1. Define **Instruction Set Architecture (ISA)** and explain its role in computer architecture. How does ISA impact overall system performance?
2. How does **Clock Cycle Per Instruction (CPI)** affect the performance of a processor? Provide an example.
3. What factors contribute to the execution time of a program on a processor? Explain how the instruction mix influences CPU performance.
4. Why does an increase in the number of executed instructions and CPI impact the total execution time?
5. Suppose a processor, **ProcessorY**, executes $\mathbf{3.3 \times 10^{12}}$ instructions while running a program. The instruction classes are divided as follows:
    - **15% class A** (CPI = 1)
    - **25% class B** (CPI = 2)
    - **40% class C** (CPI = 3)
    - **20% class D** (CPI = 4)

    The processor has a clock speed of **3 GHz**.

    - Compute the total **CPU time** required to execute the program.
    - If the number of instructions increases by **9%** and the average CPI increases by **6%**, determine the percentage increase in CPU time.

6. A program running on a system requires **310 seconds** to execute, where:

    - **100 s** is spent executing R-type instructions.
    - **120 s** is spent executing I-type and S-type instructions.
    - **90 s** is spent executing branch instructions.

If branch execution time is reduced by **35%**, determine whether total execution time can be reduced by **20%**. If so, calculate the **improvement factor**.