)) // the updated dog!
}
```

```
const p1 = Dog.findById(1)
const p2 = p1.then(dog => {
                 return dog.update()
              })

p2.then(result => {
  console.log(result)) // the updated dog!
}
```

```
Dog.findById(1)
   .then(dog => {
     return dog.update()
 })
   .then(result => {
   console.log(result)) // the updated dog!
 }
```

```
Dog.findById(1)
   .then(dog => {
     return dog.update() // what if this fails?
 })
   .then(result => {
   console.log(result))
 }
```

```
Dog.findById(1)
   .then(dog => {
     return dog.update() // what if this fails?
 })
  .then(result => {
  console.log(result))
})
  .catch(err => {
  console.error(err))
}
```

.catch

- Just like .then, but only accepts an error handler
- In most cases you can use .then for success handlers, and .catch for error handlers
- Rejection will “bubble down” to the first error handler

Success

PI

```
Dog.findById(1)
   .then(dog => {
     return dog.update()
 })
  .then(result => {
  console.log(result))
})
  .catch(err => {
  console.error(err))
}
```

Success

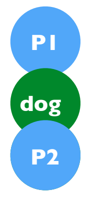
```
Dog.findById(1)
   .then(dog => {
     return dog.update()
 })
  .then(result => {
  console.log(result))
})
  .catch(err => {
  console.error(err))
}
```

Success

```
Dog.findById(1)
    .then(dog => {
      return dog.update()
 })
   .then(result => {
   console.log(result))
 })
   .catch(err => {
   console.error(err))
 }
```

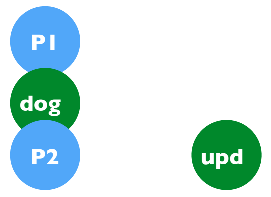
Success

```
Dog.findById(1)
    .then(dog => {
      return dog.update()
 })
   .then(result => {
   console.log(result))
 })
   .catch(err => {
   console.error(err))
 }
```



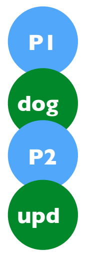
Success

```
Dog.findById(1)
   .then(dog => {
     return dog.update()
 })
   .then(result => {
   console.log(result))
 })
   .catch(err => {
   console.error(err))
 }
```



Success

```
Dog.findById(1)
   .then(dog => {
     return dog.update()
 })
  .then(result => {
  console.log(result))
 })
  .catch(err => {
  console.error(err))
 }
```



Error

PI

```
Dog.findById(1)
   .then(dog => {
     return dog.update()
 })
   .then(result => {
   console.log(result))
 })
   .catch(err => {
   console.error(err))
 }
```

Error

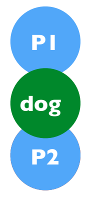
```
Dog.findById(1)
   .then(dog => {
     return dog.update()
 })
   .then(result => {
   console.log(result))
 })
   .catch(err => {
   console.error(err))
 }
```

Error

```
Dog.findById(1)
   .then(dog => {
     return dog.update()
 })
   .then(result => {
   console.log(result))
 })
   .catch(err => {
   console.error(err))
 }
```

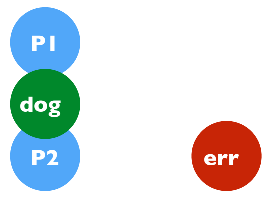
Error

```
Dog.findById(1)
    .then(dog => {
      return dog.update()
 })
   .then(result => {
   console.log(result))
 })
   .catch(err => {
   console.error(err))
 }
```



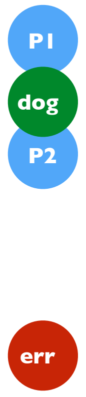
Error

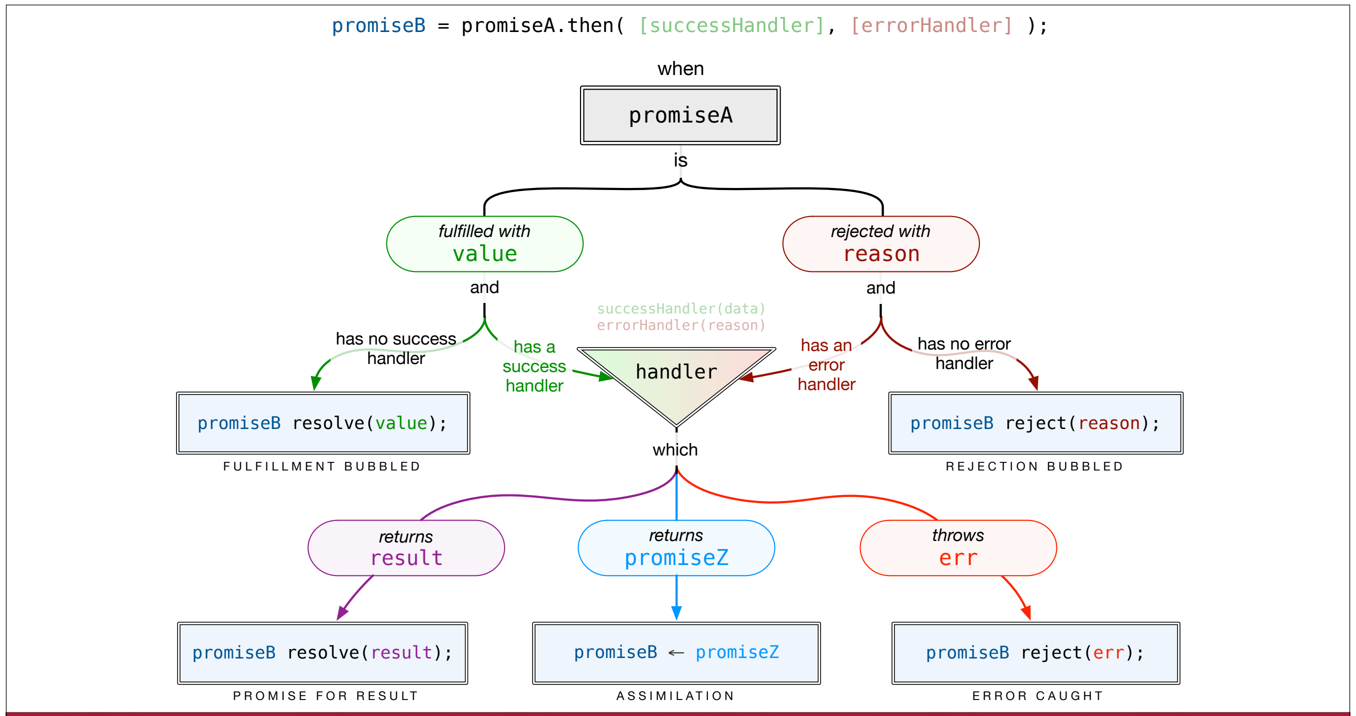
```
Dog.findById(1)
   .then(dog => {
     return dog.update()
 })
   .then(result => {
   console.log(result))
 })
   .catch(err => {
   console.error(err))
 }
```



Error

```
Dog.findById(1)
   .then(dog => {
     return dog.update()
 })
   .then(result => {
   console.log(result))
 })
   .catch(err => {
   console.error(err))
 }
```





Important: one start point (pA), five possible endpoints (pB), depending on: 1) have the right handler? 2) handler return something, or 3) handler throws an error?

External Resources for Further Reading

- Kris Kowal & Domenic Denicola: Q (great examples & resources)
- The Promises/A+ Standard (with use patterns and an example implementation)
- We Have a Problem With Promises
- HTML5 Rocks: Promises (deep walkthrough with use patterns)
- DailyJS: Javascript Promises in Wicked Detail (build an ES6-style implementation)
- MDN: ES6 Promises (upcoming native functions)
- Promise Nuggets (use patterns)
- Promise Anti-Patterns