Reliable Software, a Perspective from Industry

What are the most pressing and challenging industrial needs in the way of software technology to facilitate the production of reliable software?

E.g.:

Quality and safety standards?

Life-cycle models?

Processes, methods, techniques?

Languages and tools?

- Or something else?

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ECSS-E-ST-40C

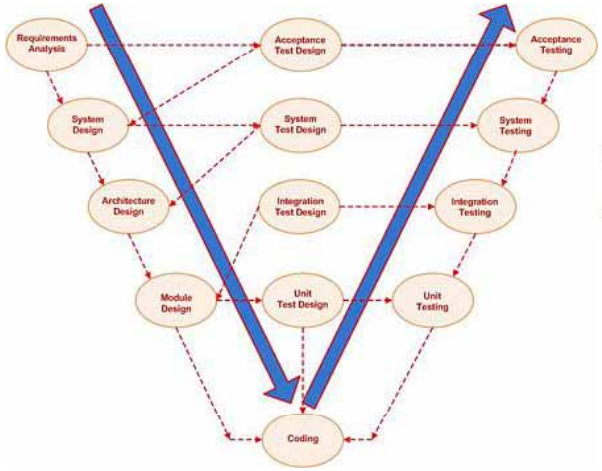
IEC 61508

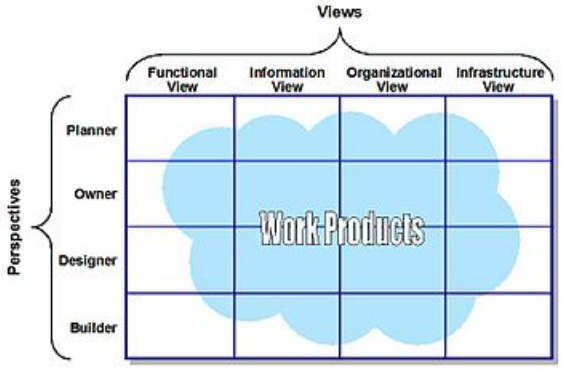
ISO 26262

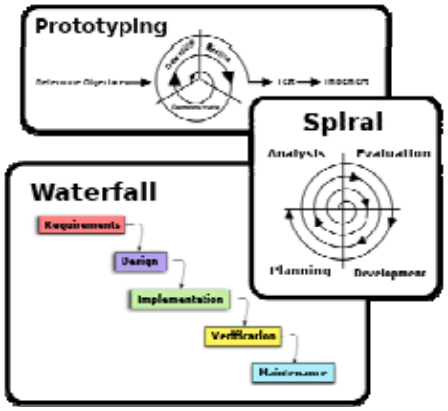
DO-178B

EN 50128


AGILE DEVELOPMENT
VALUES
VISIBILITY
ACCELERATE DELIVERY


Requirements Analysis
Acceptance Test Design
Acceptance Testing
System Design
System Test Design
System Testing
Architecture Design
Integration Test Design
Integration Testing
Module Design
Unit Test Design
Unit Testing
Coding


Views
Functional View
Information View
Organizational View
Infrastructure View
Perspectives
Planner
Owner
Designer
Builder
Work Products


Prototyping
Spiral
Analysis
Evaluation
Planning
Development
Waterfall
Requirements
Design
Implementation
Verification
Maintenance

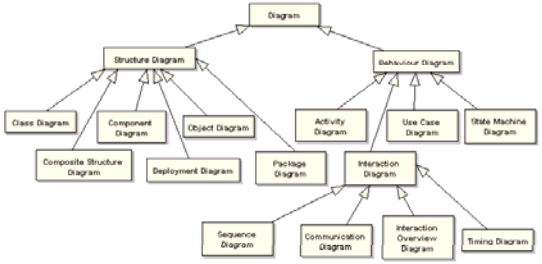
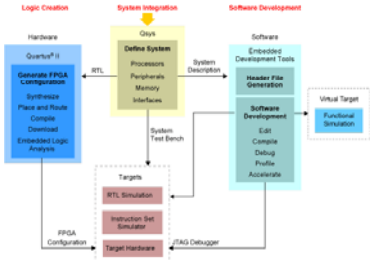
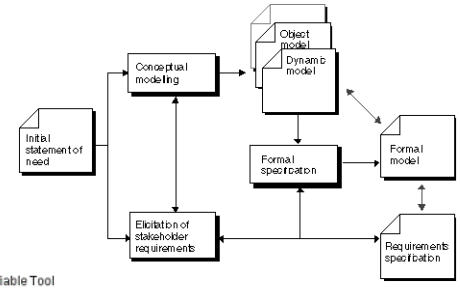
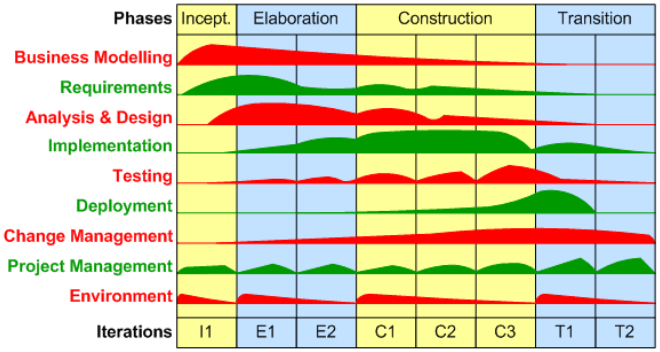
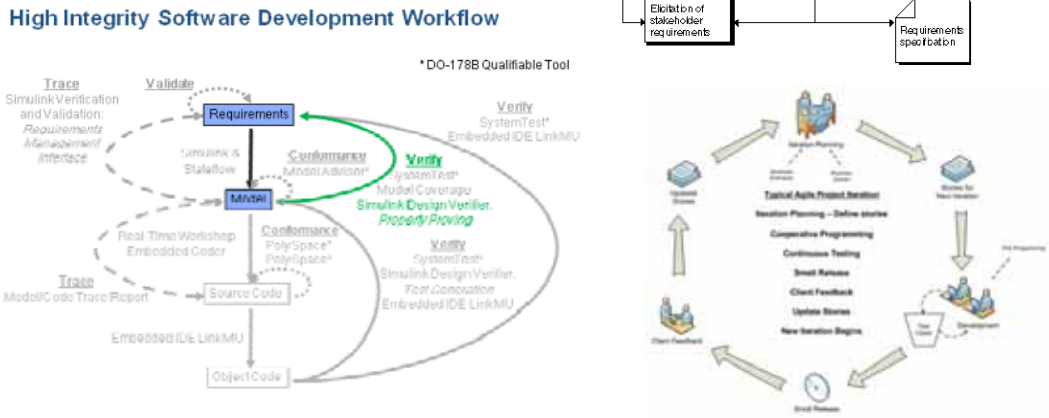


Diagram
Structure Diagram
Behaviour Diagram
Class Diagram
Component Diagram
Object Diagram
Activity Diagram
Use Case Diagram
State Machine Diagram
Composite Structure Diagram
Deployment Diagram
Package Diagram
Interaction Diagram
Sequence Diagram
Communication Diagram
Interaction Overview Diagram
Timing Diagram

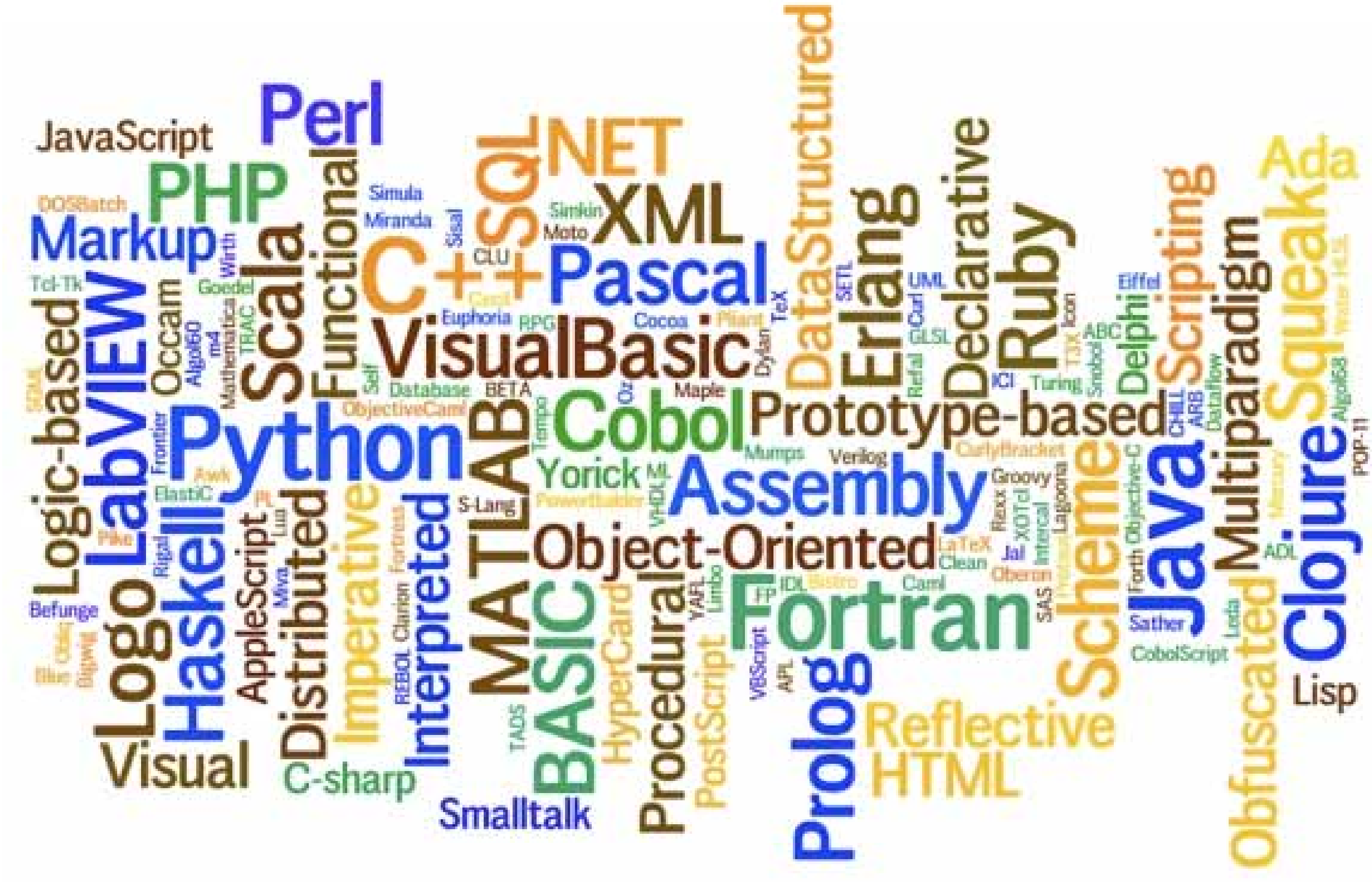

Logic Creation
System Integration
Software Development
Hardware
Software
Define System
Generate FPGA Configuration
Embedded Development Tools
Software Development
Virtual Target
Functional Simulation
Targets
RTL Simulation
Instruction Set Simulator
Target Hardware
FPGA Configuration
JTAG Debugger

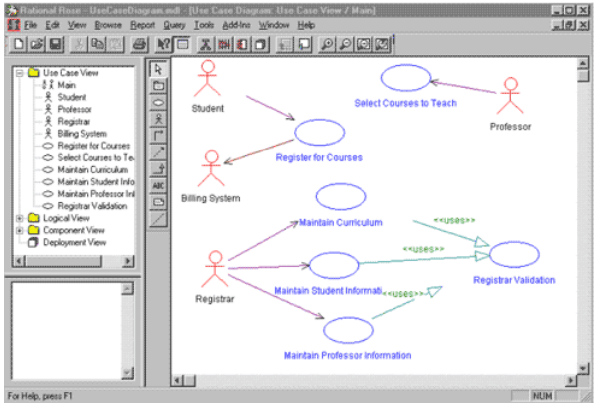

Object model
Dynamic model
Conceptual modeling
Initial statement of need
Formal specification
Formal model
Elicitation of stakeholder requirements
Requirements specification


Phases
Incept.
Elaboration
Construction
Transition
Business Modelling
Requirements
Analysis & Design
Implementation
Testing
Deployment
Change Management
Project Management
Environment
Iterations
I1
E1
E2
C1
C2
C3
T1
T2


High Integrity Software Development Workflow
* DO-178B Qualifiable Tool
Trace
Validate
Requirements
Verify
Simulink & Stateflow
Conformance
Verify
Model Coverage
Simulink Design Verifier
Property Proving
Real-Time Workshop Embedded Coder
Conformance
PolySpace
Verify
Trace
Source Code
Object Code

Typical Agile Project Iteration
Iteration Planning - Define stories
Cooperative Programming
Continuous Testing
Small Release
Client Feedback
Update Stories
New Iteration Begins


JavaScript
Perl
PHP
Markup
DOSBatch
Simula
Miranda
.NET
SQL
XML
C++
Pascal
Scala
Functional
VisualBasic
LabVIEW
Logic-based
Python
MATLAB
Cobol
Prototype-based
DataStructured
Erlang
Declarative
Ruby
Scripting
Multiparadigm
Squeak
Ada
Java
Clojure
Assembly
Object-Oriented
Fortran
Scheme
Yorick
Haskell
Logo
Visual
Distributed
Imperative
Interpreted
BASIC
Procedural
PostScript
Prolog
Reflective
HTML
Obfuscated
Lisp
Smalltalk
C-sharp
AppleScript
HyperCard
Occam
Delphi
Eiffel
Sather
CobolScript
Befunge
Tcl-Tk
Goedel
Euphoria
Cocoa
UML
Groovy
Verilog
Mumps
Maple
BETA
Database
ObjectiveCaml
CurlyBracket
Turing
ABC
Dataflow
S-Lang
Caml
Oberon
Clean
Jal
LaTeX
SAS
Forth
Lua
CLU
Moto
Simkin
Wirth
Sisal
Frontier
ElasticC
Awk
Pike
Objective-C
Lagoona
Icon
SETL
TeX
Dylan
GLSL
Self
RPG


Use Case View
Main
Student
Professor
Registrar
Billing System
Register for Courses
Select Courses to Te
Maintain Curriculum
Maintain Student Info
Maintain Professor Inf
Registrar Validation
Logical View
Component View
Deployment View
Student
Select Courses to Teach
Professor
Register for Courses
Billing System
Maintain Curriculum
<<uses>>
<<uses>>
Registrar Validation
Registrar
Maintain Student Informati
<<uses>>
Maintain Professor Information
For Help, press F1
NUM