Introduction

The changes to the original may include addition of new content, corrections, rewording, etc. If you find any inconsistency or error or you have any suggestion feel free to contact me.

Where was needed Java source code was replaced with Go source code.

About this Unit

In this unit, we will explore the fundamentals of concurrent programming, a paradigm that allows multiple processes or threads to execute simultaneously. This approach is essential for improving the performance and responsiveness of applications, especially in today's multi-core and distributed computing environments.

We will use this concepts all along the course, so it is important to understand them well.

There are many tasks that require fast processing of huge amounts of data, such as in the field of *Big Data* and *Machine Learning*. In these cases, it is common to use clusters of computers to distribute the workload and process data in parallel. This approach can significantly reduce the time required to complete complex computations.

Objectives

Upon completing this unit, you will be able to:

- Distinguish between processes and programs.
- Understand the concept of concurrent programming and its significance.
- Know the concept, differences and relationships between processes and threads.
- Have some notions about concurrent programming.
- Understand how concurrency works at the level of the OS and hardware.