CS300   
Computer Systems HW 1

## Name:

## Instructions:

1. Please name your file as CS300systems\_yourusername\_hw1.
2. All questions must be answered on an INDIVIDUAL basis. If your answer is inspired by the discussion with other students, you need mention their names in your acknowledgement section.
3. State clearly all your assumptions if anything is ambiguous. Always ask if you have any questions.
4. Please correctly cite and list any (online) references. Please pay attention to the academic conduct code, particularly the definition of plagiarism.
5. Please submit your homework through blackboard on time.
6. Thank You!

## Questions:

1. Compilers and interpreters
   * What are similarities and differences between compilers and interpreters? What are pros and cons of each respectively?
2. Caching and locality:
   * What is caching and what is locality?
   * Why can good locality help improve caching performance?

## *Answer:*

1. **Compilers and interpreters:**
   1. ***Similarities:*** Both are used to convert high – level programming language such as C, Java, Python etc. into machine language, so computer can understand.
   2. ***Differences:***
      1. Interpreters:
         1. The source program is translated and executed just one statement at a time into machine code.
         2. Does not generate intermediary code.
      2. Compilers:
         1. Scan and translate whole source program into a machine code at one time.
         2. Generate an intermediary code.
   3. ***Pros and Cons:***
      1. Interpreters:
         1. Take less amount of time to analyze source code, but execution time is slower than compilers.
         2. Has runtime error, so it is easier to debug.
      2. Compilers:
         1. Take more time to analyze source code, but execution time is faster than interpreter.
         2. Has no runtime error. Only shows error message when whole program has been scanned, so debugging becomes harder.
2. **Caching and locality:**
   1. ***What is caching and what is locality?*** 
      1. Caching: Storage recently, frequently documents, instructions to the computer memory which has short time to access.
      2. Locality: program intend to use data and instruction in the memory location which is nearby addresses or to be reference multiple times again soon (in the near future).
   2. ***Why can good locality help improve caching performance?***

Because good locality (Focus on the inner loops, Spatial Locality and Temporal Locality) can help to increase the hit rate and saving time.

## Feedback:

1. How long do you take to complete this homework? Is it too hard, too easy or OK?
   1. It took me 45 mins to complete it, It’s Ok.
2. How well do you understand this topic? I understand it quite well
3. Do you have any other feedback? N/A

Reference:

* MET CS 300 O1 Introduction to software development slides and live class
* https://www.programiz.com/article/difference-compiler-interpreter