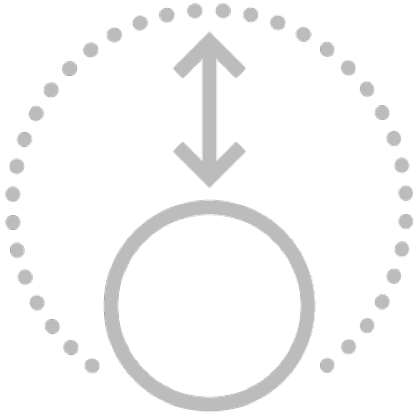
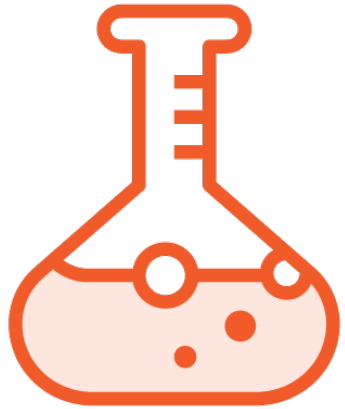
Interfaces and Dynamic Loading

Why Interfaces?

Maintainable



Extensible



Easily testable

Best Practice

Program to an abstraction rather than a concrete type

Program to an interface
rather than a concrete class

Program to an Interface

```
private void FetchData(string repositoryType)
{
    ClearListBox();
    IPersonRepository repository =
        RepositoryFactory.GetRepository(repositoryType);
    var people = repository.GetPeople();
    foreach (var person in people)
        PersonListBox.Items.Add(person);
    ShowRepositoryType(repository);
}
```

No Reference to Concrete Types

Compile-Time Factory

```
public static class RepositoryFactory
 {
     public static IPersonRepository GetRepository(
       string repositoryType)
     {
       IPersonRepository repo = null;
       switch (repositoryType)
       {
           case "Service": repo = new ServiceRepository();
               break;
           case "CSV": repo = new CSVRepository();
               break;
           case "SQL": repo = new SQLRepository();
               break;
           default:
               throw new ArgumentException("Invalid Repository Type");
       }
       return repo;
    }
 }
```

Factory Comparison

Compile-Time Factory

Has a Parameter

- Caller decides which repository to use

Compile-Time Binding

- Factory needs references to repository assemblies

Dynamic Factory

No Parameter

- Factory returns a repository based on configuration

Run-Time Binding

- Factory has no compile-time references to repository assemblies

Dynamic Loading

Get Type and Assembly from Configuration

Load Assembly through Reflection

Create a Repository Instance with the Activator

Dynamic Loading

```
public static class RepositoryFactory
{
  public static IPersonRepository GetRepository()
  {
    string typeName =
      ConfigurationManager.AppSettings["RepositoryType"];
    Type repoType = Type.GetType(typeName);
    object repoInstance = Activator.CreateInstance(repoType);
    IPersonRepository repo = repoInstance as IPersonRepository;
    return repo;
  }
}
```

Unit Testing

Testing small pieces of code

- Usually on the method level

Testing in isolation

- Eliminate outside interactions that might break the test
- Reduce the number of objects needed to run the test

Note: We still need Integration Testing

- Testing that the pieces all work together

What We Want to Test

```
public partial class MainWindow : Window
{
    private void FetchButton_Click(object sender, RoutedEventArgs e)
    {
      ClearListBox();

      IPersonRepository repository = RepositoryFactory.GetRepository();

      var people = repository.GetPeople();
      foreach (var person in people)
        PersonListBox.Items.Add(person);

      ShowRepositoryType(repository);
    }
```

What We Want to Test

```
public partial class MainWindow : Window
{
    private void FetchButton_Click(object sender, RoutedEventArgs e)
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      ShowRepositoryType(repository);
    }
```

Additional Layering

Very Simple MVVM Implementation

Application

View Model

Repository

Data Storage

Isolating Code

Move Functionality to a View Model

- Eliminates dependency on UI objects

Add a Fake Repository

- Eliminates dependency on network, file system, or SQL database
- Ensures consistent behavior

Remember: Not testing Repository here.

Testing “Fetch Data” functionality in application code.

Summary

Program to an Interface only

Dynamic Loading / Late Binding

Unit Testing

- Application Layering
- Fake Repository

UP NEXT:

Where to go Next