## Unit 1: Introduction to Secure Software Development

**Objectives:**

* Explore the waterfall and agile approaches to software development, with a focus on the implications of developing secure software using each.
* Become acquainted with the Unified Modelling Language and how it can be used to support software development.
* Gain a familiarity with the standards which are used by industry to develop secure software.
* Appreciate the importance of developing a risk-aware culture within an organization.

**Outcomes:**

* Identify relevant academic literature which discusses the ways in which secure software may be developed using an agile process.
* Decompose an activity into a set of tasks which can be represented using a flow chart from the UML portfolio of modelling techniques.
* Describe the importance of creating a culture of risk awareness in an organization, in addition to the creation of secure software.

**Reflection:**

Software development that integrates safety into all phases of the software development life cycle is known as "secure software development" (SDLC).

It was the Waterfall Process Model that was the first to be introduced into the world of process modelling. A linear-sequential life cycle model is another name for it. According to this framework, every phase's activities must be performed in their entirety before moving on to the next, as symbolized by a waterfall where water only flows downhill. As a result, the entire set of criteria must be outlined and agreed upon in advance of the project. Waterfall models have the drawback of never delivering usable software until the very end of the project cycle. There's a lot of room for error. This isn't a good model for projects that need to be both complex and object-oriented. It's a lousy model for long-term projects.

Incremental and iterative processes and techniques are combined in the Agile SDLC model to focus on the ability to adapt and client satisfaction by delivering an operating software product in a short period. The product is broken down into small, incremental builds using Agile Methods. The iterative and incremental nature of Agile development allows for a more rapid release of new software. If you're using Agile development, it's crucial to remember that new releases can unknowingly unveil security holes. We can't evaluate every code change even if we wanted to in an agile environment. They can't keep up with the pace of work and deployments, so they don't have time to review everything. As an alternative, security professionals can work with developers to help them follow good security practices (Thomas Hamilton, 2019).

To aid system and software developers in developing software systems and other non-software systems, the Unified Modeling Language (UML), short for Unified Modeling Language, is a standardised modelling language consisting of an integrated set of diagrams. For the most part, software project design is expressed using graphical notations in the UML. Communication, exploration, and validation of software architecture are all facilitated by using the UML. (Ceta, 2018).

These are the most important security standards for software development, beginning with the most critical (Alexander Goodwin, 2019):

* [NIST](https://www.kiuwan.com/security-standards-in-software-development/#nist)
* [OWASP Top 10](https://www.kiuwan.com/security-standards-in-software-development/#owasp)
* [CWE](https://www.kiuwan.com/security-standards-in-software-development/#cwe)
* [PCI DSS](https://www.kiuwan.com/security-standards-in-software-development/#pcidss)
* [MISRA-C](https://www.kiuwan.com/security-standards-in-software-development/#misrac)
* [HIPAA](https://www.kiuwan.com/security-standards-in-software-development/#hipaa)
* [WASC](https://www.kiuwan.com/security-standards-in-software-development/#wasc)
* [BIZEC](https://www.kiuwan.com/security-standards-in-software-development/#bizec)
* [SEI CERT C](https://www.kiuwan.com/security-standards-in-software-development/#certc)
* [SEI CERT J](https://www.kiuwan.com/security-standards-in-software-development/#certj)

A powerful risk-aware lifestyle is just as important to successful risk assessment as a powerful risk-aware culture. A company's risk tactic and method to risk management are supported by an impactful risk-aware culture decided by the consciousness, perceptions, and behaviors of individuals and groups within the organization.

**References:**

Ceta, N. (2018). *All You Need to Know About UML Diagrams: Types and 5+...* [online] Tallyfy. Available at: https://tallyfy.com/uml-diagram/ [Accessed 1 Sep. 2019].

Thomas Hamilton (2019). *Waterfall Vs. Agile: Must Know Differences*. [online] Guru99.com. Available at: <https://www.guru99.com/waterfall-vs-agile.html>.

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