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Homework1

Lisp Text Questions:

2.2: 2nd: ((A) (B)), 5th: (A (B (C))), and 6th: (((A) (B)) (C))

2.4: ((BOWS ARROWS) (FLOWERS CHOCOLATES))

2.6. Match each list on the left with a corresponding list on the right by substituting NIL for () wherever possible. Pay careful attention to levels of parenthesization.

() ((NIL))
 () NIL
 () (NIL)
 () (NIL (NIL))
 () (NIL NIL)

2.13:

<u>Step</u>	<u>Result</u>
1. start	(((FUN)) (IN THE) (SUN))
C..AR	((FUN))
C.AAR	(FUN)
CAAAR	FUN
2. start	(((FUN)) (IN THE) (SUN))
C..DR	((IN THE) (SUN))
C.ADR	(IN THE)
CAADR	IN
3. start	(((FUN)) (IN THE) (SUN))
C...DR	((IN THE) (SUN))
C..ADR	(IN THE)
C.DADR	(THE)

CADADR	THE
4. start	((((FUN)) (IN THE) (SUN))
C...DR	((IN THE) (SUN))
C..DDR	((SUN))
C.ADDR	(SUN)
CAADDR	SUN

2.15: Using ((A B) (C D) (E F))

<u>Function</u>	<u>Result</u>
CAR	(A B)
CDDR	((E F))
CADR	(C D)
CDAR	(B)
CADAR	B
CDDAR	NIL
CAAR	A
CDADDR	(F)
Not possible because four A's and D's maximum.	F

2.16: It should return an error since the first CAR will go to FRED, which is no longer a list, meaning the second CAR will not be able to go further.

Sebesta Chapter 1 Review Questions:

6. The majority of UNIX is written in C programming language.
7. There are various disadvantages of having too many features in a language, such as complexity, bloat, and incompatibility.
8. Operator overloading can lead to reduced readability if users create their own overloading in nonsensical/improper ways.
9. One example of a lack of orthogonality in the design of C is that of the two kinds of structured data types, arrays and records, only records can be returned from functions while arrays cannot.
10. The language that uses orthogonality as a primary design criterion is ALGOL 68.
11. The primitive control statement that is used to build more complicated control statements in languages that lack them is the “goto” statement.

12. A program is reliable if it is free from unexpected behavior, handles unexpected inputs properly, is secure, and has easy debuggability/testability.
13. Type checking the parameters of a subprogram is important because it makes sure the inputs will not cause errors. It also helps for readability.
14. Aliasing is when a variable/object has two or more distinct names in a program that can be used to access the same memory cell.
15. Exception handling allows programs to deal with unexpected conditions rather than crashing or giving incorrect values/results.
16. If a program is easy to read, then it is easier to learn, making it easier to write.
20. The two programming language deficiencies that were discovered as a result of research in software development in the 1970s were the incompleteness of type checking and inadequacy of control statements.
21. The three fundamental features of an object-oriented programming language are inheritance, polymorphism, and encapsulation.
22. The language that was the first to support the three fundamental features of object-oriented programming was Simula.
23. An example of two language design criteria that are in direct conflict with each other are reliability and cost of execution.
24. The three general methods of implementing a programming language are compiler implementation, hybrid implementation systems, and interpretation.
25. A compiler produces faster program execution than a pure interpreter.
29. Pure interpretation has the advantage of allowing easy implementation of many source-level debugging operations.

Other Lisp Questions (notes for script):

3. a. CDR, CDR, CAR: (car (cdr (cdr '(a b x d))))
- b. CDR, CAR, CDR, CAR, CAR: (car (car (cdr (car (cdr '(a (b (x d))))))))

c. CAR, CAR, CDR, CAR, CDR, CAR, CAR: (car (car (cdr (car (cdr (car (car '(((a (b (x) d))))))))))

4. a. (cons 'a (cons 'b (cons 'x (cons 'd '()))))

b. (cons 'a (cons (cons 'b (cons (cons 'x (cons 'd '())) '())) '()))

c. (cons (cons (cons 'a (cons (cons 'b (cons (cons 'x '()) (cons 'd '())) '())) '()) '())