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LAB1: Compiler Construction.

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Q1. What is the logical difference between a compiler and an interpreter,and which one is better in different situations?

Compiler: Compiler compiles the whole code of a program and then execute it. After compilation code is converted into machine code or assembly code depends upon the developer of that compile.

For example: C++ is a compile time language which compiles whole code and then translates it directly to machine code which is understandable by machine. On the other hand C# code is first compiled then converted into Assembly language and then converted into Machine Code using Linker.

Types of Compiler:

1. JIT(Just In time compiler)
   Intermediate between Compiler and Interpreter
2. AOT(Ahead of time compiler)

Interpreter: Interpreter executes the code line by line.

For Example: Python is the interpreted language which intepretes the code and generates its output

Q2. What is JIT, and in what conditions does it work better than a compiler and when is it not as good as a compiler?

JIT is just in time compiler type which is intermediate between compiler and interpreter. It compiles the code just before the execution of program. A just in time compiler is a program that can be sent directly to a computer's processor.

Scenario: It is used in scenarios where you want to see instant changes to your code.

For Example: Flutter uses JIT compiler to use its hot reload feature. AS you change the code the changes directly reflect to a user. So the scenarios that includes direct implementation or out we use JIT.

We should not use it in scenarios where we need memory optimization and speed. Also when we need resource constraints.

Real-Time Systems: In real-time systems where predictable timing is crucial, the unpredictability of JIT compilation can lead to timing issues.