CSCI 330 - Homework 2: Sebesta Chapter 2 Review Questions

Question 2:

What two common data structures were included in Plankalkül?
Answer: Plankalkül had **arrays and records** as its main data structures. These were pretty advanced for its time and helped organize data more efficiently.

Question 5:

Why was the slowness of interpretation of programs acceptable in the early 1950s?
Answer: Back then, computers were **huge, expensive, and slow** anyway, so people were more focused on **getting programs to work correctly** rather than making them run fast.

Question 6:

What hardware capability that first appeared in the IBM 704 computer strongly affected the evolution of programming languages? Explain why.
Answer: The **IBM 704** introduced **hardware support for floating-point arithmetic**, which made it much easier to write programs for scientific calculations. This was a big deal because it led to the development of **Fortran**, one of the first high-level programming languages.

Question 7:

In what year was the Fortran design project begun?
Answer: The **Fortran project started in 1954**.

Question 8:

What was the primary application area of computers at the time Fortran was designed?
Answer: Fortran was mainly created for scientific and engineering calculations, where speed and efficiency in handling mathematical formulas were super important.

Question 9:

What was the source of all of the control flow statements of Fortran I?
Answer: Fortran I's control flow statements were based on **assembly language constructs** because that's what programmers were used to working with at the time.

Question 10:

What was the most significant feature added to Fortran I to get Fortran II?
Answer: The most important addition was **support for subroutines**, which made programs more modular and easier to manage.

Question 11:

What control flow statements were added to Fortran IV to get Fortran 77?
Answer: Fortran 77 introduced IF-THEN-ELSE statements, making it easier to write structured and readable code.

Question 14:

Why were linguists interested in artificial intelligence in the late 1950s?
Answer: Linguists saw AI as a way to **automate language translation** and process human languages, which could have made communication across different languages much easier.

Question 15:

Where was Lisp developed? By whom?
Answer: Lisp was created at **MIT** by **John McCarthy** in the late 1950s.

Question 20:

What missing language element of ALGOL 60 damaged its chances for widespread use?
Answer: ALGOL 60 **didn't have built-in input/output (I/O) support**, which made it harder to use for real-world applications.

Question 21:

What language was designed to describe the syntax of ALGOL 60?
Answer: Backus-Naur Form (BNF) was specifically created to describe ALGOL 60's syntax.

Question 22:

On what programming language was COBOL based?
Answer: COBOL was heavily influenced by **FLOW-MATIC**, a language developed by **Grace Hopper**.

Question 23:

In what year did the COBOL design process begin?
Answer: COBOL's design process started in **1959**.

Question 24:

What data structure that appeared in COBOL originated with Plankalkül?
Answer: Records (structured data types) were first introduced in Plankalkül and later adopted in COBOL.

Question 25:

What organization was most responsible for the early success of COBOL (in terms of extent of use)?
Answer: The **U.S. Department of Defense (DoD)** played a big role in COBOL's success by **mandating** its use for government and military systems.

Question 36:

What missing feature of ALGOL 60 made it challenging for business applications?
Answer: ALGOL 60 didn't have **file handling features**, which made it less useful for business applications that needed to work with lots of stored data.

Question 37:

What were the primary reasons for the development of PL/I?
Answer: PL/I was created to **combine features from both scientific computing (Fortran) and business computing (COBOL)** so that one language could handle both types of tasks.

Question 46:

What features of SIMULA 67 are now important parts of object-oriented languages?
Answer: SIMULA 67 introduced **classes, objects, inheritance, and dynamic binding**, which became key features in modern object-oriented programming languages.

Question 51:

What is the primary purpose of Prolog?
Answer: Prolog is mainly used for **logic programming**, especially in **AI applications** like expert systems and natural language processing.

Question 52:

What logic does Prolog use?
Answer: Prolog is based on **predicate logic (first-order logic)**.

Question 57:

What influenced the development of C++?
Answer: C++ was inspired by **C (for efficiency and low-level programming) and Simula 67 (for object-oriented programming features)**.

Question 59:

Why was Java developed?
Answer: Java was created to be **platform-independent (via the JVM)**, secure, and more reliable for applications like **web-based systems**.

Question 60:

What is a scripting language? Name two examples.
Answer: A **scripting language** is a high-level programming language designed for automating tasks.
Examples: **Python, JavaScript**.