CSCI 620 Homework 2

Due: September 23, 2022
Points: 35

Do the following problems; show your work:

Problem A (3 Points)

Consider a 2 MB 4-way set associative cache. Suppose a block is 64 bytes and an address consists of 32 bits. If we assume that an address field is divided as described in the text: tag-field, index-field, block-offset, compute the length of each field for this cache; show your work:

a. tag-field length in bits:
b. index-field length in bits:
c. block-offset length in bits:

A.2 (5 Points) In computing the answer to this problem:

- assume that the conditional branches are taken 70% of the time, and not taken 30% of the time.
- do the computation for the average frequencies of astar and hmmer (not bzip and hmmer).

B.2 (6 Points) Do parts a and b. For part b, assume that the cache is an eight-way set associative cache.

B.8 (6 Points) Do parts a and b. In coming up with your estimates, assume that the hit times are relatively small and can be ignored.

B.13 (5 Points) Assume that the content of the TLB does not change for this problem.

2.20 (4 Points) Do part a with the following changes: the first 16 byte block can be received in 60 cycles (not 120); and each additional 16 byte block requires 32 cycles (not 16)..

2.42 (6 Points) Do parts c and d. Compute slowdown as a ratio relative to native execution. In addition: what is the geometric mean of the pure and para virtualization ratios?