Formal Grammar

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Noel Arteche

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| --- | --- | --- | --- |
| formula\_family | → |  | name  type  parameters  variables  blocks  quantifiers  quantifier\_prefix  operators  output |
|  |  |  |  |
| name | → |  | **name:** *[a-zA-Z0-9](\_?\s?[a-zA-Z0-9])\** |
|  |  |  |  |
| type | → |  | **type: CNF** |
|  |  | | | **type: circuit** |
|  |  |  |  |
| parameters | → |  | **parameters:** parameter\_declaration |
|  |  |  |  |
| parameter\_declaration | → |  | param\_name **:** param\_type param\_constraints  parameter\_declaration |
|  |  | | | ε |
|  |  |  |  |
| param\_type | → |  | **natural** |
|  |  |  |  |
| param\_contraints | → |  | **,** param\_name **<=** arithmetic\_expression  param\_constraints |
|  |  | | | , param\_name **>=** arithmetic\_expression  param\_constraints |
|  |  |  |  |
| variables | → |  | **variables:** variable\_declaration |
|  |  |  |  |
| variable\_declaration | → |  | var\_namesubindices  variable\_declaration |
|  |  | | | ε |
|  |  |  |  |
| subindices | → |  | **(**subindices\_list**)** subindices\_constraints |
|  |  |  |  |
| subindices\_list | → |  | index more\_subindices |
|  |  |  |  |
| more\_subindices | → |  | **,** subindices\_list |
|  |  | | | ε |
|  |  |  |  |
| in\_range | → |  | subindices\_list **in** range |
|  |  |  |  |
| range | → |  | **[**arithmetic\_expression**,** arithmetic\_expression**]** |
|  |  |  |  |
| blocks | → |  | **blocks:** block\_definition |
|  |  |  |  |
| block\_definition | → |  | **define block**  single\_block  block\_definition |
|  |  | | | **define blocks**  multiple\_blocks  subindices\_constraints  grouped\_in  block\_definition |
|  |  | | | ε |
|  |  |  |  |
| single\_block | → |  | block\_name **:=** block\_body |
|  |  |  |  |
| multiple\_blocks | → |  | single\_block  multiple\_blocks |
|  |  | | | ε |
|  |  |  |  |
| block\_body | → |  | block\_namemore\_names |
|  |  | | | **-**block\_name more\_names |
|  |  | | | variable\_namemore\_names |
|  |  | | | **-**variable\_name more\_names |
|  |  |  |  |
| more\_names | → |  | **,** block\_body |
|  |  | | | ε |
|  |  |  |  |
| subindices\_constraints | → |  | **where** constraints |
|  |  | | | ε |
|  |  |  |  |
| constraints | → |  | constraint more\_contraints |
|  |  |  | constraint **and** constraint more\_constraints |
|  |  |  | Constraint **or** constraint more\_constraint |
|  |  |  |  |
| contraint | → |  | in\_range |
|  |  |  | assignment |
|  |  |  | expression |
|  |  |  |  |
| more\_constraints | → |  | , constraints |
|  |  |  |  |
| grouped\_in | → |  | **grouped in** block\_name |
|  |  | | | ε |
|  |  |  |  |
| quantifiers | → |  | **quantifiers:** quantifier\_declaration |
|  |  |  |  |
| quantifier\_declaration |  |  | **block** block\_name **quantified with** quantifier  quantifier\_declaration |
|  |  |  | **blocks** **in** block\_name **quantified** **with** quantifier  quantifier\_declaration |
|  |  | | | ε |
|  |  |  |  |
| quantifier | → |  | **E** |
|  |  | | | **A** |
|  |  |  |  |
| quantifier\_prefix | → |  | **quantifier prefix:** block\_name |
|  |  |  |  |
| operators | → |  | **operators:** operator\_declaration |
|  |  | | | ε |
|  |  |  |  |
| operator\_declaration | → |  | **block** block\_name **has operator** op  operator\_declaration |
|  |  | | | **blocks in** block\_name **have operator** op  operator\_declaration |
|  |  | | | ε |
|  |  |  |  |
| op | → |  | **AND** |
|  |  | | | **OR** |
|  |  | | | **XOR** |
|  |  |  |  |
| output | → |  | **output:** block\_name |
|  |  |  |  |
| param\_name | → |  | *[a-zA-Z](\_?[a-zA-Z0-9])\** |
|  |  |  |  |
| var\_name | → |  | *[a-z](\_?[a-z0-9])\** |
|  |  |  |  |
| index | → |  | *[a-z](\_?[a-z0-9])\** |
|  |  |  |  |
| block\_name | → |  | *[A-Z](\_?[a-zA-Z0-9])\** |
|  |  |  |  |
| expression | → |  | expression **==** expression |
|  |  |  | expression **!=** expression |
|  |  |  | expression **<=** expression |
|  |  |  | expression **<** expression |
|  |  |  | expression **>=** expression |
|  |  |  | expression **>** expression |
|  |  |  | expression **+** expression |
|  |  |  | expression **-** expression |
|  |  |  | expression **\*** expresión |
|  |  |  | expression **/** expression |
|  |  |  | expression **mod** expression |
|  |  |  | param\_name |
|  |  |  | index |
|  |  |  |  |
|  |  |  |  |
| assignment | → |  | index **=** expression |
|  |  |  |  |