

Introduction to Bioinformatics

Problem Set 2: BioLingua Syntax

*In each case below, fit the statement into the general syntax of BioLingua and the specific syntax of the relevant function. If the statement produces an error message in BioLingua, **explain the message** in terms of the syntax (this is the most important part of the questions), then **fix the error**. Note that once the compiler detects one fatal error, it stops looking, so there may be others. Remember to use **HELP** to find the appropriate syntax of a function.*

- 1a. mole = 6e23
- 1b. 6e23 = mole
- 1c. (DEFINE "mole" (AS 6.02 * 10^23))
- 1d. (DEFINE mole AS 6.02 * 10^23)
- 1e. (DEFINE mole AS (* 6.02 10^23))
- 1f. (DEFINE mole AS (* 6.02 ((EXPT 10 23)))
- 1g. (DEFINE-mole AS 6e23)
- 1h. (ASSIGN mole= 6e23) [Look at the result very carefully]

- 2a. (SUM OF 1 2 3 4)
- 2b. (SUM-OF 1 2 3 4)
- 2c. (SUM-OF (1 2 3 4))
- 2d. What general syntax does SUM-OF follow -- Lisp or BioLingua-Lite?

- 3a. FOR-EACH i FROM 1 TO 10
DO (PRINT "HELLO")
- 3b. (FOR-EACH i FROM 1 TO 10)
DO (PRINT "HELLO"))
- 3c. (FOR EACH i FROM 1 TO 6
SUM i)
- 3d. (FOR-EACH IN (LIST-OF NUMBERS 100 TO 1 BY -1)
SUM n)
- 3e. (FOR-EACH gene IN (GENES-OF ss120)
AS gene size = (LENGTH-OF gene)
DO collect gene size)
- 3f. (FOR-EACH (GENES-OF ss120)
COLLECT length)
- 3g. (FOR-EACH gene IN GENES-OF ss120
DO (COLLECT (LENGTH-OF gene)))
- 3h. (FOR-EACH gene IN (GENES-OF ss120)
COLLECT (LENGTH-OF gene)
SUM (LENGTH-OF gene))
- 3i. (FOR-EACH n from 1 to 100
WITH sum = 0
DO (+ n sum))

3j. (FOR-EACH n from 1 to 100
 WITH sum = 0
 DO (INCREMENT sum BY n)

3k. (FOR-EACH gene IN ss120
 DISPLAY LENGTH-OF gene)

3l. (FOR EACH gene IN (GENES-OF ss120)
 DO (LENGTH-OF gene)
 COLLECT length)

3m. (FOR-EACH gene IN (GENES-OF ss120)
 WITH atg-count = 0
 WITH non-atg-count = 0
 AS start-codon = (SEQUENCE-OF gene FROM 1 TO 3)
 DO (IF-TRUE (SAME start-codon "atg")
 THEN (INCREMENT atg-count)
 ELSE (INCREMENT non-atg-count)
 FINALLY (COLLECT (LIST atg-count non-atg-count))))

3n. (FOR-EACH gene IN (GENES-OF ss120)
 WITH length = (LENGTH-OF gene)
 COLLECT length)
; This one is very subtle

4a. (LOAD-SHARED-FILE NONCODING-GENES-OF.LISP)

4b. (LOAD-SHARED-FILE "Noncoding-Genes-of .lisp)

5a. (COUNT-OF GENES-OF A7120)

5b. (COUNT-OF (GENES OF A7120)) ; *Why do you get the answer you get?*

6a. (SEQUENCE-OF all4312 (FROM 1) (TO 20))

6b. (SEQUENCE-OF all4312 FROM-1-TO-20)

6c. (DEFINE tn1 AS
 (SEQUENCE-OF a7120 chromosome FROM 6157112 To 6157522))

6d. (DEFINE tn1 AS (SEQUENCE OF a7120 FROM 6157112 TO 6157522))
 ; *Why do you get the answer you get?*