MVVM in Aurelia

Agends

- Dependency Injection (DI)
- Model View View-Model (MVVM)

Dependency Injection (DI)

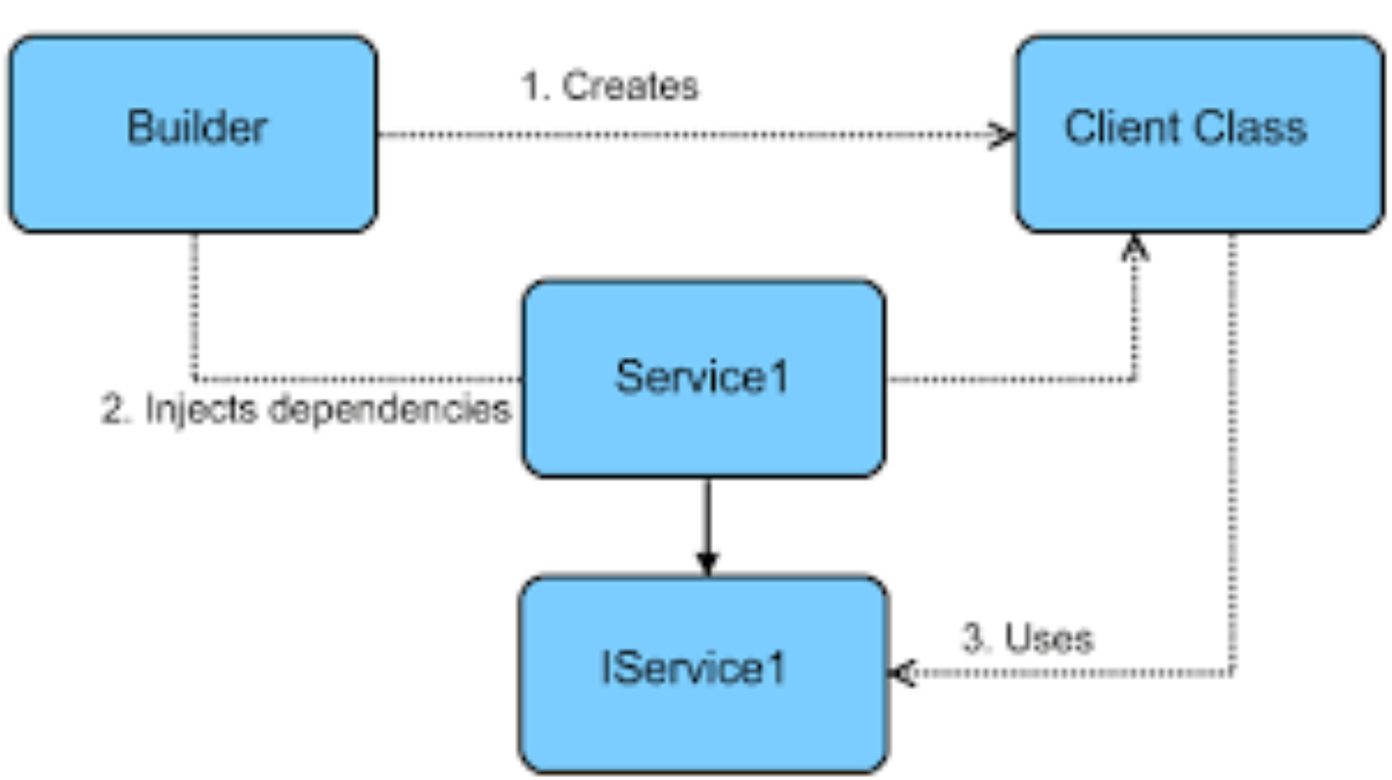
- When building applications, it's often necessary to take a "divide and conquer" approach by breaking down complex problems into a series of simpler problems.

- This translates to breaking down complex objects into a series of smaller objects, each focusing on a single concern, and collaborating with the others to form a complex system.

- The work of destructuring a system can introduce a new complexity of "re-assembling" the smaller parts again at runtime. This is what a dependency injection aims to simplify - using simple declarative hints.

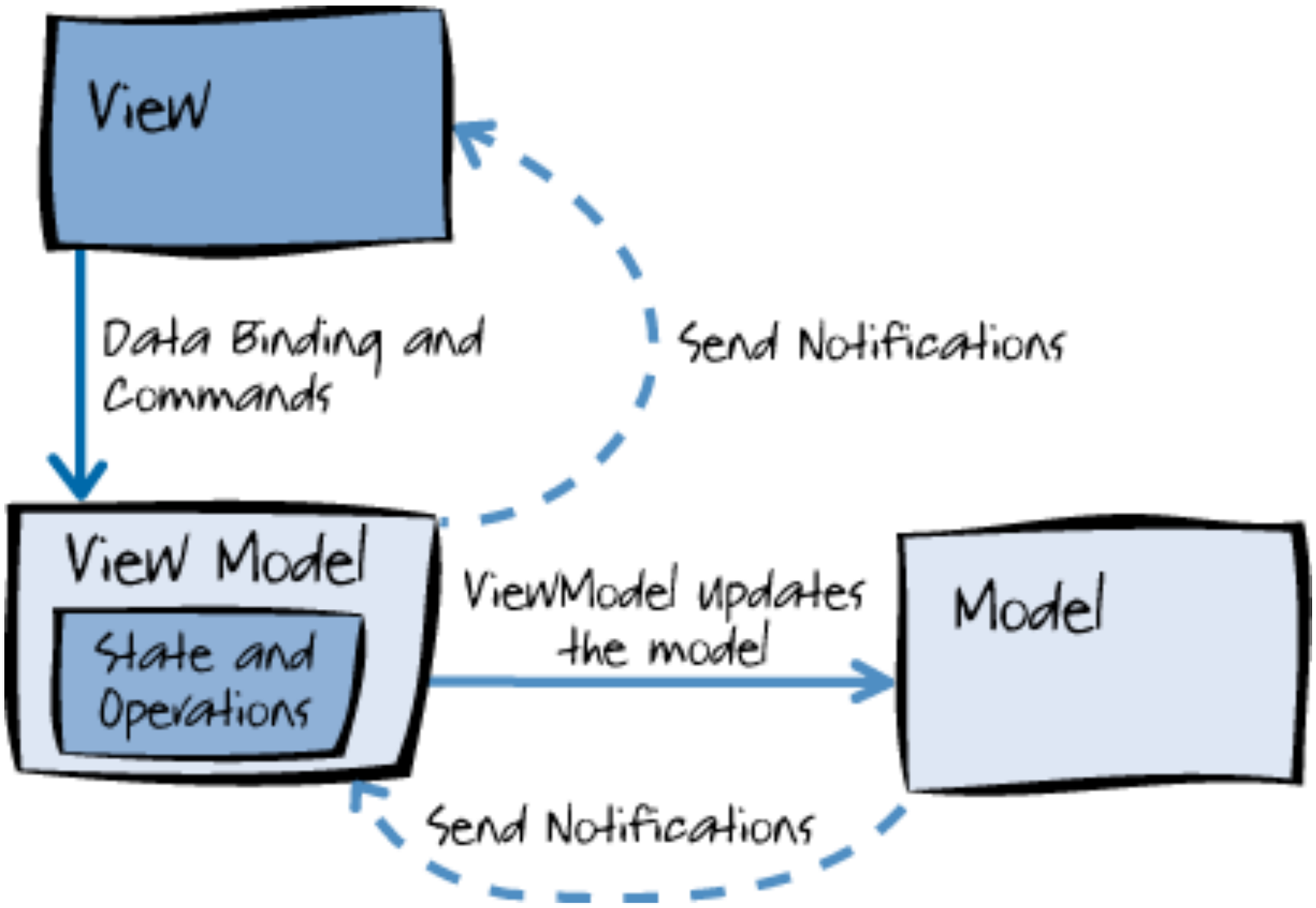
Benefits of DI

- Dependency injection separates the creation of a client's dependencies from the client's behavior, which allows program designs to be loosely coupled



https://en.wikipedia.org/wiki/Dependency_injection

MVVM


View
Data Binding and Commands
Send Notifications
View Model
State and Operations
ViewModel updates the model
Model
Send Notifications

Benefits of MVVM

1. Separation of Skills: This enables a separation of responsibilities on teams have a designers and programmers

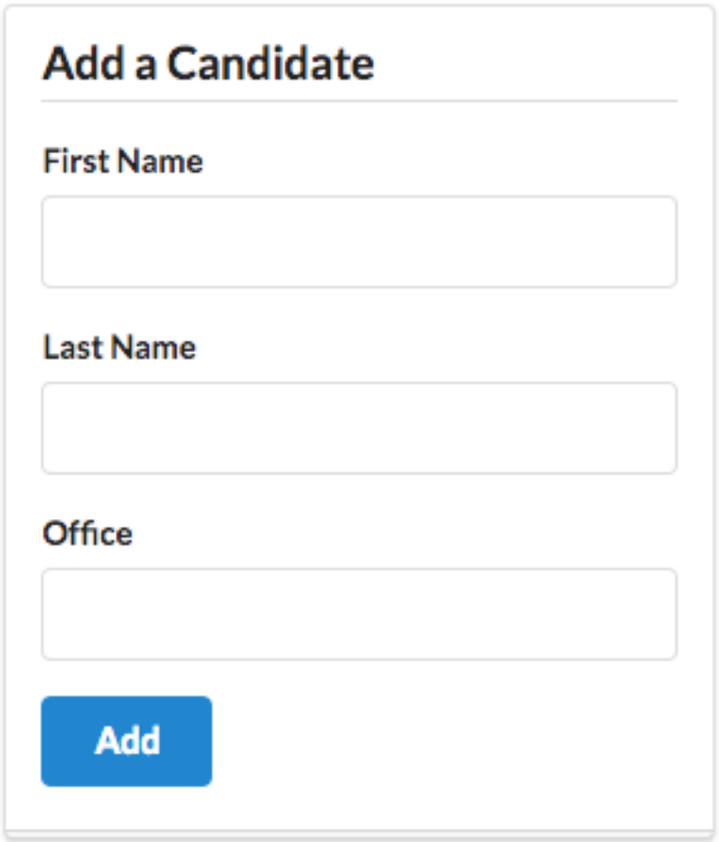
2. Views are agnostic from the code that runs behind them, enabling the same view-models to be reused across multiple views

3. No duplicated code to update views - rely on databinding to keep view and view-model in sync.

4. Since view-model is separated from view view-model classes can be tested independently

5. The Model can be shared across multiple view-models, and can be used to centralise resource access (e.g. Remote API access).

View



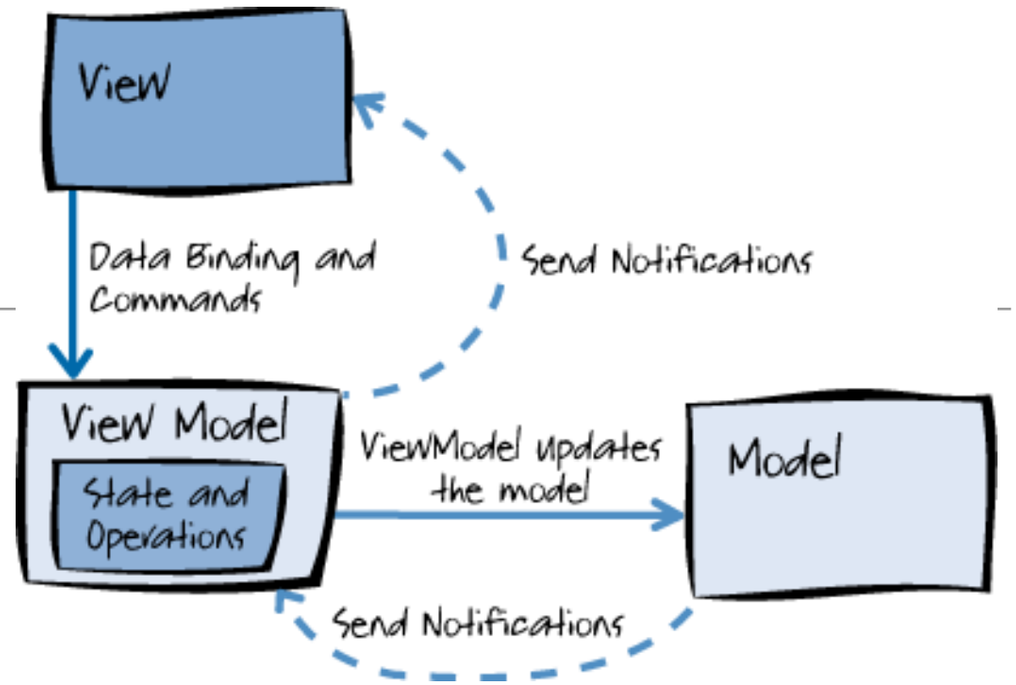

```
<template>

  <form submit.trigger="addCandidate()" class="ui form stacked segment">
    <h3 class="ui dividing header"> Add a Candidate </h3>
    <div class="field">
      <label>First Name </label> <input value.bind="firstName">
    </div>
    <div class="field">
      <label>Last Name </label> <input value.bind="lastName">
    </div>
    <div class="field">
      <label>Office </label> <input value.bind="office">
    </div>
    <button class="ui blue submit button">Add</button>
  </form>

</template>
```

View-Model

```
import {inject} from 'aurelia-framework';
import DonationService from '../services/donation-service';

@inject(DonationService)
export class Candidate {

  firstName = '';
  lastName = '';
  office = '';

  constructor(ds) {
    this.donationService = ds;
  }

  addCandidate() {
    this.donationService.addCandidate(this.firstName, this.lastName, this.office);
  }
}
```

Model

```
import {inject} from 'aurelia-framework';
import Fixtures from './fixtures';

@inject(Fixtures)
export default class DonationService {

  donations = [];
  methods = [];
  candidates = [];

  constructor(data) {
    this.donations = data.donations;
    this.candidates = data.candidates;
    this.methods = data.methods;
  }

  donate(amount, method, candidate) {
    const donation = {
      amount: amount,
      method: method,
      candidate: candidate
    };
    this.donations.push(donation);
    console.log(amount + ' donated to ' + candidate.firstName + ' ' + candidate.lastName + ': ' + method);
  }

  addCandidate(firstName, lastName, office) {
    const candidate = {
      firstName: firstName,
      lastName: lastName,
      office: office
    };
    this.candidates.push(candidate);
  }
}
```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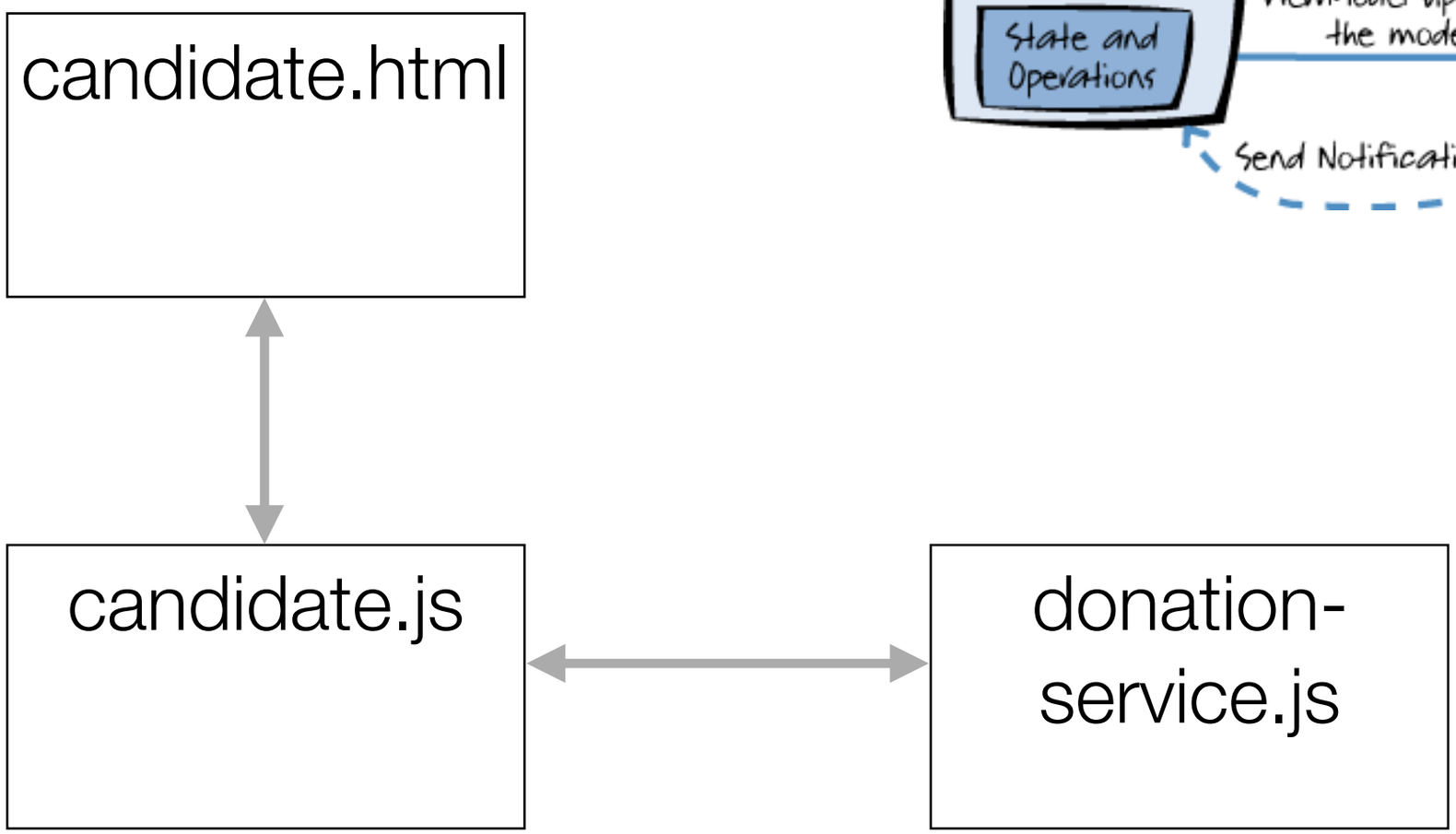
candidate.html
candidate.js
donation-service.js

```
<template>

  <form submit.trigger="addCandidate()" class="ui form stacked segment">
    <h3 class="ui dividing header"> Add a Candidate </h3>
    <div class="field">
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    </div>
    <div class="field">
      <label>Last Name </label> <input value.bind="lastName">
    </div>
    <div class="field">
      <label>Office </label> <input value.bind="office">
    </div>
    <button class="ui blue submit button">Add</button>
  </form>

</template>
```

candidate.html

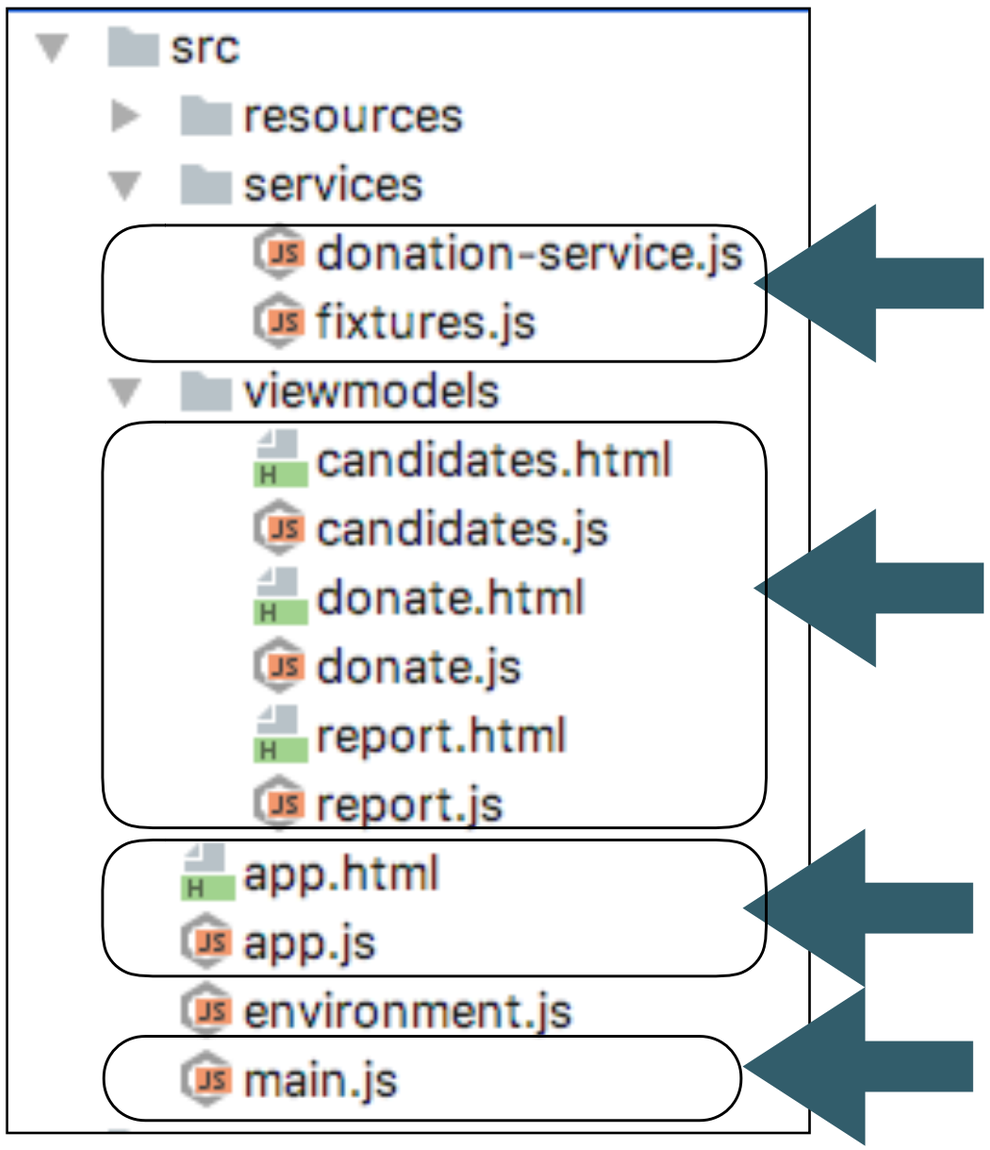
```
import {inject} from 'aurelia-framework';
import Fixtures from './fixtures';

@inject(Fixtures)
export default class DonationService {

  donations = [];
  methods = [];
  candidates = [];

  constructor(data) {
    this.donations = data.donations;
    this.candidates = data.candidates;
    this.methods = data.methods;
  }

  donate(amount, method, candidate) {
    const donation = {
      amount: amount,
      method: method,
      candidate: candidate
    };
    this.donations.push(donation);
    console.log(amount + ' donated to ' + candidate.firstName + ' '
            + candidate.lastName + ': ' + method);
  }

  addCandidate(firstName, lastName, office) {
    const candidate = {
      firstName: firstName,
      lastName: lastName,
      office: office
    };
    this.candidates.push(candidate);
  }
}
```

candidate.js

donation-service.js

```
import {inject} from 'aurelia-framework';
import DonationService from '../services/donation-service';

@inject(DonationService)
export class Candidate {

  firstName = '';
  lastName = '';
  office = '';

  constructor(ds) {
    this.donationService = ds;
  }

  addCandidate() {
    this.donationService.addCandidate(this.firstName,
                                      this.lastName, this.office);
  }
}
```

Project Structure



- Shared services
- Reusable view-models
- Landing view-model
- Main Entrypoint

DI in the Candidate View-Model

Import the inject ‘decorator’ from the aurelia frameowork

Import DonationSevice Class

Inject a ‘singleton’ instance of DonationService into the Candidate object

Accept the injected DonationService instance and save for later

Send the new candidate details to donationService

```
import {inject} from ‘aurelia-framework';


import DonationService from ‘../services/donation-service';


@inject(DonationService)
export class Candidate {

  firstName = '';
  lastName = '';
  office = '';


  constructor(ds) {
    this.donationService = ds;
  }


  addCandidate() {
    this.donationService.addCandidate(this.firstName,
                                      this.lastName,
                                      this.office);
  }
}
```

DI in DonationService

- Fixtures contains sample initial data for test purposes

```
import {inject} from 'aurelia-framework';
import Fixtures from './fixtures';

@inject(Fixtures)
export default class DonationService {

  donations = [];
  methods = [];
  candidates = [];

  constructor(data) {
    this.donations = data.donations;
    this.candidates = data.candidates;
    this.methods = data.methods;
  }

  donate(amount, method, candidate) {
    const donation = {
      amount: amount,
      method: method,
      candidate: candidate
    };
    this.donations.push(donation);
    console.log(amount + ' donated to ' + candidate.firstName + ' '
            + candidate.lastName + ': ' + method);
  }

  addCandidate(firstName, lastName, office) {
    const candidate = {
      firstName: firstName,
      lastName: lastName,
      office: office
    };
    this.candidates.push(candidate);
  }
}
```

```
export default class Fixtures {

  methods = ['Cash', 'PayPal'];

  candidates = [
    {
      firstName: 'Lisa',
      lastName: 'Simpson'
    },
    {
      firstName: 'Bart',
      lastName: 'Simpson'
    }
  ];

  donations = [
    {
      amount: 23,
      method: 'cash',
      candidate: this.candidates[0]
    },
    {
      amount: 212,
      method: 'paypal',
      candidate: this.candidates[1]
    }
  ];
}
```

Report View-Model

```
import {inject} from 'aurelia-framework';
import DonationService from '../services/donation-service';

@inject(DonationService)
export class Report {

  donations = [];

  constructor(ds) {
    this.donationService = ds;
    this.donations = this.donationService.donations;
  }
}
```

- donations and array in Report view-model, bound to view

Initialised to reference donations array in DonationService

```
<template>

  <article class="ui stacked segment">
    <h3 class='ui dividing header'> Donations to Date </h3>
    <table class="ui celled table segment">
      <thead>
        <tr>
          <th>Amount</th>
          <th>Method donated</th>
          <th>Candidate</th>
        </tr>
      </thead>
      <tbody>
        <tr repeat.for="donation of donations">
          <td> ${donation.amount}</td>
          <td> ${donation.method}</td>
          <td> ${donation.candidate.lastName}, ${donation.candidate.firstName}</td>
        </tr>
      </tbody>
    </table>
  </article>

</template>
```

- View now bound to DonationService donations

Donate View-Model

```
import {inject} from 'aurelia-framework';
import DonationService from '../services/donation-service';

@inject(DonationService)
export class Donate {

  amount = 0;

  methods = [];
  selectedMethod = '';

  candidates = [];
  selectedCandidate = '';

  constructor(ds) {
    this.donationService = ds;
    this.methods = ds.methods;
    this.selectedMethod = this.methods[0];
    this.candidates = ds.candidates;
    this.selectedCandidate = this.candidates[0];
  }

  makeDonation() {
    this.donationService.donate(this.amount,
                                this.selectedMethod,
                                this.selectedCandidate);
  }
}
```

```
<template>

    <form submit.trigger="makeDonation()" class="ui form stacked segment">

      <h3 class='ui dividing header'> Make a Donation </h3>
      <div class="grouped inline fields">
        <div class="field">
          <label>Amount</label> <input type="number" value.bind="amount">
        </div>
      </div>

      <h4 class="ui dividing header"> Select Method </h4>
      <div class="grouped inline fields">

        <div class="field" repeat.for="method of methods">
          <div class="ui radio checkbox">
            <input type="radio" model.bind="method" checked.bind="selectedMetho
            <label>${method}</label>
          </div>
        </div>
        <label class="ui circular label"> ${selectedMethod} </label>
      </div>

      <h4 class="ui dividing header"> Select Candidate </h4>
      <div class="grouped inline fields">
        <div class="field" repeat.for="candidate of candidates">
          <div class="ui radio checkbox">
            <input type="radio" model.bind="candidate" checked.bind="selectedCa
            <label>${candidate.lastName}, ${candidate.firstName}</label>
          </div>
        </div>
        <label class="ui circular label"> ${selectedCandidate.firstName} ${sele
      </div>

      <button class="ui blue submit button">Donate</button>

    </form>

</template>
```

- makeDonation updates DonationService model
- Databinding ensures report is updated

Make a Donation

Amount 2

Select Method

- (•) Cash
- ( ) PayPal

Cash

Select Candidate

- ( ) Simpson, Lisa
- (•) Simpson, Bart
- ( ) simpson, donald

Bart Simpson

Donate

Donations to Date

Amount	Method donated	Candidate
23	cash	Simpson, Lisa
212	paypal	Simpson, Bart
2	Cash	Simpson, Bart

Add a Candidate

First Name

donald

Last Name

simpson

Office

president

Add