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**Acknowledgements**

The following individuals submitted parts of this specification and/or have assisted the AML team in the development of the specification:

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**Preface**

**OMG**

Founded in 1989, the Object Management Group, Inc. (OMG) is an open membership, not-for-profit computer industry standards consortium that produces and maintains computer industry specifications for interoperable, portable, and reusable enterprise applications in distributed, heterogeneous environments. Membership includes Information Technology vendors, end users, government agencies, and academia.  
  
OMG member companies write, adopt, and maintain its specifications following a mature, open process. OMG™s specifications implement the Model Driven Architecture (MDA®), maximizing ROI through a full-lifecycle approach to enterprise integration that covers multiple operating systems, programming languages, middleware and networking infrastructures, and software development environments. OMG™s specifications include: UML® (Unified Modeling Language); CORBA® (Common Object Request Broker Architecture); CWM (Common Warehouse Metamodel); and industry-specific standards for dozens of vertical markets.  
  
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• MOF  
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• CWM  
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• IDL/Language Mappings  
• Specialized CORBA specifications  
• CORBA Component Model (CCM)

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The type styles shown below are used in this document to distinguish programming statements from ordinary English. However, these conventions are not used in tables or section headings where no distinction is necessary.

Times/Times New Roman - 10 pt.: Standard body text

**Helvetica/Arial - 10 pt. Bold: OMG Interface Definition Language (OMG IDL) and syntax elements.**

Courier - 10 pt. Bold: Programming language elements.

Helvetica/Arial - 10 pt : Exceptions

NOTE: Terms that appear in italics are defined in the glossary. Italic text also represents the name of a document, specification, or other publication.

#import('js', 'com.nomagic.reportwizard.tools.script.JavaScriptTool')#import("query", "com.nomagic.reportwizard.tools.QueryTool")#import('text', 'com.nomagic.reportwizard.tools.TextTool')#set($printedEnums = $array.createArray())#set($printedInterfaces = $array.createArray())#set($printedClasses = $array.createArray())#set($printedDataTypes = $array.createArray())#set($printedStereoTypes = $array.createArray())#set($level = 0)#foreach ($pkg in $packageScope) #packageList($pkg, 1)#end#macro (writeText $txt)#set($txt1 = $text.html($txt)) $txt1#end#macro (writeBookmark1 $obj1 $dp1 $withNum)#if($withNum == “true”)

# $bookmark.create($obj1.ID, $dp1)

#else

# $bookmark.create($obj1.ID, $dp1)

#end#end#macro (writeHeader1 $dp2 $withNum)#if($withNum == “true”)

# $dp2

#else

# $dp2

#end#end#macro (writeBookmark2 $obj2 $dp3 $withNum)#if($withNum == “true”)

## $bookmark.create($obj2.ID, $dp3)

#else

## $bookmark.create($obj2.ID, $dp3)

#end#end#macro (writeHeader2 $dp4 $withNum)#if($withNum == “true”)

## $dp4

#else

## $dp4

#end#end#macro (writeBookmark3 $obj3 $dp5 $withNum)#if($withNum == “true”)

### $bookmark.create($obj3.ID, $dp5)

#else

### $bookmark.create($obj3.ID, $dp5)

#end#end#macro (writeHeader3 $dp6 $withNum)#if($withNum == “true”)

### $dp6

#else

### $dp6

#end#end#macro (writeBookmark4 $obj4 $dp7 $withNum)#if($withNum == “true”)

#### $bookmark.create($obj4.ID, $dp7)

#else

#### $bookmark.create($obj4.ID, $dp7)

#end#end#macro (writeHeader4 $dp8 $withNum)#if($withNum == “true”)

#### $dp8

#else

#### $dp8

#end#end#macro (writeBookmark $obj4 $dp7 $withNum)#if($withNum == “true”)

1. **$bookmark.create($obj4.ID, $dp7)**

#else

**$bookmark.create($obj4.ID, $dp7)**

#end#end#macro (writeHeader $dp8 $withNum)#if($withNum == “true”)

1. **$dp8**

#else

**$dp8**#end#end#macro (writeListItem $dp9)

* **$dp9**#end

#macro (writeCode $code)

$code#end

## MACRO printAttr

#macro(printAttr $att)

• $att.visibility $att.name#if($att.type) : #if($js.eval(‘(typeQN.indexOf(“UML Standard Profile”) != -1)’, ‘typeQN’, $att.type.qualifiedName))$att.type.name#else$bookmark.open($att.type.ID, $att.type.name)#end #end#if($att.multiplicity != “”) [$att.multiplicity]#end#if($att.defaultValue) = $att.defaultValue.text#end#end

## MACRO printOper

#macro(printOper $oper)#set($paramLists = $oper.ownedParameter)#set($size = 0)#foreach($p in $paramLists)#if($p.direction != “return”)#set($size = $size +1)#end#end#set($i = 1)

• $oper.visibility $oper.name (#foreach($param in $paramLists)#if($param.direction != “return”)$param.name#if($param.type) : #if($js.eval(‘(typeQN.indexOf(“UML Standard Profile”) != -1)’, ‘typeQN’, $param.type.qualifiedName))$param.type.name#else $bookmark.open($param.type.ID, $param.type.name)#end#end#if($param.multiplicity != “”) [$param.multiplicity]#end#if($param.defaultValue) = $param.defaultValue.text#end#if($size != $i), #end#set($i = $i + 1)#end#end)#if($oper.type) : #if($js.eval(‘(typeQN.indexOf(“UML Standard Profile”) != -1)’, ‘typeQN’, $oper.type.qualifiedName))$oper.type.name#else $bookmark.open($oper.type.ID, $oper.type.name)#end#end#if($oper.hasTypeModifier() && $oper.typeModifier != “”)$oper.typeModifier#end#end

#macro(printAsso $attribute $association $object)#foreach($member in $association.memberEnd)#if($member.type != $object)#set($memberEnd = $member)#end#end

• $memberEnd.visibility#if($attribute.name != “”) $attribute.name#end#if($memberEnd.type) : #if($js.eval(‘(typeQN.indexOf(“UML Standard Profile”) != -1)’, ‘typeQN’,$memberEnd.type.qualifiedName))$memberEnd.type.name#else$bookmark.open($memberEnd.type.ID,$memberEnd.type.name)#end#end#if($memberEnd.multiplicity !=“”)[$memberEnd.multiplicity]#end#if($memberEnd.defaultValue) = $memberEnd.defaultValue.text#end#end

#macro (writeHeading $object $disp $isBookmark $headingLevel $headType $withNumbering)#if($headType != “”)#set($disp = “<$headType> $disp”)#end#if($headingLevel == 1)#if($isBookmark == “true”)#writeBookmark1($object $disp $withNumbering)#else#writeHeader1($disp $withNumbering)#end#elseif($headingLevel == 2)#if($isBookmark == “true”)#writeBookmark2($object $disp $withNumbering)#else #writeHeader2($disp $withNumbering)#end#elseif($headingLevel == 3)#if($isBookmark == “true”)#writeBookmark3($object $disp $withNumbering)#else#writeHeader3($disp $withNumbering)#end#elseif($headingLevel == 4)#if($isBookmark == “true”)#writeBookmark4($object $disp $withNumbering)#else#writeHeader4($disp $withNumbering)#end#else#if($isBookmark == “true”)#writeBookmark($object $disp $withNumbering)#else#writeHeader($disp $withNumbering)#end#end#end#macro(findNestedElement $object)#set($innerElement = $report.getInnerElement($object))#foreach($nested in $innerElement)#if($nested.elementType != “package” && $nested.elementType != “model” && $nested.elementType != “profile” )#if($nested.elementType == “interface”)#set($tmp = $nestedInterface.add($nested))#elseif($nested.elementType == “class”)#set($tmp = $nestedClass.add($nested))#elseif($nested.elementType == “enumeration”)#set($tmp = $nestedEnum.add($nested))#elseif($nested.elementType == “datatype”)#set($tmp = $nestedDataTypes.add($nested))#elseif($nested.elementType == “stereotype”)#set($tmp = $nestedStereoTypes.add($nested))#end#set($in = $report.getInnerElement($nested))#if($in.size() > 0)#findNestedElement($nested)#end#end#end#end

## MACRO packageList

#macro (packageList, $parentPackage, $plevel)#set($packageInterface = $array.createArray())#set($packageClass = $array.createArray())#set($packageEnum = $array.createArray())#set($packageDataTypes = $array.createArray())#set($packageStereoTypes = $array.createArray())#set($nestedInterface = $array.createArray())#set($nestedClass = $array.createArray())#set($nestedEnum = $array.createArray())#set($nestedDataTypes = $array.createArray())#set($nestedStereoTypes = $array.createArray())#if(($parentPackage.elementType ==“package”)||($parentPackage.elementType == “profile”))#foreach($element in $parentPackage.ownedElement)#if($element.elementType == “interface”)#set($tmp = $packageInterface.add($element))#set($inner = $report.getInnerElement($element))#if($inner.size() > 0)#findNestedElement($element)#end#elseif($element.elementType == “class”)#set($tmp = $packageClass.add($element))#set($inner = $report.getInnerElement($element))#if($inner.size() > 0)#findNestedElement($element)#end#elseif($element.elementType == “enumeration”)#set($tmp = $packageEnum.add($element))#set($inner = $report.getInnerElement($element))#if($inner.size() > 0)#findNestedElement($element)#end#elseif($element.elementType == “datatype”)#set($tmp = $packageDataTypes.add($element))#set($inner = $report.getInnerElement($element))#if($inner.size() > 0)#findNestedElement($element)#end#elseif($element.elementType == “stereotype”)#set($tmp = $packageStereoTypes.add($element))#set($inner = $report.getInnerElement($element))#if($inner.size() > 0)#findNestedElement($element)#end#end#end#end#set($tmp = $array.addCollection($packageInterface, $nestedInterface))#set($tmp = $array.addCollection($packageClass, $nestedClass))#set($tmp = $array.addCollection($packageEnum, $nestedEnum))#set($tmp = $array.addCollection($packageDataTypes, $nestedDataTypes))#set($tmp = $array.addCollection($packageStereoTypes, $nestedStereoTypes))#set($diagramList = $array.createArray())#foreach($d in $sorter.humanSort($parentPackage.ownedDiagram))#if(($d.diagramType == “Class Diagram”)|| ($d.diagramType == “Profile Diagram”) ||($d.diagramType == “Package Diagram”))#set($tmp = $diagramList.add($d))#end#end#if($parentPackage != $project.model)#set($displayTitle = $js.eval(‘pkgname.replace(/[0-9\.]\s\*/gi, “”)’, ‘pkgname’, $parentPackage.name))#if($js.eval(‘(pkgn.charAt(0) > “7”)&&(pkgn.indexOf(“.”) != -1)’, ‘pkgn’, $parentPackage.name))#writeHeading($displayTitle, $displayTitle, “false”, $plevel, “Package”, “true”)#else#writeHeading($displayTitle, $displayTitle, “false”, $plevel, “”, “true”) #end#if($parentPackage.documentation != “”)#writeText($parentPackage.documentation)#end#printDiagrams($diagramList)#end#set ($subPackages = $parentPackage.nestedPackage)#foreach ($pkg in $sorter.humanSort($subPackages))#if ($plevel == 1)#packageList($pkg, 2)#elseif($plevel == 2)#packageList($pkg, 3)#elseif($plevel == 3)#packageList($pkg, 4)#else#packageList($pkg, 5)#end#end#end

##MACRO printDiagrams

#macro (printDiagrams $pkgdiagrams)#if($pkgdiagrams)#if($pkgdiagrams.size() > 0)#foreach($diag in $sorter.humanSort($pkgdiagrams))

$image.setWidth($diag.image, -2)

**$bookmark.create($diag.ID, $js.eval(‘ename.replace(/[0-9\.]\s\*/gi, “”)’, ‘ename’, $diag.name))**

#if($diag.documentation != “”)#writeText($diag.documentation)#end #set($diagramElements = $array.createArray()) #set($diagramElements = $report.getDiagramElements($diag)) #set($interfaceLists = $array.createArray()) #set($classLists = $array.createArray()) #set($enumLists = $array.createArray()) #set($dataTypesLists = $array.createArray()) #set($stereoTypesLists = $array.createArray())#foreach($element in $diagramElements)#if($element.elementType == “interface”)#set($tmp = $interfaceLists.add($element))#set($tmp = $packageInterface.remove($element))#elseif($element.elementType == “class”)#set($tmp = $classLists.add($element))#set($tmp = $packageClass.remove($element))#elseif($element.elementType == “datatype”)#set($tmp = $dataTypesLists.add($element))#set($tmp = $packageDataTypes.remove($element))#elseif($element.elementType == “stereotype”)#set($tmp = $stereoTypesLists.add($element))#set($tmp = $packageStereoTypes.remove($element))#elseif($element.elementType == “enumeration”)#set($tmp = $enumLists.add($element))#set($tmp = $packageEnum.remove($element))#end#end#if($dataTypesLists.size() > 0)#set($knownDataTypes = $array.createArray())#foreach($dtp in $sorter.humanSort($dataTypesLists))#if(!$printedDataTypes.contains($dtp))#set($tmp = $printedDataTypes.add($dtp))#createCommonContent($dtp, “DataType”)#else#set($tmp = $knownDataTypes.add($dtp))#end#end#if($knownDataTypes.size() > 0) #writeHeading($knownDataTypes, “Known other Data Types”, “false”, 5, “”, “false”) #set($size = $knownDataTypes.size())#foreach($e in $knownDataTypes)$bookmark.open($e.ID, $e.name)#if($size != $velocityCount), #end#end#end#end#if($interfaceLists.size() > 0)#set($knownInterface = $array.createArray())#foreach($interface in $sorter.humanSort($interfaceLists))#if(!$printedInterfaces.contains($interface))#set($tmp = $printedInterfaces.add($interface))#createCommonContent($interface, “Interface”)#else#set($tmp = $knownInterface.add($interface))#end#end#if($knownInterface.size() > 0)#writeHeading($knownInterface, “Known other interfaces” , “false”, 5, “”, “false”)#set($size = $knownInterface.size())#foreach($i in $knownInterface)$bookmark.open($i.ID, $i.name)#if($size != $velocityCount), #end#end#end#end#if($classLists.size() > 0)#set($knownClass = $array.createArray())#foreach($class in $sorter.humanSort($classLists))#if(!$printedClasses.contains($class))#set($tmp = $printedClasses.add($class))#createCommonContent($class, “Class”)#else#set($tmp = $knownClass.add($class))#end#end#if($knownClass.size() > 0)#writeHeading($knownClass, “Known other classes” , “false”, 5, “”, “false”)#set($size = $knownClass.size())#foreach($c in $knownClass)$bookmark.open($c.ID,$c.name)#if($size != $velocityCount), #end#end#end#end#if($enumLists.size() > 0)#set($knownEnum = $array.createArray())#foreach($enum in $sorter.humanSort($enumLists))#if(!($printedEnums.contains($enum)))#set ($tmp = $printedEnums.add($enum))#createEnumerationContent($enum)#else#set($tmp = $knownEnum.add($enum))#end#end#if($knownEnum.size() > 0)#writeHeading($knownEnum, “Known other enumerations” , “false”, 5, “”, “false”)#set($size = $knownEnum.size())#foreach($e in $knownEnum)$bookmark.open($e.ID, $e.name)#if($size != $velocityCount), #end#end#end#end#if($stereoTypesLists.size() > 0)#set($knownStereoTypes = $array.createArray())#foreach($stp in $sorter.humanSort($stereoTypesLists))#if(!$printedStereoTypes.contains($stp))#set($tmp = $printedStereoTypes.add($stp))#createCommonContent($stp, “Stereotype”)#else#set($tmp = $knownStereoTypes.add($stp))#end#end#if($knownStereoTypes.size() > 0)#writeHeading($knownStereoTypes, “Known other Stereotypes” , “false”, 5, “”, “false”)#set($size = $knownStereoTypes.size())#foreach($e in $knownStereoTypes)$bookmark.open($e.ID,$e.name)#if($size != $velocityCount), #end#end #end#end#end#if($packageDataTypes.size() > 0)#set($knownDataType = $array.createArray())#foreach($dtp in $sorter.humanSort($packageDataTypes))#if(!$printedDataTypes.contains($dtp))#set($tmp = $printedDataTypes.add($dtp))#createCommonContent ($dtp, “DataType”)#else#set($tmp = $knownDataType.add($dtp))#end#end#if($knownDataType.size() > 0)#writeHeading($knownDataType, “Known other Data Types” , “false”, 5, “”, “false”)#set($size = $knownDataType.size())#foreach($i in $knownDataType)$bookmark.open($i.ID,$i.name)#if($size != $velocityCount), #end#end#end#end#if($packageInterface.size() > 0)#set($knownInterface = $array.createArray())#foreach($interface in $sorter.humanSort($packageInterface))#if(!$printedInterfaces.contains($interface))#set($tmp = $printedInterfaces.add($interface))#createCommonContent($interface, “Interface”)#else#set($tmp = $knownInterface.add($interface))#end#end#if($knownInterface.size() > 0)#writeHeading($knownInterface, “Known other interfaces” , “false”, 5, “”, “false”)#set($size = $knownInterface.size())#foreach($i in $knownInterface)$bookmark.open($i.ID, $i.name)#if($size != $velocityCount), #end#end#end#end#if($packageClass.size() > 0)#set($knownClass = $array.createArray())#foreach($class in $sorter.humanSort($packageClass))#if(!$printedClasses.contains($class))#set($tmp = $printedClasses.add($class))#createCommonContent($class, “Class”)#else#set($tmp = $knownClass.add($class))#end#end#if($knownClass.size() > 0)#writeHeading($knownClass, “Known other classes” , “false”, 5, “”, “false”)#set($size = $knownClass.size())#foreach($c in $knownClass)$bookmark.open($c.ID, $c.name)#if($size != $velocityCount), #end#end#end#end#if($packageEnum.size() > 0)#set($knownEnum = $array.createArray())#foreach($enum in $sorter.humanSort($packageEnum))#if(!$printedEnums.contains($enum))#set($tmp = $printedEnums.add($enum))#createEnumerationContent($enum)#else#set($tmp = $knownEnum.add($enum))#end#end#if($knownEnum.size() > 0)#writeHeading($knownEnum, “Known other enumerations” , “false”, 5, “”, “false”)#set($size = $knownEnum.size())#foreach($e in $knownEnum)$bookmark.open($e.ID, $e.name)#if($size != $velocityCount), #end#end#end#end#if($packageStereoTypes.size() > 0)#set($knownStereoType = $array.createArray())#foreach($stp in $sorter.humanSort($packageStereoTypes))#if(!$printedStereoTypes.contains($stp))#set($tmp = $printedStereoTypes.add($stp))#createCommonContent($stp, “Stereotype”)#else#set($tmp = $knownStereoType.add($stp))#end#end#if($knownStereoType.size() > 0)#writeHeading($knownStereoType, “Known other Stereotypes” , “false”, 5, “”, “false”)#set($size = $knownStereoType.size())#foreach($i in $knownStereoType)$bookmark.open($i.ID,$i.name)#if($size != $velocityCount), #end#end#end#end#end#end#end

##MACRO createEnumerationContent

#macro(createEnumerationContent $enum)

#writeHeading($enum, $enum.name, “true”, 3, “Enumeration”, “true”)

#if($enum.documentation != “”)#writeHeading($enum, “Description”, “false”, 5, “”, “false”)#writeText($enum.documentation) #end#set($allDiagrams = $project.getDiagrams())#set($pas = $enum.presentationElement)#set($size = $pas.size())#if($pas.size() > 0)#set($diagramList = $array.createArray())

#foreach($pa in $pas) #set($entry = $pa.diagramPresentationElement.name) #if(!$diagramList.contains($entry))#set($tmp = $diagramList.add($entry)) #end #end#end#if($diagramList.size() > 0)#writeHeading($diagramList, “Diagrams”, “false”, 5, “”, “false”)#foreach($diag1 in $diagramList)#set($targetDiag = $report.findElementByName($allDiagrams, $diag1))#if ($targetDiag.size() > 0)$bookmark.open($targetDiag.get(0).ID, $js.eval(‘ename.replace(/[0-9\.]\s\*/gi, “”)’, ‘ename’, $diag1))#end#if($size != $velocityCount), #end#end#end#set($enumLiterals = $enum.ownedLiteral)#if($enumLiterals.size() > 0) #writeHeading($implementInterface “Enumeration Literals”, “false”, 5, “”, “false”)#foreach($enumLit in $sorter.humanSort($enumLiterals)) #writeListItem($enumLit.name)#if($enumLit.documentation != “”)#writeText($enumLit.documentation)#end#end #end #end

## MACRO createCommonContent

#macro(createCommonContent $umlType $typeName)#writeHeading($umlType, $umlType.name, “true”, 3, $typeName, “true”)#if($umlType.documentation != “”)#writeHeading($umlType, “Description”, “false”, 5, “”,“false”)#writeText($umlType.documentation)#end#set($allDiagrams = $project.getDiagrams())#set($pas = $umlType.presentationElement)#set($size = $pas.size())#if($pas.size() > 0)#set($diagramList = $array.createArray())#foreach($pa in $pas) #set($entry =$pa.diagramPresentationElement.name)#if(!$diagramList.contains($entry))#set($tmp = $diagramList.add($entry)) #end #end#end#if($diagramList.size() > 0)#writeHeading($diagramList “Diagrams”, “false”, 5, “”, “false”)#foreach($diag1 in $sorter.humanSort($diagramList))#set($targetDiag = $report.findElementByName($allDiagrams, $diag1))#if ($targetDiag.size() > 0)$bookmark.open($targetDiag.get(0).ID, $js.eval(‘ename.replace(/[0-9\.]\s\*/gi, “”)’, ‘ename’, $diag1))#end#if($size != $velocityCount), #end#end#end#if (($typeName != “DataType”)&&($typeName != “Interface”))#set($implementInterface = $umlType.realizedInterface)#set($size = $implementInterface.size())#if($implementInterface.size() > 0)#writeHeading($implementInterface “Implemented Interface”, “false”, 5, “”, “false”)#foreach($interface in $sorter.humanSort($implementInterface))$bookmark.open($interface.ID,$interface.name)#if($size != $velocityCount), #end#end#end#end#set($baseClassifier = $umlType.baseClassifier)#set($size = $baseClassifier.size())#if($baseClassifier.size() > 0)#writeHeading($baseClassifier, “Direct Known Superclasses (Generalization)”, “false”, 5, “”, “false”)#foreach($bclass in $sorter.humanSort($baseClassifier))$bookmark.open($bclass.ID, $bclass.name)#if($size !=$velocityCount), #end#end#end#set($specClassifier = $umlType.specificClassifier)#set($size = $specClassifier.size())#if($specClassifier.size() > 0)#writeHeading($specClassifier, “Direct Known Subclasses (Specialization)”, “false”, 5, “”, “false”)#foreach($sclass in $sorter.humanSort($specClassifier))$bookmark.open($sclass.ID, $sclass.name)#if($size !=$velocityCount), #end#end#end#set($allAtt= $array.createArray())#foreach($a in $umlType.ownedAttribute)#if(!$a.association) #set($tmp = $allAtt.add($a)) #end #end#if($allAtt.size() > 0)#writeHeading($allAtt, “Attributes”, “false”, 5, “”, “false”)#foreach($att in $allAtt)#if(!$att.association)#printAttr($att)#if($att.documentation != “”)#writeText($att.documentation)#end#end#end#end#set($allOper = $umlType.ownedOperation)#if($allOper.size() > 0)#writeHeading($allOper, “Operations”, “false”, 5, “”, “false”)#foreach($oper in $allOper) #printOper($oper)#if($oper.documentation != “”)#writeText($oper.documentation)#end#end#end#set($associationLists = $array.createArray())#foreach($attribute in $umlType.ownedAttribute)#if($attribute.association)#set($tmp=$associationLists.add($attribute.association))#end#end#if($associationLists.size() > 0)#writeHeading($associationLists, “Associations”, “false”, 5, “”, “false”)

#foreach($attribute in $umlType.ownedAttribute) #if($attribute.association) #set($association = $attribute.association) #printAsso($attribute, $association, $umlType)#if($memberEnd.type.documentation != “”) #writeText($memberEnd.type.documentation)#end#end #end #end

#set($rules = $array.createArray())#foreach($rule in $umlType.ownedRule) #set($tmp = $rules.add($rule)) #end

#if($rules.size() > 0)#writeHeading($rules, “Constraints”, “false”, 5, “”, “false”)#foreach ($rulei in $rules)

#writeListItem($rulei.name)#if ($rulei.specification)#if(($rulei.documentation)&&($rulei.documentation !=“”))#writeText($rulei.documentation)#end#if($rulei.specification.language)$js.eval(‘lname.replace(“OCL2\.0”, “OCL”)’, ‘lname’, $rulei.specification.language.toString())#end#writeCode($rulei.specification.text)#end#end#end#end