CS6600 : Computer Architecture
Assignment 4 : Design your own Data Prefetcher for LLC

Submission Deadline: End of Semester

In this assignment you are required to implement your own data prefetching policy for the last level cache (LLC) using the ChampSim simulator. You can look at the following papers for reference:

1. *Bouquet of Instruction Pointers: Instruction Pointer Classifier-based Hardware Prefetching*: https://dpc3.compas.cs.stonybrook.edu/pdfs/Bouquet.pdf
2. *Accurately and Maximally Prefetching Spatial Data Access Patterns with Bingo*: https://dpc3.compas.cs.stonybrook.edu/pdfs/Accurately.pdf
3. *Multi-Lookahead Offset Prefetching*: https://dpc3.compas.cs.stonybrook.edu/pdfs/Multi_lookahead.pdf

The benchmark traces to be used are provided here: benchmark_drive_link
Warm up for 50 million instructions and measure the behaviour of the next 200 million instructions. For the final evaluation, your policy would be compared with other submissions and ranked based on the IPC and LLC cache hit value achieved.

Rules:

1. The default Champsim simulator configuration is to be followed, which can be found in *champsim_config.json* file. Only the *prefetcher* option for LLC needs to be specified.
2. There is no constraint on the storage and hardware budget that your prefetcher requires. But the feasibility of your storage requirements would be considered to resolve tie-breakers.

Submission guidelines:

1. This is a team-based assignment: 2 members per team.
2. Submit only file: *RollNumber_A4*.tar.gz file, containing the following:
   (a) Your report in *RollNumber_A4*.pdf format. The report should contain the following:
      i. Details of your prefetcher, its advantages and limitations.
   (b) Implementation folders:
      i. *mypref*, which contains your prefetch policy.

   You are not required to submit the entire Champsim framework. Make sure that all the above source codes are compatible with the latest version of Champsim simulator.
   (c) Folder: *tests*, which contains all the scripts/commands used to benchmark the data prefetcher.