Table 1: FANOUT Design Metric - Definition and Computation

FANOUT	
Definition	Number of called classes.
Worse	For greater values.
Computation Details	We sum up the *Called Classes* belonging to the system.
Visitor Type	Model Visitor

Implementation details for each entity the visitor can visit

visit: Method	**Visit Type**: Model Visitor
	Applicability: not Abstract Method, not from Interface and Annotation ComplexType.

Dependencies Information:

Dep-visitor	Dep-entity	Dep-level
Called Classes	Method	Method

visit: Class	**Visit Type:** Model Visitor
	Applicability: ComplexType

Dependencies Information:

Dep-visitor	Dep-entity	Dep-level
Called Classes	Type	Type

Table 2: FANIN Design Metric - Definition and Computation

FANOUT	
Definition	Number of calling classes.
Worse	For greater values.
Computation Details	We sum up the *Calling Classes*.
Visitor Type	Model Visitor

Implementation details for each entity the visitor can visit

visit: Class	**Visit Type**: Model Visitor
	Applicability: Not Anonymous ComplexType

Dependencies Information:

Dep-visitor	Dep-entity	Dep-level
Calling Classes	Type	Type

Table 3: ATFD Design Metric - Definition and Computation

Access to Foreign Data (ATFD)	
Definition	The number of attributes from unrelated classes belonging to the system, accessed directly or by invoking accessor methods.
Worse	For greater values.
Computation Details	For **methods**: we sum up the *Used Inter Variables* belonging to the system, also through not *Contructor*, *Public*, and not *Abstract Called Inter Methods* of the system. For **class**: we sum up the *Used Inter Variable* belonging to the system, also through not *Constructor*, *Public* and not *Abstract Called Inter Methods* from the field declaration class of the

	methods and from all the not *Constructor* and not *Abstract Methods Declared In Class* . We do not declare a dependency to $ATFD$ on method because we have to count each accessed variable only once. When we check for used variable in *Called Inter Methods*, we have to know the *Used Intra Variables* the methods use, hence the dependency to *Used Intra Variables*.
Visitor Type	Model Visitor

Implementation details for each entity the visitor can visit

visit: Method	**Visit Type**: Model Visitor
	Applicability: Not Abstract nor Constructor Method, not from Interface and Annotation ComplexType.

Dependencies Information:

Dep-visitor	Dep-entity	Dep-level
Used Inter Variables	Method	Method
Called Inter Methods	Method	Method
Used Intra Variables	Method	Method
visit: Class	Visit Type: Model Visitor	
	Applicability: ComplexType	

Dependencies Information:

Dep-visitor	Dep-entity	Dep-level
Used Inter Variables	Type	Type
Called Inter Methods	Type	Type
Used Intra Variables	Type	Type
Methods Declared In Class	Type	Type

Table 4: FDP Design Metric - Definition and Computation

Foreign Data Providers (FDP)	
Definition	The number of classes in which the attributes accessed in conformity with the $ATFD$ metric - are defined.
Worse	For greater values.
Computation Details	We sum up the classes where foreign data are defines, counting each class only once.
Visitor Type	Model Visitor

Implementation details for each entity the visitor can visit

visit: Method	**Visit Type**: Model Visitor
	Applicability: not Abstract Method, not from Interface and Annotation ComplexType.

Dependencies Information:

Dep-visitor	Dep-entity	Dep-level
Used Inter Variables	Method	Method
Called Inter Methods	Method	Method
Used Intra Variables	Method	Project

Table 5: RFC Design Metric - Definition and Computation

Response for a Class (RFC)	
Definition	RFC is the size of the response set of a class. The response set of a class includes "all methods that can be invoked in response to a message to an object of the class". It includes local methods (also the inherited ones) as well as methods in other classes.
Worse	For greater values.
Computation Details	We sum up also the *Called Inter Methods* and *Called Hierarchy Methods* by the *Inherited Methods* counting each method only one time. We consider only call to classes belonging to the system.
Visitor Type	Model Visitor

Implementation details for each entity the visitor can visit

visit: Class	**Visit Type**: Model Visitor
	Applicability: not Interface nor Annotation ComplexType

Dependencies Information:

Dep-visitor	Dep-entity	Dep-level
Called Inter Methods	Type	Project
Called Hierarchy Methods	Type	Project
Methods Declared In Class	Type	Type
Inherited Methods	Type	Type

Table 6: CBO Design Metric - Definition and Computation

Coupling Between Objects classes (CBO)	
Definition	Two classes are coupled if one of them uses the other, i.e., one class calls a method or accesses an attribute of the other class. Coupling involving inheritance and methods polymorphically called are taken into account. CBO for a class is the number of classes to which it is coupled.
Worse	For greater values.
Computation Details	We sum up all the unrelated classes belonging to the system that define the *Used Inter Variables*, *Used Hierarchy Variables*, *Used Inter Types*, *Used Hierarchy Types*, *Called Inter Methods*, and *Called Hierarchy Methods* by the measured class and its *Ancestor Classes* and by methods the measured class methods declare and inherit. We count each class once.
Visitor Type	Model Visitor

Implementation details for each entity the visitor can visit

visit: Class	**Visit Type**: Model Visitor
	Applicability: not Annotation nor Interface ComplexType

Dependencies Information:

Dep-visitor	Dep-entity	Dep-level
LOC	Type	Type
visit: Project	Visit Type: Model Visitor	
	Applicability: Project	

Dependencies Information:

Dep-visitor	Dep-entity	Dep-level

Used Inter Variables	Type	Project
Used Hierarchy Variables	Type	Project
Used Inter Types	Type	Project
Used Hierarchy Types	Type	Project
Called Inter Methods	Type	Project
Called Hierarchy Methods	Type	Project
Methods Declared In Class	Type	Type
Ancestor Classes	Type	Type
Inherited Methods	Type	Project

Table 7: CFNAMM Design Metric - Definition and Computation

Called Foreign Not Accessor or Mutator Methods (CFNAMM)	
Definition	For **method**: the number of called not accessor or mutator methods declared in unrelated classes respect to the one that declares the measured method. For **class**: the number of called not accessor or mutator methods declared in unrelated classes respect to the measured one. We consider only call to classes belonging to the system.
Worse	-
Computation Details	We sum up the number of not accessor or mutator *Called Inter Methods* and *Called Hierarchy Methods* of the system. We do not count the call to default constructor of classes.
Visitor Type	Model Visitor

Implementation details for each entity the visitor can visit

	Visit Type: Model Visitor
visit: Method	**Applicability**: not Abstract Method, not from Interface and Annotation ComplexType.

Dependencies Information:

Dep-visitor	Dep-entity	Dep-level
Called Inter Methods	Method	Method
Called Hierarchy Methods	Method	Method
visit: Class	Visit Type: Model Visitor	
	Applicability: ComplexType	

Dependencies Information:

Dep-visitor	Dep-entity	Dep-level
Methods Declared In Class	Type	Type
Called Inter Methods	Type	Type
Called Hierarchy Methods	Type	Type

Table 8: CINT Design Metric - Definition and Computation

Coupling Intensity (CINT)	
Definition	The number of distinct operations called by the measured operation.
Worse	For greater values.
Computation Details	We sum up Called Inter Methods belonging to system classes.
Visitor Type	Model Visitor

Implementation details for each entity the visitor can visit

visit: Method	**Visit Type**: Model Visitor
	Applicability: not Abstract Method, not from Interface and Annotation ComplexType.

Dependencies Information:

Dep-visitor	Dep-entity	Dep-level
Called Inter Methods	Method	Method

Table 9: CDISP Design Metric - Definition and Computation

Coupling Dispersion (CDISP)	
Definition	The number of classes in which the operations called from the measured operation are defined, divided by CINT.
Worse	For greater values.
Computation Details	$\begin{cases} CDISP = \dfrac{FANOUT}{CINT} & CINT \neq 0 \\ CDISP = 0 & CINT = 0 \end{cases}$
Visitor Type	Model Visitor

Implementation details for each entity the visitor can visit

visit: Method	**Visit Type**: Model Visitor
	Applicability: not Abstract Method, not from Interface and Annotation ComplexType.

Dependencies Information:

Dep-visitor	Dep-entity	Dep-level
FANOUT	Method	Method
CINT	Method	Method

Table 10: MaMCL Design Metric - Definition and Computation

Maximum Message Chain Length (MaMCL)	
Definition	The maximum length of chained calls in a method.
Worse	For greater values.
Computation Details	We compute the maximum length of a chain in $Message\ Chains\ Info$
Visitor Type	Model Visitor

Implementation details for each entity the visitor can visit

visit: Method	**Visit Type**: Model Visitor
	Applicability: not Abstract Method, not from Interface and Annotation ComplexType.

Dependencies Information:

Dep-visitor	Dep-entity	Dep-level
Message Chains Info	Method	Method

Table 11: NMCS Design Metric - Definition and Computation

Number of Message Chain Statements (NMCS)	
Definition	The number of different chained calls in a method.
Worse	For greater values.
Computation Details	We compute the number of chains in $Message\ Chains\ Info$

Visitor Type	Model Visitor

Implementation details for each entity the visitor can visit

	Visit Type: Model Visitor
visit: Method	**Applicability**: not Abstract Method, not from Interface and Annotation ComplexType.

Dependencies Information:

Dep-visitor	Dep-entity	Dep-level
Message Chains Info	Method	Method

Table 12: MeMCL Design Metric - Definition and Computation

Mean Message Chain Length (MeMCL)	
Definition	The average length of chained calls in a method.
Worse	For greater values.
Computation Details	We compute the rounded average length of a chain in *Message Chains Info*. If NMCS is zero, then MeMCL is zero too.
Visitor Type	Model Visitor

Implementation details for each entity the visitor can visit

	Visit Type: Model Visitor
visit: Method	**Applicability**: not Abstract Method, not from Interface and Annotation ComplexType.

Dependencies Information:

Dep-visitor	Dep-entity	Dep-level
Message Chains Info	Method	Method
NMCS	Method	Method

Table 13: CC Design Metric - Definition and Computation

Changing Classes (CC)	
Definition	The number of classes in which the methods that call the measured method are defined in.
Worse	For greater values.
Computation Details	We sum up the number of *Calling Classes*.
Visitor Type	Model Visitor

Implementation details for each entity the visitor can visit

	Visit Type: Model Visitor
visit: Method	**Applicability**: not private Method not declared in Anonymous ComplexType

Dependencies Information:

Dep-visitor	Dep-entity	Dep-level
Calling Classes	Method	Method

Table 14: CM Design Metric - Definition and Computation

Changing Methods (CM)	
Definition	The number of distinct methods that call the measured method.
Worse	For greater values.
Computation	We sum up the number of *Calling Methods*.

Details	
Visitor Type	Model Visitor

Implementation details for each entity the visitor can visit

visit: Method	**Visit Type**: Model Visitor
	Applicability: not private Method not declared in Anonymous ComplexType

Dependencies Information:

Dep-visitor	Dep-entity	Dep-level
Calling Methods	Method	Method