Cache Quiz

Due Mar 12 at 11:59pm **Points** 100 **Questions** 11

Available until Mar 13 at 11:59pm Time Limit None Allowed Attempts 3

Instructions

- This quiz should be done by yourself
- If you have questions please come to office hours
- If you find any mistakes in any of the questions, please let us know about them and we will fix them as soon as possible.

Take the Quiz Again

Attempt History

	Attempt	Time	Score
LATEST	Attempt 1	21,431 minutes	82.24 out of 100

① Correct answers are hidden.

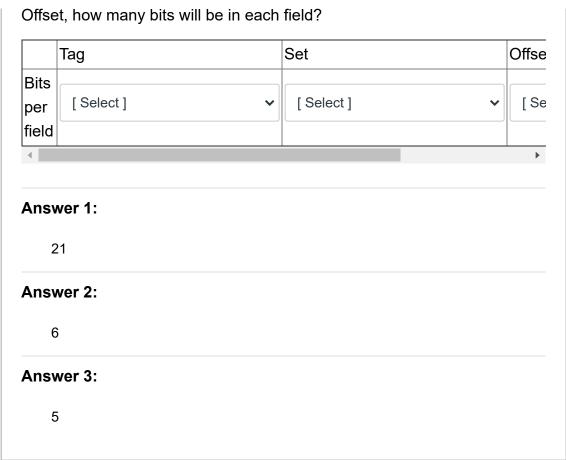
Score for this attempt: 82.24 out of 100

Submitted Mar 12 at 6:01pm

This attempt took 21,431 minutes.

Question 1		
You have a Direct Mapped ca	che with following parameters	
Cache Data Size (C)	2048	
Oddie Bala Olze (O)		

After partitioning the address, which is 32 bits big, into Tag, Set, and



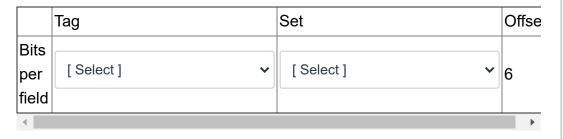
Partial

Question 2 3 / 9 pts

You have a Fully Associative cache with following parameters

Cache Data Size (C)	8192
Block Size (b)	64

After partitioning the address, which is 32 bits big, into Tag, Set, and Offset, how many bits will be in each field?



Answer 1:

19			
Answer 2:			
7			
Answer 3:			
6			

Question 3 9 / 9 pts

You have a K-Way set associative cache with following parameters

Cache Data Size (C)	2048
Block Size (b)	16
Blocks/Ways per set (K)	4

After partitioning the address, which is 32 bits big, into Tag, Set, and Offset, how many bits will be in each field?

	Tag	Set	Offset
Bits per field	23	5	4

Answer 1:

23

Answer 2:

5

Answer 3:

4

Question 4

9 / 9 pts

You have a single level cache system with the following setup

• CPU -- Cache -- Memory

The system has the following properties

Cache Access Time	554ns
Cache Hit Rate	68%
Memory Access Time	4,334ns

What is the average memory access time?

Report your answer to TWO decimal places.

1,940.88

Question 5

9 / 9 pts

You have a two-level cache system with the following set up

• CPU -- Cache 1 -- Cache 2 -- Memory

The system has the following properties

Cache1 Access Time	29ns
Cache1 Hit Rate	75%
Cache2 Access Time	295ns
Cache2 Hit Rate	99%
Memory Access Time	2,041ns

What is the average memory access time?

Report your answer to **TWO** decimal places.

107.85

Question 6 9 / 9 pts

You have a six-level cache system with the following set up

• CPU -- Cache 1 -- Cache 2 -- Cache 3 -- Cache 4 -- Cache 5 -- Cache 6 -- Memory

The system has the following properties

Cache1 Access Time	9ns
Cache1 Hit Rate	8%
Cache2 Access Time	4ns
Cache2 Hit Rate	2%
Cache3 Access Time	6ns
Cache3 Hit Rate	4%
Cache4 Access Time	1ns
Cache4 Hit Rate	7%
Cache5 Access Time	1ns
Cache5 Hit Rate	4%
Cache6 Access Time	4ns
Cache6 Hit Rate	6%
Memory Access Time	4ns

What is the average memory access time?

Report your answer to **TWO** decimal places.

25.76

Question 7	9 / 9 pts
Select all of the statements that are TRUE	
A Write Through Cache DOES have a dirty bit	
A Write Through Cache does NOT have a dirty bit	
A Write Back Cache DOES have a dirty bit	
A Write Back Cache does NOT have a dirty bit	

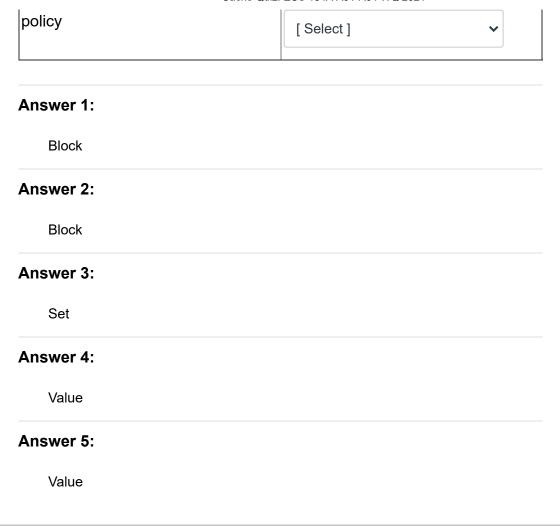
Partial

Question 8 3.6 / 9 pts

For each of the following overhead bits, select whether there are these bits per cache, per set, per block, or per value.

• Assume the cache is a K-way set associative cache.

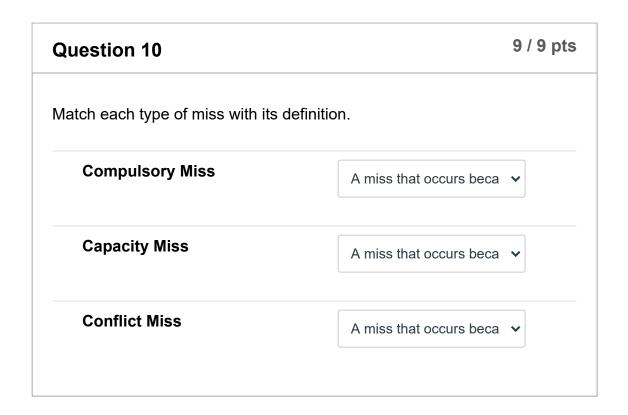
	Instance Per
Valid Bit	Block
Dirty Bit	[Select]
Tag Bits	[Select]
Counter if using FIFO replacement policy	[Select]
Counters if using LRU replacement	



Partial

For each action, match it with when it occurs. For this problem assume the cache is a K-way set associative cache using a Least Recently Used replacement policy. Valid Bit Is set to 0 when The computer is turned The CPU writes to this t Dirty Bit is set to 0 when The computer is turned The computer is turned





Partial

Question 11

7.5 / 10 pts

For each of the cache modifications that we could perform, select whether it will increase, decrease, have no effect, or have an unknown effect on the parameter.

An unknown effect means that it could either decrease or increase the

parameter in question.

- No effect also includes marginal or very little effect
- When answering for multilevel caching, answer based on the caching system as a whole.

Improvement	Hit Rate	Cache Access Time
Increase Cache Size (C)	[Select] 🗸	[Select]
Increase Associativity(K)	[Select] 🗸	[Select]
Increase Block Size(b)	[Select] v	[Select]
Use Multilevel Caching	[Select] 🗸	[Select]
4)

Answer 1:	
Increase	
Answer 2:	
Increase	
Answer 3:	
Decrease	
Answer 4:	
Increase	
Answer 5:	
Increase	
Answer 6:	
Unknown	

Answer 7:

Unknown	
Answer 8:	
Increase	
Answer 9:	
Unknown	
Answer 10:	
Increase	
Answer 11:	
Increase	
Answer 12:	
Increase	

Quiz Score: 82.24 out of 100