Question 1
Complete
Mark 0.00 out of 2.00
Flag question

List the components of the service times of HDD read requests! Which of them can be overlapped in time?

Components: average time of the location search by the head, command processing time, average seek time, time to read a single sector (rotation time per sector), time of data transmission per sector. Time to read one sector and time of data transmission of a sector can overlap.

Comment:

Question **2**

Complete

Mark 2.00 out of 2.00

Remove flag

What does the **TLB coverage** mean in virtual memory systems?

The amount of memory taken by pages which translational addresses are stored in the TLB.

Question 2 What does the **TLB coverage** mean in virtual memory systems? Complete Mark 2.00 out of The amount of memory taken by pages which translational addresses are stored in the TLB. 2.00 Remove flag Comment: Question 3 What are the main advantages of distributed arbitration algorithms over centralized ones? Complete Mark 0.00 out of Centralised ones might cause starvation of the devices that are at the back of the queuque, whereas 2.00 distributed arbitration is based on priority of each device. Flag question Comment: Question 4 Partially correct

Mark 1.00 out of

Question 4

Partially correct

Mark 1.00 out of 2.00

♥ Flag question



Which USB data transfer mode do the following USB peripherals use (dominantly)?

	Mouse	Web cam	Pendrive
Interrupt transfer mode	X		
Isochronous transfer mode		X	
Bulk transfer mode			x [X

Question $\bf 5$

Incorrect

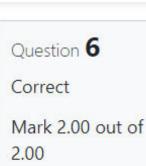
Mark 0.00 out of 2.00

▼ Flag question

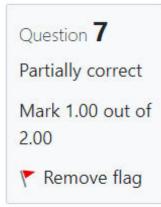


Indicate the properties of the write through and the write back cache write policies!

	Write back	Write through
The cache controller updates the main memory each time the cache content is modified	X X [blank]	x [X]
The cache is completely disabled for write operations		
The cache controller updates the main memory only when a cache block is evicted	× [X]	X × [blank]



Remove flag



FALSE
When the next request targets a different row, it will be faster to serve

When the next request targets the same row, it will be faster to serve

It increases the data transmission throughput

Reducing the row closing/activation operations decreases the load of the transistors, increasing the lifespan of the memory

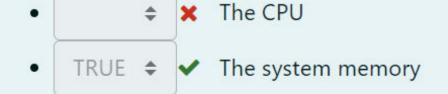
Question **8**Partially correct

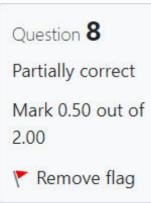
Mark 0.50 out of 2.00

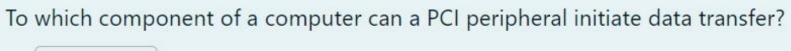
Dama arra flan

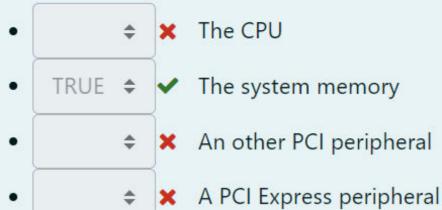
To which component of a computer can a PCI peripheral initiate data transfer?

What are the benefits of leaving the last row open by the memory controller?









Question **9**

Correct

Mark 2.00 out of 2.00

Remove flag

What is the purpose of the garbage collection in SSD devices?

- FALSE
 To move the pages belonging to the same file next to each other to make read and write operations faster
- FALSE

 ◆ To increase the storage capacity by deleting the unnecessary files
- FALSE

 ◆ ✓ To remove the unnecessary electrons from the drive

Question 10

Correct

Mark 6.00 out of 6.00

▼ Flag question

A hard disk drive contains 4 double-sided platters, with 100000 tracks on each recording surface and with 1000 sectors in each track. The size of the sectors is 500 byte. There is no ZBR, and the speed of the data transmission interface is $200 \cdot 10^6$ byte/s. The command processing time is neglected, because it is very low. The average seek time is 7 ms, and the revolution speed is 4000 RPM.

a) The storage capacity of the hard disk drive, measured in 10^9 bytes, is: 400 \checkmark ·10⁹ byte (1 point)

n 10

.00 out of

question

A hard disk drive contains 4 double-sided platters, with 100000 tracks on each recording surface and with 1000 sectors in each track. The size of the sectors is 500 byte. There is no ZBR, and the speed of the data transmission interface is 200·10⁶ byte/s. The command processing time is neglected, because it is very low. The average seek time is 7 ms, and the revolution speed is 4000 RPM.

- a) The storage capacity of the hard disk drive, measured in 10⁹ bytes, is: 400 ✓ ·10⁹ byte (1 point)
- b) The full revolution time of the disk, given in ms, is: 15 ms (1 point)
- c) How long does it take to read one sector from the recording surface, given that the head is at the appropriate position (it points to the beginning of the sector): 0.015 w ms (1 point)
- d) How long does it take to transmit one sector on the data transmission interface? (in ms) 0.0025 ms (1 point)
- e) How much slower is the full service time of a request for 100 consecutive sectors than the full service time of a request for 1 sector? (2 point)

The answer is: 1.485 ✓ ms

f) We would like to increase the rotation time from 4000 RPM to 6000 RPM. What should be the new seek time, which ensures that the full service time of 1 sector remains the same with the higher rotation speed?

 Information

A computer has a single-channel DRAM based system memory with 64 bit data units. The burst size is set to 8 data units.

The memory controller receives the following read requests, given by row and column coordinates

• (row 8, column 4), (row 2, column 24), (row 2, column 16)

Question 11

Correct

Mark 3.00 out of 3.00

Flag question



List the commands sent by the memory controller to the memory modules (in the right order) according to FCFS and FR-FCFS command scheduling, assuming that there can be a single row open at a time.

Initially, row 2 is open in the DRAM bank. After the last command the memory controller **does not close** the active row. (3 points)

FCFS scheduling:

(Command	Parameter
1.	PRECHARGE	
1:	/	
	ACTIVATE	8
2:	/	~
3	READ	4
3:	,	

FR-FCFS scheduling:

	Command	Parameter
1:	READ	24
	>	>
2:	READ	16
	>	\
_	PRECHARGE	

FCFS scheduling:

	Command	Parameter
1:	PRECHARGE	
	~	
2:	ACTIVATE	8
۷.	~	~
3:	READ	4
٠.	~	~
4:	PRECHARGE	
	~	
5:	ACTIVATE	2
٥.	~	~
6:	READ	24
0.	~	~
7:	READ	16
/:	~	~
8:		
9:		

FR-FCFS scheduling:

	Command	Parameter
1:	READ	24
	~	~
2:	READ	16
۷.	~	~
3:	PRECHARGE	
	~	
4:	ACTIVATE	8
	~	~
5:	READ	4
٥.	~	~
6:		
7:		
8:		
9:		

(You might not need all lines.)

Your answer is correct.

Given the DRAM technologies provided by the table, in which clock cycle does the first data appear on the data lines of the memory module for the request (row 4, column 24), measured in clock cycles (part a), and measured in nanoseconds (part b)? The timing parameters are given in format $T_{CAS} - T_{RCD} - T_{RP}$, where T_{RP} is the delay of the PRECHARGE command, T_{RCD} is the row activation delay, and T_{CAS} is the column latency, all of them given in (external) clock cycles. (Write only a singe number into the fields!) (3 points)

Technology	(a) Time t	ill the response, in cycles	(b) Time till response, in ns	
DDR2-800, 5-5-5	15	~	*	[37.5 or 37,5]
DDR3-1600, 7-8-8	23	~	*	[28.75 or 28,75]
DDR3-2000, 11-13-13	37	~	*	: [37]