

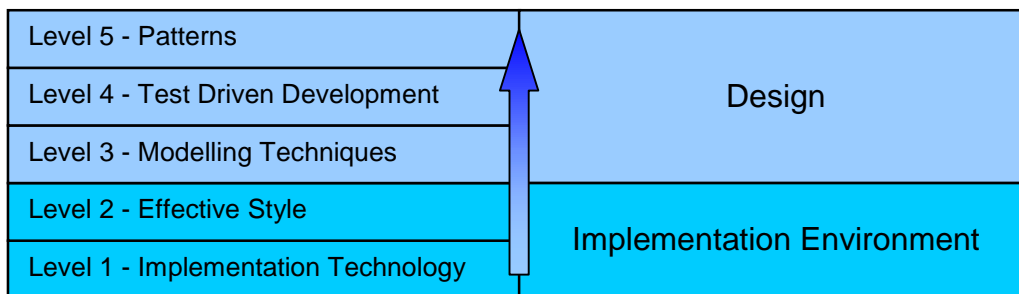
# CSE Design Services

## Introduction

Effective design is key for developing robust, flexible and maintainable applications. However, good designs can only be achieved when development staff are comfortable with the constraints and idioms of the target implementation environment. In addition to the consideration of good design in projects, attention still has to be given to the other key areas of software engineering such as project management, requirements engineering and acceptance testing. These areas are addressed by other CSE services.

- We recommend that companies adopt the following five level capability model.
- We can assist your organisation in the adoption of this capability.

## The Five Level Capability Framework



### Level 1 - Implementation Technology

Capability in this area initially involves developing a clear understanding of the concepts that underpin the implementation environment. In the case of enterprise application development, this probably means having a clear understanding of the concepts of classes, components, services and the relational data model. It also involves developing a clear understanding of how these concepts are realized in the implementation technology, i.e. the language syntax and key API's of the implementation environment.

### Level 2 - Effective Style

All implementation environments have a set style of heuristics that need to be adopted in order to produce coherent designs. Many of these heuristics are subtle and sometimes even counter-intuitive. Capability in this area involves becoming familiar with good style practice for the particular implementation environment. It is common for project designs to be compromised because of a lack of understanding of the style constraints of the implementation environment.

### Level 3 - Modelling techniques

Having a strong modelling capability is important in order to be able to communicate your designs clearly. Modelling comes into focus especially when dealing with applications that are event driven or have a high level of concurrency. Capability in this area involves learning how to apply modelling languages such as UML to software development projects.

### Level 4 - Test Driven Development (TDD)

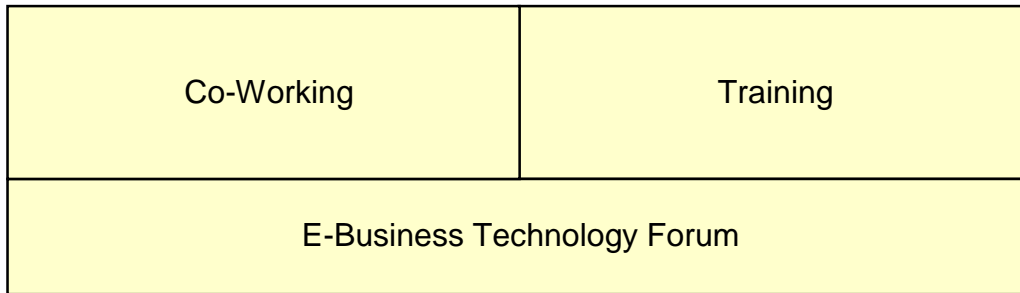
TDD is an approach to drive out a good design and ensure that applications are robust. It creates a large bank of regression tests, which gives developers more confidence to continuously improve or refactor the design of an application. TDD also allows developers to solve design problems in small incremental steps. Capability in this area involves learning how to adopt a test driven approach to development.

### Level 5 - Patterns

Software patterns are documented pieces of design know-how that help development staff to produce good designs. The difficulty with patterns is knowing when and where to apply them. Applying patterns at every possible opportunity leads to overly complex and inflexible designs. Capability in this area involves becoming familiar with patterns and their application. A TDD approach allows patterns to 'emerge' in a very natural and unforced way.

## How can CSE assist?

There are three mechanisms by which we can assist with the adoption of the five levels of capability:



### 1. Co-Working

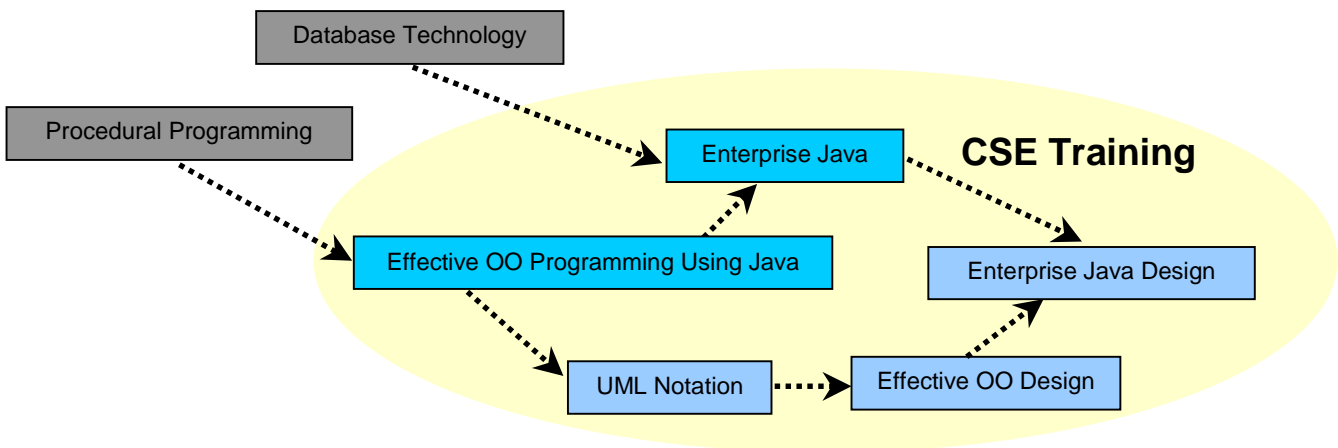
The CSE has a number of experienced Senior Consultants. Typically for a co-working assignment, a CSE Senior Consultant would work with your development team for a number of days per week, over a number of consecutive weeks. They would not only contribute to the application design and implementation, but would:

- Disseminate design know-how to the team members
- Monitor and provide feedback on the design integrity of the application as the design evolves
- Provide continuous feedback on progress of the design process adoption
- Assist with traversing the five levels of capability

Co-working is particularly suited to development teams wishing to make a smooth transition from an older implementation technology to Java and its associated design practices. This avoids the steep learning curve associated with the adoption of a powerful but complex new technology.

### 2. Training

The CSE have developed a number of unique immersion training courses. The roadmap below shows the path by which they can be followed by development staff. Each course addresses different levels of the capability framework also outlined below. These comprehensive courses can if required be customized to suit specific client needs. They can also be supported by an appropriate level of co-working.



**Effective Object-Oriented Programming Using Java:** This lab-based course teaches OO concepts and fundamental design practices. It explains Java syntax and the core APIs. It teaches effective coding style through the use of good and bad idiom examples. The course introduces the developer to the concept of Test Driven Development and the JUnit testing tool. It is suitable for software developers with experience in a procedural programming language, wishing to move to OO development.

Level 5 - Patterns
Level 4 - Test Driven Development
Level 3 - Modeling Techniques
Level 2 - Effective Style
Level 1 - Implementation Technology

**UML Notation:** This course provides the developer with a good grounding in the UML notation. An understanding of OO concepts is a requirement.

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**Effective Object-Oriented Design:** This course teaches how to design high quality OO solutions. It is structured around a specific case study exercise that allows the attendees to get hands on design experience. It specifically focuses on the key concepts of Test Driven Development, refactoring and design patterns. The course is suitable for developers with Java programming and UML modelling experience. The content of this course can be applied to .NET projects as well as Java ones.

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**Enterprise Java:** This course explains the J2EE APIs and how they relate to one another. It also looks beyond the J2EE standard to explain other important Java enterprise technologies such as JDO, Struts and Aspect Oriented Programming. The course is suitable for developers with Java programming and database experience.

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**Enterprise Java Design:** The complexity of J2EE often frustrates the developer trying to maintain design simplicity. This course explains how the complexity of J2EE can be tamed, with the adoption of the appropriate architectural patterns and approach. It naturally follows on from the 'Effective OO Design' and 'Enterprise Java' courses, and therefore a familiarity with the contents of these courses is a prerequisite.

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### **3. E-Business Technology (EBT) Forum**

The motivation for the EBT Forum is to provide a mechanism by which technical staff can gain valuable insight into promising new design approaches and implementation technologies. The topics covered are designed to assist organisations in achieving capability across the five level framework.

The EBT Forum consists of monthly workshops that address specific areas of application design and implementation technology. Topics covered in previous workshops have included:

- J2EE Persistence Frameworks
- Aspect Oriented Programming
- Model View Controller and Model2 Architectures
- Distribution and Concurrency Patterns
- Web Services
- Testing using Mock Objects
- Open Source J2EE Solutions
- Test Driven J2EE Development

The EBT Forum has its own dedicated web site, which contains code samples and research papers. The web site can be found at:

<http://ebt.cse.dcu.ie>

Organisations availing of CSE Corporate Membership may use the EBT Forum service free of charge.

#### ***Where to from here?***

If your organisation is interested in using best practice design with state of the art implementation technologies, the CSE Design Services may be just what you are looking for.

Whether you are interested in Co-working, Training or our EBT Forum, there will be something that we can assist your organisation with.

If you would like us to visit your organisation to discuss our Design Services in more detail, please contact us:

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