

## HomeWork1

### Question1

#### 2.2

**Answer:**

- ((A)(B))
- (A(B(C)))
- (((A)(B))(C))

#### 2.4

**Answer:**

((BOWS ARROWS)(FLOWERS)(CHOCOLATES))

#### 2.6

**Answer:**

() -----→NIL

(( )) -----→(NIL)

(( ( )) -----→((NIL))

(( ( )) -----→(NIL NIL)

(( ( ( )) -----→(NIL (NIL)

#### 2.13

**Answer:**

Fun is the CAAAR

IN is the CADADR

SUN is the CAADDR

## 2.15

**Answer:**

CAR-----→(AB)

CDDR---→((EF))

CADR---→(CD)

CDAR--→NIL

CAAR--→A

CDADDR-→(F)

CADADDR→F

## 2.16

**Answer:**

CAAR takes CAR of the CAR

CAR of (FRED NIL) is FRED

The CAR of that causes Error.

## Question2

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**6-In what language is most of UNIX written?**

C.

**7-What is the disadvantage of having too many features in a language?**

Too many features in a language can reduce the readability of the language, and potentially make the language overly complex.

**8-How can user-defined operator overloading harm the readability of a program?**

A user-defined operator could potentially behave in an unexpected way, or make it harder to understand the code without knowing the meaning of the operator or the definition.

**9-What is one example of a lack of orthogonality in the design of C?**

Arrays and pointers are related but may not be interchangeable.

**10-What language used orthogonality as a primary design criterion?**

ALGOL 68.

**11-What primitive control statement is used to build more complicated control statements in languages that lack them?**

Goto.

**12-What does it mean for a program to be reliable?**

A program is reliable if it can perform correctly task under any circumstances

**13-Why is type-checking the parameters of a subprogram important?**

It helps make sure the program is semantically correct, preventing type errors and potential runtime crashes.

**14-What is aliasing?**

Aliasing happens when two or more variables refer to the same memory location, which could cause unexpected crashes, errors, or side effects.

**15-What is exception handling?**

Exception handling is the process of structurally managing runtime errors or unusual conditions to maintain program stability.

**16-Why is readability important to writability?**

Readability makes it easier to read, understand, and modify, code, which makes error handling, and corrections easier.

**20-What two programming language deficiencies were discovered as a result of the research in software development in the 1970s?**

Lack of modularity and poor support for data abstraction.

**21-What are the three fundamental features of an object-oriented programming language?**

Encapsulation, inheritance, and polymorphism.

**22-What language was the first to support the three fundamental features of object-oriented programming?**

Simula 67.

**23-What is an example of two language design criteria that are in direct conflict with each other?**

Efficiency and readability: Optimizing for performance may not align with readability for some programs.

**24-What are the three general methods of implementing a programming language?**

Compilation, pure interpretation, and hybrid implementation.

**25-Which produces faster program execution, a compiler or a pure interpreter?**

A compiler.

**26-What are the advantages in implementing a language with a pure interpreter?**

Direct execution of source code without the need for compilation, enhanced debugging features, and cross-platform compatibility.