# CS508 Assignment 1 Solution - Fall 2026

## Question 1: Application Domains and Suitable Languages

| Client/Project | Recommended Language | Reason |
|---|---|---|
| Scientific Research Organization | FORTRAN | FORTRAN is specifically designed for scientific and numerical computing. It provides efficient execution of complex mathematical algorithms, matrix operations, and floating-point calculations, making it ideal for global weather simulations. |
| Data Analytics Firm | SNOBOL | SNOBOL is a specialized language for string manipulation and pattern matching. Its powerful pattern-processing capabilities make it suitable for extracting keywords, identifying patterns, and analyzing large volumes of textual data. |
| Financial Institution | COBOL | COBOL is widely used in commercial and financial information systems. It supports precise decimal arithmetic, high-volume transaction processing, and structured report generation, which are essential requirements of banking applications. |
| AI Solutions Company | LISP | LISP is a prominent language in artificial intelligence research. Its symbolic expression processing, recursion, dynamic data structures, and support for knowledge |

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| | | representation make it suitable for developing intelligent systems involving reasoning and natural language processing. |
| Aerospace Firm | Ada | Ada is designed for safety-critical and real-time applications. It provides strong typing, task-based concurrency, and reliable error handling, making it appropriate for aircraft control systems that require predictable and dependable execution. |
| Web Development Company | SNOBOL | SNOBOL provides advanced string-processing and pattern-matching capabilities. These features allow applications to identify prohibited expressions, search textual content, and dynamically filter or modify user-submitted data. |

## Question 2: Four Improvements Introduced in Java Compared to C

### 1. Automatic Memory Management

C requires programmers to allocate and release memory manually using functions such as malloc() and free(). Incorrect memory management can result in memory leaks and dangling pointers. Java introduces automatic garbage collection, which identifies and removes unused objects, reducing memory-management errors and developer effort.

### 2. Object-Oriented Programming

C primarily follows a procedural programming approach and does not provide built-in support for classes and inheritance. Java supports object-oriented programming through classes, objects, encapsulation, inheritance, and polymorphism. These features improve code reusability, modularity, and maintainability, especially in large software projects.

### 3. Platform Independence

C programs are generally compiled into machine code for a particular target platform. Java programs are compiled into platform-independent bytecode, which executes through the Java Virtual Machine (JVM). This makes Java applications portable across different operating systems without requiring recompilation of the source code for each platform.

### 4. Exception Handling

C does not provide a dedicated structured exception-handling mechanism. Programmers generally manage errors through return values and error codes. Java provides exception handling using try, catch, finally, and throw. This allows developers to detect and handle runtime errors systematically, improving program reliability and reducing unexpected failures.