**Step 1:** The first step is the representation of axioms in abstract forms; This is done by replacing every entity in an axiom with a general variable based on the type of the entity. Figure 6 shows the transformation result for the example ontology. It should be noted that this abstraction over the axioms is different from the final generalisation which represent the detected syntactic regularities. This transformation is an intermediate step of algorithm 1.

\begin{align}
?\text{class}_2 & \text{ SubClassOf } ?\text{class}_1 & (14) \\
?\text{class}_2 & \text{ SubClassOf } ?\text{objectProperty}_1 \text{ some } ?\text{class}_1 & (15) \\
?\text{class}_2 & \text{ SubClassOf } ?\text{objectProperty}_1 \text{ only } ?\text{class}_1 & (16)
\end{align}

Figure 6: Result of step 1 of the replacement procedure. The transformation of the axioms of Figure 5 is shown.

**Step 2:** For each one of the general axioms (14)-(16) we retrieve their instantiations and check if a replacement of a variable with an entity gives better separation of axioms in different groups. The examination of variable replacements depends on the structural commonalities of the axioms. Our criterion is that if there are more than two structural differences between a pair of axioms then the variable should be checked for further replacements. The idea behind this criterion is that we want to find an optimal variable replacement in the axioms that will reflect the differences between the entities in the ontology. In the example ontology in Figure 6, the general axiom (14) abstracts the axioms (1)-(8) in Figure 5. Many of these axioms have more than one structural difference ((1) and (5) or (2) and (14) etc.). Therefore, further possible replacements should be examined. The general axiom is the root of the tree. Then, the branches of the tree show all possible values for each variable of the general axiom. An example tree for the generalisation (14) is shown in Figure 7. The leaf nodes of the tree show the instantiations that result from the replacement of the parent node. Replacements that abstract only a single axiom are discarded. Replacements that separate the values of the other variables into different sets and abstract more than one axiom are kept. For example, in figure 6 all further splits of variable ?\text{class}_2 are discarded as they abstract only a single axiom. However, the replacements for ?\text{class}_1 are kept as they abstract more than one axiom. Therefore, classes A, B and C in the axioms of the form of (14) are marked as “relevant” and they are not replaced by a placeholder. The same procedure is followed for the general axioms (15) and (16). In particular, none of the referenced entities of the general axioms (15) and (16) are marked as “relevant” because none of the possible replacements