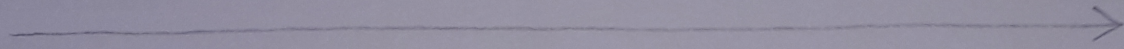


ELEMENTS OF LEAN LANGUAGE

NO LOGICAL SIGNIFICANCE

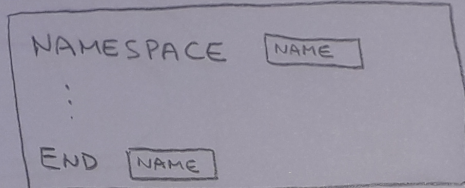
LOGICAL SIGNIFICANCE



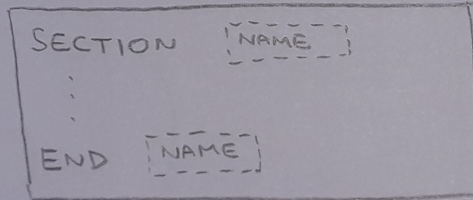
QUERY COMMANDS

- # PRINT
- # CHECK
- # REDUCE
- ⋮

BLOCKS OF CODE



↳ ORGANIZE DATA



↳ RESTRICTS THE SCOPE OF COMMANDS:

- VARIABLE/S
- OPEN

OPEN COMMAND

VARIABLE/S COMMAND

IMPLICIT λ ABSSTRACTION
IMPLICIT ARGUMENTS

DEF COMMAND

CONSTANT/S COMMAND

QUERY INFORMATION

INTRODUCES SYNTACTIC SHORTCUTS

EXTENDS SIGNATURE

TYPES

⋮

SORT $m+1$ = TYPE m

- TYPE $m-1$
- TYPE $m-1 \rightarrow$ TYPE $m-4$
- $max \rightarrow$ TYPE $m-1 \rightarrow$ BOOL
- $max \times$ TYPE $m-1$
- $max \times$ (TYPE $m-1 \rightarrow$ BOOL)
- $list$ (TYPE $m-1$)

- $\prod (\alpha : \text{TYPE } m-1). \beta \alpha$
WHERE $\beta : \text{TYPE } m-1 \rightarrow \text{TYPE } m$
- $\prod (m : max). \beta m$
WHERE $\beta : max \rightarrow \text{TYPE } m$

■ CLOSED UNDER TAKING \rightarrow, \times

⋮

SORT 2 = TYPE 1

- TYPE
- $max \rightarrow$ TYPE
-

SORT 1 = TYPE 0 = TYPE

- PROP
- $max \rightarrow$ PROP
- max
- $PROP \rightarrow PROP \rightarrow PROP$
- BOOL

SORT 0 = PROP

- FALSE
- TRUE

NAT \rightarrow TYPE

- $\lambda m : \text{NAT}, \text{INT}$

PROP \rightarrow PROP \rightarrow PROP

- AND
- OR
- IMPLIES
- ..

PROP \rightarrow PROP

- NOT

NAT \rightarrow NAT

- $\lambda m, m+1$

NAT \rightarrow PROP

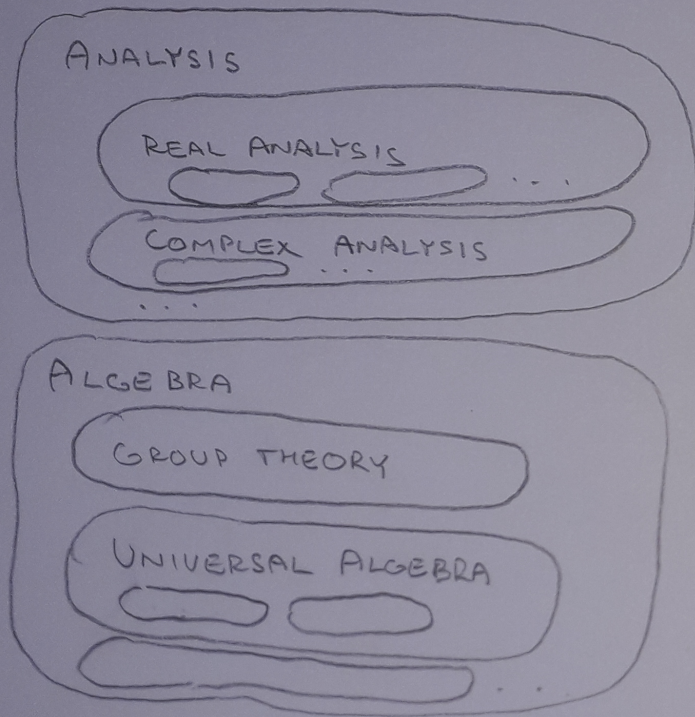
- $\lambda m, m = max$

...

NAMESPACES

ORDINARY MATHEMATICS :

FIELDS OF STUDY
(THEORIES)



LEAN :

NAMESPACES

NAMESPACE A

CONSTANT μ

NAMESPACE B

CONSTANT ν

NAMESPACE C

CONSTANT w

END C

END B

NAMESPACE D

PRINT μ

PRINT B. ν

PRINT B.C. w

END D

END A

} OPEN B

PRINT ν

PRINT C. w

} OPEN B.C

PRINT w

- NAMED

- CAN BE REOPENED

- NESTED