

## Cedar Safe Language Syntax

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13.31 module ::= DIRECTORY (nd ?(: TYPE nt) ?(USING [nu, 36.tu] ) ; :=. typeName | builtInType | typeCons
    ( interface | implementation )
2 interface ::= nm, !.. : CEDAR DEFINITIONS ?lock4 builtInType ::= INT | REAL | TYPE | ATOM |
    ?(IMPORTS ( (niv : | ) nit ), ... ) ~ { ?open7 (d | b); !.. } . CONDITION | MONITORLOCK
3 implementation ::= nm : CEDAR See Table 4 2. TYPE only in a b or an interface's d.
    ( PROGRAM ?drType42 | MONITOR ?drType42 ?locks ) 39 typeCons ::= subrange25 | paintedTC40.1 | transfe
    ?(IMPORTS ( (niv : | ) nit ), ... ) ?(EXPORTS ne, ... ) arrayTC44 | seqTC45 | refTC46 | listTC47 |
5locks ::= LOCKS e ?(USING nu: t) recordTC50 | unionTC52 | enumTC54 | defaultTC55

13.46 block ::= ?(CHECKED | UNCHECKED | TRUSTED)
    { ?open ?enable ?body ?( EXITS (n, !..=>s); ... 40) } paintedTC13; := typeName37 PAINTED t
7 open ::= OPEN (n ~ e | e), !.. ; --In 2, 5 4.41 transferTC ::= ?(SAFE | UNSAFE) xfer ?drType
8 enable ::= ENABLE { enChoice; ... }; 41.xfer ::= PROC | PORT | PROCESS | SIGNAL | ERROR | PRO
9 enChoice ::= ( e, !.. | ANY ) => s --In 7, 27.1.42 drType ::= ?fields1 RETURNS fields2 | fields1 --
10 body ::= (d | b); !.. ; s; ... | s; !.. --In 45.fields ::= [ d11, ... ] | [t, ... ] | ANY --In

13.51 declaration ::= n, !.. : ?(PUBLIC | PRIVATE) varTC44 arrayTC40 ::= ARRAY t1 OF t2
13 binding ::= n, !.. : ?(PUBLIC | PRIVATE) t ~ ( 45 seqTC ::= SEQUENCE n : t1 OF t2 -- Only as last type
    e | t2 -- t=TYPE-- | CODE | ?INLINE ?(ENTRY | INTERNAL) 46.refTC ::= REF ?varTC40
    47 listTC ::= LIST OF varTC40

13.64 statement ::= e1_e2 | e | block6 | escape | loop6 | recordTC40 ::= ?MONITORED RECORD fields43
16 escape ::= GOTO n | EXIT | CONTINUE | (RETURN | RESUME) 52 unionTC ::= SELECT n : (t | *) FROM (n => fields4
17 loop ::= ?iterator ?(WHILE e | UNTIL e) ENDCASE -- Only as last type
    DO ?body10 ?(REPEAT FINISHED=>s) 4.ENDLOOP 41.enumTC ::= {n, ...} | MACHINE DEPENDENT e({?n}){ ...
18 iterator ::= THROUGH e | 4.115 defaultTC ::= t _ | t _ e
    FOR n : t ( ?DECREASING IN e | ONLY AS t1 ) a decl in body9 or field43 (n: t _ e), in a type
    e is a subrange. n is readonly.

13.79 expression ::= n | literal56 application26 |
    (e | typeName37) . (9) n |
    prefixOp e | e1 infixOp e2 | e1 AND (2) e2 | e1 OR (1) e2 |
    e ^ (9) | ERROR | [ argBinding27 ] |
    builtIn [ e, ... ?applEn27.1 ] |
    funnyAppl e ?( [?argBinding27 ?applEn27.1 ] ) |
    s | subrange25 | if28 | select29 | safeSelect32
    Precedence is in bold in rules 19-21. All operators associate to the left except
    _, which associates to the right. Application has highest precedence. Subrange
    only after IN or THROUGH. s only in if28 and select choices30 33.
20 prefixOp ::= @ (8) | (7) | (~ | NOT) (3)
21 infixOp ::= * | / | MOD (6) | + | (5) | relOp (4) | _ (0)
22 relOp ::= ?NOT (?~ (= | < | >) | <= | >= | # | IN) --In 21, 30.
23 builtIn ::= -- These are enumerated in Table 4 5.
24 funnyAppl ::= FORK | JOIN | WAIT | NOTIFY | BROADCAST |
    SIGNAL | ERROR | RETURN WITH ERROR
25 subrange ::= ?typeName37 (e1 [ . | ] e2) ( | - | ) 19, 39.
26 application ::= e [ ?argBinding ?applEn ]
27 argBinding ::= (n ~ ?e ), !.. | (?e), !.. --In 19, 26.
27.1applEn ::= ! enChoice9; ... -- In 19, 26.

13.88 if ::= IF e1 THEN e2 ?(ELSE e3)
29 select ::= SELECT e FROM choice; ... endChoice
    The ";" is "," in an expression, here and in 32.
30 choice ::= (?relOp22 e1 ), !..=> e2
31 endChoice ::= ENDCASE ?(=> e3) --In 29, 32, 34.
32 safeSelect ::= WITH e SELECT FROM safeChoice; ... endChoice31
33 safeChoice ::= n : t => e2

13.26 name ::= letter (letter | digit)...
57 literal ::= num | ?D digit (B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S | T | U | V | W | X | Y | Z |
    ?num . num ?exponent | num exponent |
    ' extendedChar | " extendedChar ... " | $ n
58 exponent ::= ?(E | e) num
59 num ::= digit !..
60 extendedChar ::= space | \ extension | anyCharNot "Or\
61 extension ::= digit1 digit2 digit3 digit4 digit5 digit6 digit7 digit8 digit9 digit10 digit11 digit12 digit13 digit14 digit15 digit16 digit17 digit18 digit19 digit20 digit21 digit22 digit23 digit24 digit25 digit26 digit27 digit28 digit29 digit30 digit31 digit32 digit33 digit34 digit35 digit36 digit37 digit38 digit39 digit40 digit41 digit42 digit43 digit44 digit45 digit46 digit47 digit48 digit49 digit50 digit51 digit52 digit53 digit54 digit55 digit56 digit57 digit58 digit59 digit60 digit61 digit62 digit63 digit64 digit65 digit66 digit67 digit68 digit69 digit70 digit71 digit72 digit73 digit74 digit75 digit76 digit77 digit78 digit79 digit80 digit81 digit82 digit83 digit84 digit85 digit86 digit87 digit88 digit89 digit90 digit91 digit92 digit93 digit94 digit95 digit96 digit97 digit98 digit99 digit100 digit101 digit102 digit103 digit104 digit105 digit106 digit107 digit108 digit109 digit110 digit111 digit112 digit113 digit114 digit115 digit116 digit117 digit118 digit119 digit120 digit121 digit122 digit123 digit124 digit125 digit126 digit127 digit128 digit129 digit130 digit131 digit132 digit133 digit134 digit135 digit136 digit137 digit138 digit139 digit140 digit141 digit142 digit143 digit144 digit145 digit146 digit147 digit148 digit149 digit150 digit151 digit152 digit153 digit154 digit155 digit156 digit157 digit158 digit159 digit160 digit161 digit162 digit163 digit164 digit165 digit166 digit167 digit168 digit169 digit170 digit171 digit172 digit173 digit174 digit175 digit176 digit177 digit178 digit179 digit180 digit181 digit182 digit183 digit184 digit185 digit186 digit187 digit188 digit189 digit190 digit191 digit192 digit193 digit194 digit195 digit196 digit197 digit198 digit199 digit200 digit201 digit202 digit203 digit204 digit205 digit206 digit207 digit208 digit209 digit210 digit211 digit212 digit213 digit214 digit215 digit216 digit217 digit218 digit219 digit220 digit221 digit222 digit223 digit224 digit225 digit226 digit227 digit228 digit229 digit230 digit231 digit232 digit233 digit234 digit235 digit236 digit237 digit238 digit239 digit240 digit241 digit242 digit243 digit244 digit245 digit246 digit247 digit248 digit249 digit250 digit251 digit252 digit253 digit254 digit255 digit256 digit257 digit258 digit259 digit260 digit261 digit262 digit263 digit264 digit265 digit266 digit267 digit268 digit269 digit270 digit271 digit272 digit273 digit274 digit275 digit276 digit277 digit278 digit279 digit280 digit281 digit282 digit283 digit284 digit285 digit286 digit287 digit288 digit289 digit290 digit291 digit292 digit293 digit294 digit295 digit296 digit297 digit298 digit299 digit300 digit301 digit302 digit303 digit304 digit305 digit306 digit307 digit308 digit309 digit310 digit311 digit312 digit313 digit314 digit315 digit316 digit317 digit318 digit319 digit320 digit321 digit322 digit323 digit324 digit325 digit326 digit327 digit328 digit329 digit330 digit331 digit332 digit333 digit334 digit335 digit336 digit337 digit338 digit339 digit340 digit341 digit342 digit343 digit344 digit345 digit346 digit347 digit348 digit349 digit350 digit351 digit352 digit353 digit354 digit355 digit356 digit357 digit358 digit359 digit360 digit361 digit362 digit363 digit364 digit365 digit366 digit367 digit368 digit369 digit370 digit371 digit372 digit373 digit374 digit375 digit376 digit377 digit378 digit379 digit380 digit381 digit382 digit383 digit384 digit385 digit386 digit387 digit388 digit389 digit390 digit391 digit392 digit393 digit394 digit395 digit396 digit397 digit398 digit399 digit400 digit401 digit402 digit403 digit404 digit405 digit406 digit407 digit408 digit409 digit410 digit411 digit412 digit413 digit414 digit415 digit416 digit417 digit418 digit419 digit420 digit421 digit422 digit423 digit424 digit425 digit426 digit427 digit428 digit429 digit430 digit431 digit432 digit433 digit434 digit435 digit436 digit437 digit438 digit439 digit440 digit441 digit442 digit443 digit444 digit445 digit446 digit447 digit448 digit449 digit450 digit451 digit452 digit453 digit454 digit455 digit456 digit457 digit458 digit459 digit460 digit461 digit462 digit463 digit464 digit465 digit466 digit467 digit468 digit469 digit470 digit471 digit472 digit473 digit474 digit475 digit476 digit477 digit478 digit479 digit480 digit481 digit482 digit483 digit484 digit485 digit486 digit487 digit488 digit489 digit490 digit491 digit492 digit493 digit494 digit495 digit496 digit497 digit498 digit499 digit500 digit501 digit502 digit503 digit504 digit505 digit506 digit507 digit508 digit509 digit510 digit511 digit512 digit513 digit514 digit515 digit516 digit517 digit518 digit519 digit520 digit521 digit522 digit523 digit524 digit525 digit526 digit527 digit528 digit529 digit530 digit531 digit532 digit533 digit534 digit535 digit536 digit537 digit538 digit539 digit540 digit541 digit542 digit543 digit544 digit545 digit546 digit547 digit548 digit549 digit550 digit551 digit552 digit553 digit554 digit555 digit556 digit557 digit558 digit559 digit560 digit561 digit562 digit563 digit564 digit565 digit566 digit567 digit568 digit569 digit570 digit571 digit572 digit573 digit574 digit575 digit576 digit577 digit578 digit579 digit580 digit581 digit582 digit583 digit584 digit585 digit586 digit587 digit588 digit589 digit590 digit591 digit592 digit593 digit594 digit595 digit596 digit597 digit598 digit599 digit600 digit601 digit602 digit603 digit604 digit605 digit606 digit607 digit608 digit609 digit610 digit611 digit612 digit613 digit614 digit615 digit616 digit617 digit618 digit619 digit620 digit621 digit622 digit623 digit624 digit625 digit626 digit627 digit628 digit629 digit630 digit631 digit632 digit633 digit634 digit635 digit636 digit637 digit638 digit639 digit640 digit641 digit642 digit643 digit644 digit645 digit646 digit647 digit648 digit649 digit650 digit651 digit652 digit653 digit654 digit655 digit656 digit657 digit658 digit659 digit660 digit661 digit662 digit663 digit664 digit665 digit666 digit667 digit668 digit669 digit670 digit671 digit672 digit673 digit674 digit675 digit676 digit677 digit678 digit679 digit680 digit681 digit682 digit683 digit684 digit685 digit686 digit687 digit688 digit689 digit690 digit691 digit692 digit693 digit694 digit695 digit696 digit697 digit698 digit699 digit700 digit701 digit702 digit703 digit704 digit705 digit706 digit707 digit708 digit709 digit710 digit711 digit712 digit713 digit714 digit715 digit716 digit717 digit718 digit719 digit720 digit721 digit722 digit723 digit724 digit725 digit726 digit727 digit728 digit729 digit730 digit731 digit732 digit733 digit734 digit735 digit736 digit737 digit738 digit739 digit740 digit741 digit742 digit743 digit744 digit745 digit746 digit747 digit748 digit749 digit750 digit751 digit752 digit753 digit754 digit755 digit756 digit757 digit758 digit759 digit760 digit761 digit762 digit763 digit764 digit765 digit766 digit767 digit768 digit769 digit770 digit771 digit772 digit773 digit774 digit775 digit776 digit777 digit778 digit779 digit780 digit781 digit782 digit783 digit784 digit785 digit786 digit787 digit788 digit789 digit790 digit791 digit792 digit793 digit794 digit795 digit796 digit797 digit798 digit799 digit800 digit801 digit802 digit803 digit804 digit805 digit806 digit807 digit808 digit809 digit810 digit811 digit812 digit813 digit814 digit815 digit816 digit817 digit818 digit819 digit820 digit821 digit822 digit823 digit824 digit825 digit826 digit827 digit828 digit829 digit830 digit831 digit832 digit833 digit834 digit835 digit836 digit837 digit838 digit839 digit840 digit841 digit842 digit843 digit844 digit845 digit846 digit847 digit848 digit849 digit850 digit851 digit852 digit853 digit854 digit855 digit856 digit857 digit858 digit859 digit860 digit861 digit862 digit863 digit864 digit865 digit866 digit867 digit868 digit869 digit870 digit871 digit872 digit873 digit874 digit875 digit876 digit877 digit878 digit879 digit880 digit881 digit882 digit883 digit884 digit885 digit886 digit887 digit888 digit889 digit890 digit891 digit892 digit893 digit894 digit895 digit896 digit897 digit898 digit899 digit900 digit901 digit902 digit903 digit904 digit905 digit906 digit907 digit908 digit909 digit910 digit911 digit912 digit913 digit914 digit915 digit916 digit917 digit918 digit919 digit920 digit921 digit922 digit923 digit924 digit925 digit926 digit927 digit928 digit929 digit930 digit931 digit932 digit933 digit934 digit935 digit936 digit937 digit938 digit939 digit940 digit941 digit942 digit943 digit944 digit945 digit946 digit947 digit948 digit949 digit950 digit951 digit952 digit953 digit954 digit955 digit956 digit957 digit958 digit959 digit960 digit961 digit962 digit963 digit964 digit965 digit966 digit967 digit968 digit969 digit970 digit971 digit972 digit973 digit974 digit975 digit976 digit977 digit978 digit979 digit980 digit981 digit982 digit983 digit984 digit985 digit986 digit987 digit988 digit989 digit990 digit991 digit992 digit993 digit994 digit995 digit996 digit997 digit998 digit999 digit1000 digit1001 digit1002 digit1003 digit1004 digit1005 digit1006 digit1007 digit1008 digit1009 digit1010 digit1011 digit1012 digit1013 digit1014 digit1015 digit1016 digit1017 digit1018 digit1019 digit1020 digit1021 digit1022 digit1023 digit1024 digit1025 digit1026 digit1027 digit1028 digit1029 digit1030 digit1031 digit1032 digit1033 digit1034 digit
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