Q10

Due Nov 4 at 11:59pm **Points** 100 **Questions** 5
Available Nov 3 at 12pm - Nov 4 at 11:59pm 1 day **Time Limit** 25 Minutes

Attempt History

	Attempt	Time	Score
LATEST	Attempt 1	25 minutes	0 out of 100 *

* Some questions not yet graded

ⓘ Correct answers will be available on Nov 5 at 12am.

Score for this quiz: **0** out of 100 *
Submitted Nov 4 at 12:23pm
This attempt took 25 minutes.

Question 1

Not yet graded / 20 pts

Name one bottleneck in uniprocessors that prevents exploitation of ILP efficiently.

Your Answer:

Cache misses can lead to significant memory stalls because the needed data may be stored in memory or in off chip caches. During these stalls, we are forced to reduce the total utilization of the functional units.

Increasing complexity of the issue logic,

or, lack of parallelism in single threaded programs,

or, increasing power consumption to support aggressive speculation

Question 2

Not yet graded / 20 pts

Give an example application, other than the vector operation example shown in the slide, which is abundant of thread-level parallelism. Be specific.

Your Answer:

Any online application that allows for multiple users will use thread-level parallelism. For example, an online transaction from Amazon requires processing of multiple transactions simultaneously.

Question 3

Not yet graded / 20 pts

Briefly explain the main idea of simultaneous multithreading.

Your Answer:

A single processor can run multiple threads. For example, the Intel i9 processor has simultaneous multithreading (called hyperthreading). It has 8 cores and 16 threads, so each core/uniprocessor can run two threads. The 2018 i7 doesn't have hyperthreading. It has 8 cores and 8 threads.

In a multi-issue dynamically scheduled superscalar processor, instructions from different threads are issued and executed without regard to which threads they come from.

Similarly speaking, multiple threads can be executed simultaneously by a processor.

Question 4

Not yet graded / 20 pts

Show the main differences between symmetric multiprocessors and distributed memory multiprocessors.

Your Answer:

Symmetric multiprocessors have a small number of cores, share a single memory with uniform memory latency. On the other hand, distributed memory multiprocessors have their memory distributed among the processors.

in symmetric MP, a centralized memory is shared by all processors with the same memory access latency. It is not scalable beyond 8 nodes.

In distributed memory MP, memory is physically distributed and associated with individual processors. Memory access latency become non-uniform as latency to access local memory is shorted than that of accessing remote memory. It can be scaled to include more than 8 nodes.

Question 5

Not yet graded / 20 pts

List the two main challenges of parallel processing.

Your Answer:

1) The improvement through parallelization is limited to the amount of code that has been parallelized by the programmer.

2) There is a large cost in memory access latency. We can use caching to reduce this latency.

Limited parallelism in an application, and high cost to access remote memory

Quiz Score: **0** out of 100