

section *CircusFormalSyntax* **parents** *ZFormalSyntax*

$N ::= NAME$
 $Par ::= Paragraph$
 $CSExp ::= csname\langle N \rangle \mid$
 $cs\langle seq\ N \rangle \mid$
 $csunion\langle CSExp \times CSExp \rangle \mid$
 $csinter\langle CSExp \times CSExp \rangle \mid$
 $csminus\langle CSExp \times CSExp \rangle$
 $NSExp ::= ns\langle seq\ N \rangle \mid$
 $nsunion\langle NSExp \times NSExp \rangle \mid$
 $nsinter\langle NSExp \times NSExp \rangle \mid$
 $nsminus\langle NSExp \times NSExp \rangle$

$\mid\ BOOL, T, F : N$

$Program ::= program\langle seq\ CircusPar \rangle$

$CircusPar ::= zparagraphdeclaration\langle Par \rangle \mid$
 $channeldeclaration\langle CDecl \rangle \mid$
 $channelsetdeclaration\langle N \times CSExp \rangle \mid$
 $processdeclaration\langle ProcDecl \rangle$

$SimpleCDecl ::= simplecdecl\langle seq_1\ N \rangle \mid$
 $typedsimplecdecl\langle seq_1\ N \times Expression \rangle \mid$
 $genericcdecl\langle Formals \times seq_1\ N \times Expression \rangle$

$CDecl ::= cdecl\langle seq_1\ SimpleCDecl \rangle$

$ProcDecl ::= simpleprocessdeclaration\langle N \times ProcDef \rangle \mid$
 $genericprocessdeclaration\langle N \times Formals \times ProcDef \rangle$

$ProcDef ::= processdefinition\langle Proc \rangle \mid$
 $parameterisedprocessdefinition\langle DeclPart \times Proc \rangle \mid$
 $indexedprocessdefinition\langle DeclPart \times Proc \rangle$

$ProcessState ::= stateExpr\langle Expression \rangle \mid$
 $stateDecl\langle DeclName \times Expression \rangle$

$Proc ::= proc\langle\langle seq\ PPar \times ProcessState \times seq\ PPar \times Action \rangle\rangle \mid$
 $processsequentialcomposition\langle\langle Proc \times Proc \rangle\rangle \mid$
 $processexternalchoice\langle\langle Proc \times Proc \rangle\rangle \mid$
 $processinternalchoice\langle\langle Proc \times Proc \rangle\rangle \mid$
 $processparallelcomposition\langle\langle Proc \times CSExp \times Proc \rangle\rangle \mid$
 $processinterleave\langle\langle Proc \times Proc \rangle\rangle \mid$
 $processhiding\langle\langle Proc \times CSExp \rangle\rangle \mid$
 $processinstantiation\langle\langle DeclPart \times ProcDef \times seq_1\ Expression \rangle\rangle \mid$
 $processcallinstantiation\langle\langle N \times seq_1\ Expression \rangle\rangle \mid$
 $processcall\langle\langle N \rangle\rangle \mid$
 $indexedprocessinstantiation\langle\langle DeclPart \times ProcDef \times seq_1\ Expression \rangle\rangle \mid$
 $indexedprocesscallinstantiation\langle\langle N \times seq_1\ Expression \rangle\rangle \mid$
 $processrenaming\langle\langle Proc \times seq_1\ N \times seq_1\ N \rangle\rangle \mid$
 $genericprocessinstantiation\langle\langle N \times seq_1\ Expression \rangle\rangle \mid$
 $iteratedprocesssequentialcomposition\langle\langle DeclPart \times Proc \rangle\rangle \mid$
 $iteratedprocessexternalchoice\langle\langle DeclPart \times Proc \rangle\rangle \mid$
 $iteratedprocessinternalchoice\langle\langle DeclPart \times Proc \rangle\rangle \mid$
 $iteratedprocessparallelcomposition\langle\langle CSExp \times DeclPart \times Proc \rangle\rangle \mid$
 $iteratedprocessinterleave\langle\langle DeclPart \times Proc \rangle\rangle$

$PPar ::= zparagraph\langle\langle Par \rangle\rangle \mid$
 $actionparagraph\langle\langle N \times ParAction \rangle\rangle \mid$
 $namesetparagraph\langle\langle N \times NSExp \rangle\rangle$

$ParAction ::= paraction\langle\langle Action \rangle\rangle \mid$
 $parameterisedparaction\langle\langle DeclPart \times ParAction \rangle\rangle$

$Action ::= schemaaction\langle\langle Expression \rangle\rangle \mid$
 $commandaction\langle\langle Command \rangle\rangle \mid$
 $namedaction\langle\langle N \rangle\rangle \mid$
 $cspaction\langle\langle CSPAction \rangle\rangle \mid$
 $renamingaction\langle\langle Action \times seq_1(N \times Expression) \rangle\rangle$

$CParameter ::= inputparameter\langle\langle N \rangle\rangle \mid$
 $guardedinputparameter\langle\langle N \times Predicate \rangle\rangle \mid$
 $outputparameter\langle\langle Expression \rangle\rangle \mid$
 $simpleparameter\langle\langle Expression \rangle\rangle$

$Comm ::= communication\langle\langle N \times seq\ CParameter \rangle\rangle \mid$
 $genericcommunication\langle\langle N \times seq_1\ Expression \times seq\ CParameter \rangle\rangle$

$Command ::= assignment\langle\langle seq_1(N \times Expression)\rangle\rangle \mid$
 $ifcommand\langle\langle GActions\rangle\rangle \mid$
 $variableblock\langle\langle DeclPart \times Action\rangle\rangle \mid$
 $actionspecification\langle\langle seq_1 N \times Predicate \times Predicate\rangle\rangle \mid$
 $assumption\langle\langle Predicate\rangle\rangle \mid$
 $coercion\langle\langle Predicate\rangle\rangle \mid$
 $substitutionbyvalue\langle\langle DeclPart \times Action\rangle\rangle \mid$
 $substitutionbyresult\langle\langle DeclPart \times Action\rangle\rangle \mid$
 $substitutionbyvalueresult\langle\langle DeclPart \times Action\rangle\rangle$

$GActions ::= gactions\langle\langle seq_1(Predicate \times Action)\rangle\rangle$

$CSPAction ::= skip \mid stop \mid chaos \mid$
 $interruptaction\langle\langle Action \times Action\rangle\rangle \mid$
 $prefixedaction\langle\langle Comm \times Action\rangle\rangle \mid$
 $guardedaction\langle\langle Predicate \times Action\rangle\rangle \mid$
 $actionsequentialcomposition\langle\langle Action \times Action\rangle\rangle \mid$
 $actionexternalchoice\langle\langle Action \times Action\rangle\rangle \mid$
 $actioninternalchoice\langle\langle Action \times Action\rangle\rangle \mid$
 $actionparallelcomposition\langle\langle Action \times NSExp \times CSExp \times NSExp \times Action\rangle\rangle \mid$
 $actioninterleave\langle\langle Action \times NSExp \times NSExp \times Action\rangle\rangle \mid$
 $actionhding\langle\langle Action \times CSExp\rangle\rangle \mid$
 $paractioninstantiation\langle\langle ParAction \times seq_1 Expression\rangle\rangle \mid$
 $recursiveaction\langle\langle N \times Action\rangle\rangle \mid$
 $iteratedactionsequentialcomposition\langle\langle DeclPart \times Action\rangle\rangle \mid$
 $iteratedactionexternalchoice\langle\langle DeclPart \times Action\rangle\rangle \mid$
 $iteratedactioninternalchoice\langle\langle DeclPart \times Action\rangle\rangle \mid$
 $iteratedactionparallelcomposition\langle\langle CSExp \times DeclPart \times NSExp \times Action\rangle\rangle \mid$
 $iteratedactioninterleave\langle\langle DeclPart \times NSExp \times Action\rangle\rangle$