

implemented metrics

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Context: Model
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- 01. NPM -> Number of packages in the model.
- 02. NCM -> Number of classes in the model.
- 03. NASM -> Number of associations in the model.
- 04. NAGM -> Number of aggregations in the model.
- 05. NIM -> Number of inheritance relations in the model.
- 06. NATM -> Number of attributes in classes within the model.
- 07. NOM -> Number of operations in classes within the model.
- 08. NACTM -> Number of attributes with class type in the model.
- 09. NNOEM -> Number of navigable owned association ends in the model.
- 10. NACM -> Number of all ancestors of all classes in the model.

- 11. ASvsC -> Ratio between number of associations and number of classes in the model.
- 12. AGvsC -> Ratio between number of aggregations and number of classes in the model.
- 13. GEvsC -> Ratio between number of inheritance relations and number of classes in the model.
- 14. ATvsC -> Ratio between number of attributes and number of classes in the model.
- 15. OvsC -> Ratio between number of operations and number of classes in the model.
- 16. NTDM -> Number of class type dependencies in the model.
- 17. NDEPM -> Number of class dependencies in the model.
- 18. DEPvsC -> Ratio between number of class dependencies and number of classes in the model.
- 19. MaxAgg -> Maximum of aggregation trees.
- 20. MaxDIT -> Maximum of all depths of inheritance trees.
- 21. ANA -> Average number of ancestors of all classes in the model.
- 22. NIH -> Total number of inheritance hierarchies in the model.

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Context: Package
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- 01. NCP -> Number of classes within the package.
- 02. NACP -> Number of abstract classes within the package.
- 03. NIP -> Number of interfaces within the package.
- 04. NIRP -> Number of interface realizations within the package.
- 05. NIUP -> Number of interface usages within the package.
- 06. NPP -> Number of nested packages inside the package.
- 07. NAP -> Number of associations within the package.
- 08. NAGGR -> Number of aggregation relationships within the package.
- 09. NATP -> Number of attributes in classes within the package.
- 10. NATIP -> Number of inherited attributes in classes within the package.
- 11. NNPATP -> Number of non-public attributes in classes within the package.
- 12. NOP -> Number of operations in classes within the package.
- 13. NOPIP -> Number of inherited operations in classes within the package.
- 14. NNPOP -> Number of non-public operations in classes within the package.
- 15. NIGP -> Number of internal generalization relationships within the package.
- 16. NIATP -> Number of internal attribute class types within the package.
- 17. NIAEP -> Number of internal navigable owned association end types within the package.
- 18. NESUBP -> Number of external classes which are direct subclasses of classes within the package.
- 19. NEACP -> Number of attributes in external classes typed by classes within the package.
- 20. NEAECp -> Number of external navigable owned association ends typed by classes within the package.
- 21. NESUPP -> Number of external classes which are direct superclasses of classes within the package.
- 22. NETAP -> Number of attributes within the package typed by classes in other packages.
- 23. NAETOP -> Number of internal navigable owned association ends typed by classes in other packages.

- 24. DNH -> Depth in the nesting hierarchy.
- 25. A -> Ratio between number of abstract classes and number of classes within the package.
- 26. R -> Number of relationships between classes and interfaces within the package.
- 27. NCAP -> Number of classes and associations within the package. (useful?)
- 28. NAVCP -> Ratio between number of associations and number of classes within the package.
- 29. TNATP -> Total number of attributes in classes within the package.
- 30. TNOpp -> Total number of operations in classes within the package.
- 31. AHF -> Attribute hiding factor.
- 32. AIF -> Attribute inheritance factor.
- 33. MHF -> Operation hiding factor.

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- 34. OIF -> Operation inheritance factor.
- 35. NITRP -> Number of internal class type relationships within the package.
- 36. NICRP -> Number of internal relationships between classes within the package.
- 37. H -> Relational cohesion.
- 38. NTCTP -> Number of times classes within the package are used as types from outside the package.
- 39. NDCOP -> Number of dependencies of classes in other packages on classes within the package.
- 40. Ca -> Afferent coupling.
- 41. NTTCP -> Number of times classes within the package use classes in other packages as type.
- 42. NDOCP -> Number of dependencies of classes within the package on classes in other packages.
- 43. NOPP -> Number of other packages.
- 44. ANDOCP -> Average number of other package's class usages by classes within the package.
- 45. Ce -> Efferent coupling.
- 46. TC -> Total coupling.
- 47. I -> Instability (Ratio between efferent coupling and total coupling).

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Context: Class
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- 01. NATC -> Number of attributes within the class.
- 02. NPUBAC -> Number of public attributes within the class.
- 03. NPROAC -> Number of protected attributes within the class.
- 04. NPRIAC -> Number of private attributes within the class.
- 05. DAC -> Number of attributes that have another class as type.
- 06. DAC2 -> Number of different classes that are used as attribute type.
- 07. ECAtt -> Number of times the class is externally used as attribute type.
- 08. ECPAr -> Number of times the class is externally used as parameter type.
- 09. NOPC -> Number of operations within the class.
- 10. NPARC -> Number of incoming parameters in operations within the class.
- 11. ICPaC -> Number of parameters within the class having another class as type.
- 12. ICPaI -> Number of parameters within the class having another interface as type.
- 13. NASOC -> Number of associations with other classes.
- 14. NASSC -> Number of associations with itself.
- 15. NDPC -> Number of direct part classes which compose a composite class.
- 16. NSUPC -> Number of direct parent classes of the class.
- 17. NSUPC2 -> Total number of ancestors of the class.
- 18. NSUBC -> Number of direct child classes of the class.
- 19. NSUBC2 -> Number of all children of the class.
- 20. MaxDIT -> Depth of Inheritance Tree.
- 21. HAgg -> Length of the longest path to the leaves in the aggregation hierarchy.

- 22. NAI -> Number of attributes visible to subclasses (public and protected).
- 23. NPPAC -> Number of private and protected attributes within the class.
- 24. DAM -> Ratio between number of private and protected attributes and number of attributes.
- 25. ICPa -> Number of parameters within the class having another class or interface as type.
- 26. APOC -> Average number of parameters in all operations within the class.
- 27. NASC -> Number of association with other classes or itself.
- 28. CBC -> Number of attributes and associations with class type (coupling between classes).

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NON CLASS DIAGRAM METRICS

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- 01. NUM -> Number of use cases in the model.
- 02. NAM -> Number of actors in the model.
- 03. NASUAM -> Number of associations between use cases and actors in the model.

to be continued...