Metrics for Object-Oriented Programs

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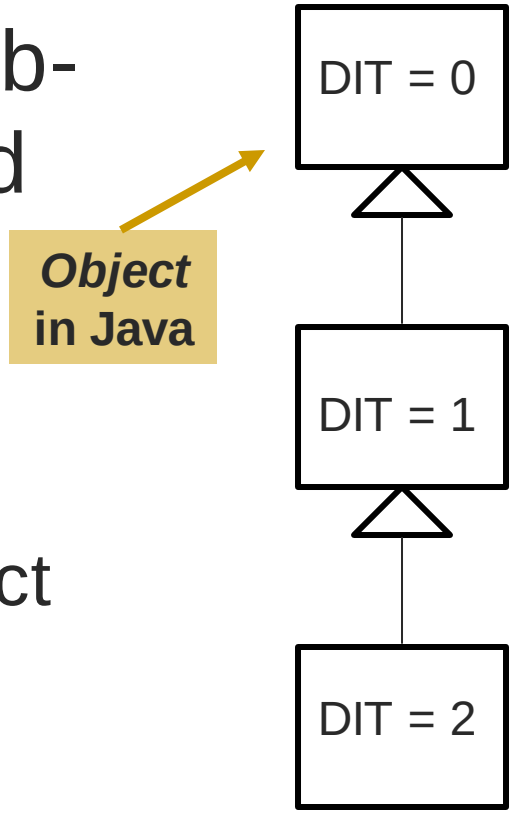
POO Metrics

- Chidamber-Kemerer (CK) Suite
  - Depth of Inheritance Tree (DIT)
  - Number of Children (NOC)
  - Coupling between Object Classes (CBO)
  - Lack of Cohesion of Methods (LCOM)
  - Weighted Methods per Class (WMC)
- Number of Methods Overridden (NMO)

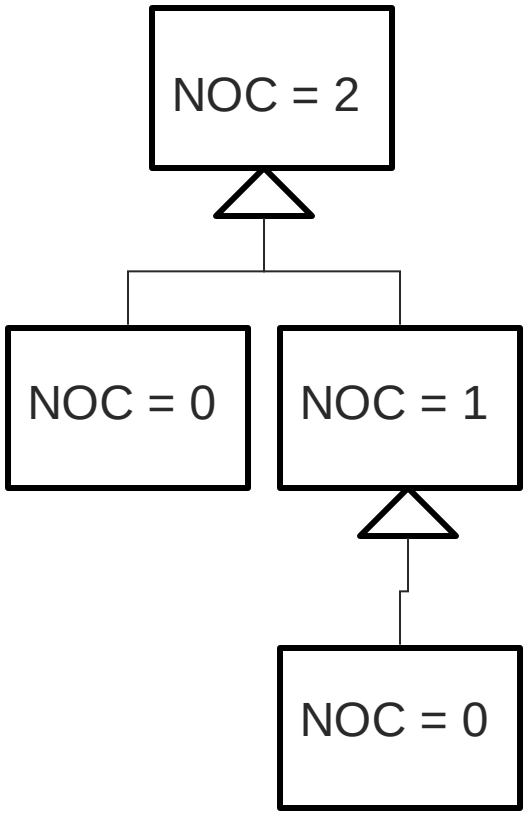
Depth of Inheritance Tree (DIT)

- It counts the number of levels in a inheritance tree that sub-classes inherit methods and attributes from
- The deeper the tree
  - The more complex the project
  - The harder to understand its deepest sub-classes



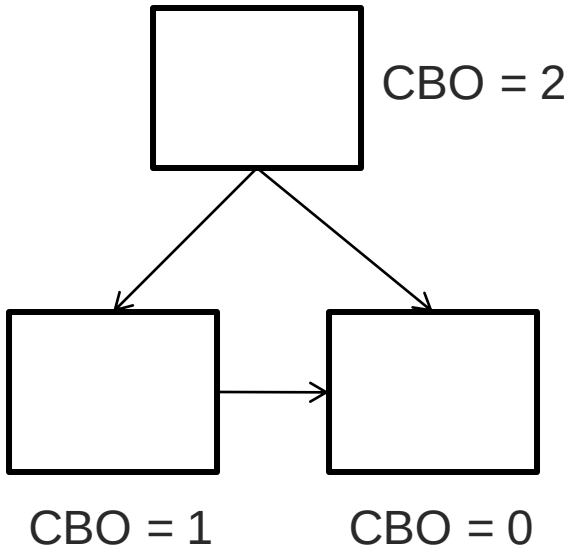
Number of Children (NOC)

- It counts the number of direct sub-classes
  - It measures how wide a inheritance tree is
- Higher values may indicate high reuse



Coupling between Objects (CBO)

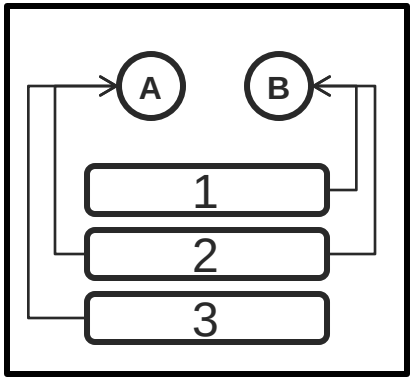
- Similar to Fan-out
  - It counts the number of classes called by a class



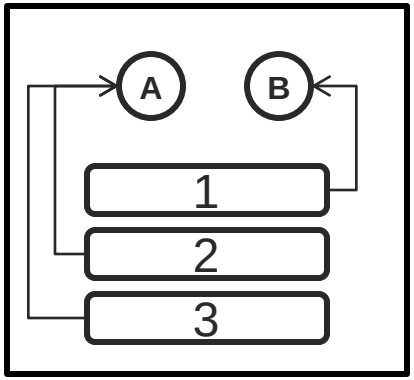
- Classes with high coupling may be harder to understand and evolve

Lack of Cohesion (LCOM)

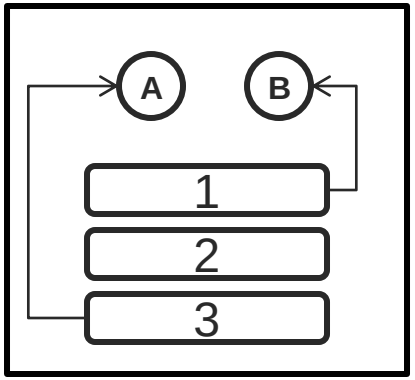
- It measures how frequent methods in a class access common attributes
  - More common attributes, more cohesion, less lack of cohesion (LCOM)



LCOM = 0 (1 - 2)



LCOM = 1 (2 - 1)



LCOM = 3 (3 - 0)

More OOP Metrics

- Weighted Methods per Class (WMC)
  - It gives weights to methods in a class
  - Weights might be the method LOC
  - High values may indicate more complexity
- Number of Methods Overridden (NMO)
  - It counts the number of methods in a class that are overridden by its subclasses
  - High values may indicate a problem with inheritance

Bibliography

- Ian Sommerville. **Software Engineering**, 9th Edtion. Pearson Education, 2010.
  - Section 24.4 Software Measurement and Metrics