

Input: The sets of Categories, Documents, CodeGroups, and DocGroups

$Categories = \{cat_1, cat_2, \dots, cat_n\}$

$Documents = \{doc_1, doc_2, \dots, doc_m\}$

$CodeGroups = \{codeGroup_1, codeGroup_2, \dots, codeGroup_o\}$

$DocGroups = \{docGroup_1, docGroup_2, \dots, docGroup_p\}$

Input: The mappings of categories to documents, of categories to code groups, and of documents to document groups

$Occurrence : (category \subseteq Categories) \mapsto (document \subseteq Documents)$

$CodeGroup : (category \subseteq Categories) \mapsto (codeGroup \subseteq CodeGroups)$

$DocGroup : (doc \subseteq Documents) \mapsto (docGroup \subseteq DocGroups)$

Result: A directed graph: $G = (Nodes, Links)$ with elements as nodes, and direct and indirect links

$Nodes \leftarrow Codes \cup Documents \cup CodeGroups \cup DocGroups$

$Links \leftarrow \emptyset$

foreach $category \in Categories$ **do**

```
1   | if  $(category \mapsto document) \in Occurrence$  then  
    |    $Links \leftarrow Links \cup (category, document)$   
    | end  
2   | if  $(category \mapsto codeGroup) \in CodeGroup$  then  
    |    $Links \leftarrow Links \cup (category, codeGroup)$   
    | end  
end
```

foreach $document \in Documents$ **do**

```
3   | if  $(document \mapsto docGroup) \in DocGroup$  then  
    |    $Links \leftarrow Links \cup (document, docGroup)$   
    | end  
end
```

foreach $category \in Categories$ **do**

```
4   | if  $(category \mapsto document) \in Occurrence$  and  $(document \mapsto docGroup) \in DocGroup$  then  
    |    $Links \leftarrow Links \cup (category, docGroup)$   
    | end  
5   | if  $(category \mapsto document) \in Occurrence$  and  $(document \mapsto docGroup) \in DocGroup$  and  
    |    $(category \mapsto codeGroup) \in CodeGroup$  then  
    |    $Links \leftarrow Links \cup (codeGroup, docGroup)$   
    | end  
end
```

return $G = (Nodes, Links)$