PES University,
(Estd. Under Karnataka State Act 10 of 2013)
100 ft Ring Road, Hosakerehalli, Bengaluru-560 085

Department of Computer Science & Engineering
RR Campus and EC Campus

CIRCULAR

Course Code and Course Title : **UE23CS251B - Microprocessor and Computer Architecture**.
Coding assignment:

Assignment question 1:
Write a Python script that simulates **cache performance** using a dataset of memory accesses.

- Use a **trace file** with a sequence of memory addresses.
- Implement a **direct-mapped or set-associative cache**.
- Compute **hit/miss rates** and optimize performance.

Requirements:

- Load a memory trace file (memory_trace.txt).
- Process accesses and update cache status.
- Display cache statistics **before and after optimization**

Assignment question 2:

Problem Statement:
Modern web browsers use caching to reduce load times and improve user experience.

- Simulate a **browser cache** that stores the last N visited web pages.
- Implement **LRU (Least Recently Used) caching policy** to evict the least-used page.
- Analyse hit/miss rates for different cache sizes.

Assignment question 3:

CPU task scheduling affects cache locality (keeping frequently used data in cache). Implement a task scheduler that optimizes CPU cache utilization. Use a priority queue to schedule tasks while maximizing cache hits.
Expected Outcome: A program that simulates task scheduling with cache-aware strategies. Improved CPU efficiency by reducing cache misses. Comparison of FIFO and LRU scheduling policies

Please note the following pointers:

- All assignments can be coded with any programming language
- Group activity (same team as Mini Project)– Coding assignment
- The problem statements is assigned based on formula:
  problem number=(TeamId mod 3) +1
- Submission Mode: online .
- Submission link will be sent by respective subject teacher.
- Submission deadline:17th April 2025

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