Started on	Monday, 16 June 2025, 10:52 AM
State	Finished
Completed on	Monday, 16 June 2025, 11:46 AM
Time taken	54 mins 7 secs
Marks	36.00/40.00
Grade	**22.50** out of 25.00 (**90**%)

Question **1**

Correct

Mark 1.00 out of 1.00

For concurrency in OS:

- a. interrupt handling is necessary ✔
- b. special processor support is required
- c. timer interrupts are necessary
- d. cache memory is necessary

The correct answer is: interrupt handling is necessary

Question **2**

Incorrect

Mark 0.00 out of 1.00

The following paging exceptions allow for returning to the program after they occur:

Select one or more:

- a. page fault ✔
- b. attempting to write to a write-protected frame
- c. interrupt on write (IOW) ✔
- d. attempt to read from the frame storing the code ✖

Twoja odpowiedź jest niepoprawna.

The correct answers are: page fault, interrupt on write (IOW)

Question 3

Correct

Mark 1.00 out of 1.00

The return from interrupt instruction:

Select one or more:

- a. causes the processor to switch to a process other than the interrupted one
- b. restores the program counter ✔
- c. restores the process stack
- d. restores the conditions register ✔

Twoja odpowiedź jest poprawna.

The correct answers are: restores the program counter, restores the conditions register

Question 4

Correct

Mark 1.00 out of 1.00

What mechanism is used to save and restore the task state?

- a. task descriptor
- b. scheduling data
- c. applications counter
- d. context switch ✔

The correct answer is: context switch

Question 5

Correct

Mark 1.00 out of 1.00

Imprecise interrupts can be handled:

Select one or more:

- a. only when the program allows accepting interrupts
- b. when new instructions are suspended to be fetched into the pipeline
- c. after saving the full state of the pipeline ✔
- d. after clearing the pipeline from the instructions ✔

Twoja odpowiedź jest poprawna.

The correct answers are: after clearing the pipeline from the instructions, after saving the full state of the pipeline

Question 6

Correct

Mark 1.00 out of 1.00

Inter-process communication can be organized using:

Select one or more:

- a. interrupts
- b. shared memory fields accessible through system calls ✔
- c. messages ✔
- d. shared directly addressable memory fields ✔

Twoja odpowiedź jest poprawna.

The correct answers are: messages, shared directly addressable memory fields, shared memory fields accessible through system calls

Question 7

Correct

Mark 1.00 out of 1.00

A concurrent system is one that, in principle:

Select one or more:

- a. It runs on a multiprocessor computer
- b. Requires the use of timer interrupts
- c. It allows multiple programs/processes/threads to run physically simultaneously
- d. Allows multiple programs/processes/threads to run simultaneously or seemingly simultaneously ✔

Twoja odpowiedź jest poprawna.

The correct answer is: Allows multiple programs/processes/threads to run simultaneously or seemingly simultaneously

Question 8

Correct

Mark 3.00 out of 3.00

For the disk operation scheduling SCAN method, the currently being executed operation is in 33 cylinder. The direction in the SCAN method is ascending. The next scheduled operations (in the order of their queuing) are:

Operation number	1	2	3	4	5
Cylinder number	42	25	28	37	41

After which disk operation the current scan direction will change? Provide the cylinder number of the operation after which the direction will change.

Answer: 42 ✔

The correct answer is: 42

Question 9

Correct

Mark 3.00 out of 3.00

When opening a file, we specify the opening mode and the sharing mode.

Let us encode the opening codes:

fmOpenRead	10
fmOpenWrite	01
fmOpenReadWrite	00
fmShareDenyWrite	10
fmShareExclusive	00
fmShareDenyRead	01
fmShareDenyNone	11

The first program opened the file in mode 00 and sharing mode 10

The second program wants to open the file in mode 01 and sharing mode 11

Will the second program be able to open the file (0-no, 1-yes, 2-it depends on other circumstances)?

Answer: 0 ✔

The correct answer is: 0

Question 10

Correct

Mark 3.00 out of 3.00

page	M	R	belongs to process
1	1	1	5
2	0	1	3
3	1	0	4
4	0	0	4
5	1	1	5
6	1	1	3
7	0	1	4
8	1	0	5

Using the above table of bits M and R for the pages in NRU swapping, with the priority frame allocation rule, which page will be sent to the disk first? The pages are scanned starting from the top. A process number is its priority (the smaller number, the higher priority). The process for which the frame is needed is 4. Provide a page number.

Answer: 4 ✔

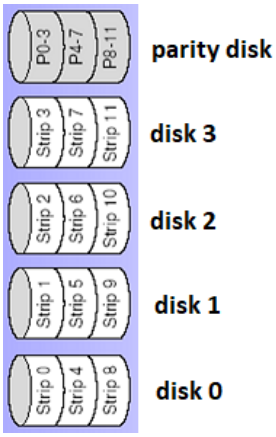
The correct answer is: 4

Question **11**

Correct

Mark 3.00 out of 3.00

In RAID 4, data is placed in Strips that are "scattered" over the data disks, so that each subsequent strip is on the next data disk, modulo the number of disks. For this, there is a parity disk that holds the parity bits of zeroth bits, first bits, second bits, etc., equal-numbered strips divided by the number of data disks, for example, strips 0-3, 4-7, 8-11, etc.:



the start of strips 0,1,2,3 looks like this:

0	1	0	0	1	Parity disk
0	0	0	0	0	Disk 3
1	0	1	1	0	Disk 2
1	1	0	0	1	Disk 1
0	1	1	0	0	Disk 0

In the parity strip, the values are placed so that the parity bit keeps the corresponding strip bits 0-3 odd.

Disk 3 has been damaged and reads only 0. After replacing the disk with a new one, what values should be put in the strip on disk 3?

Enter the values of the consecutive bits on disk 3, without any separators between them, for example 00000

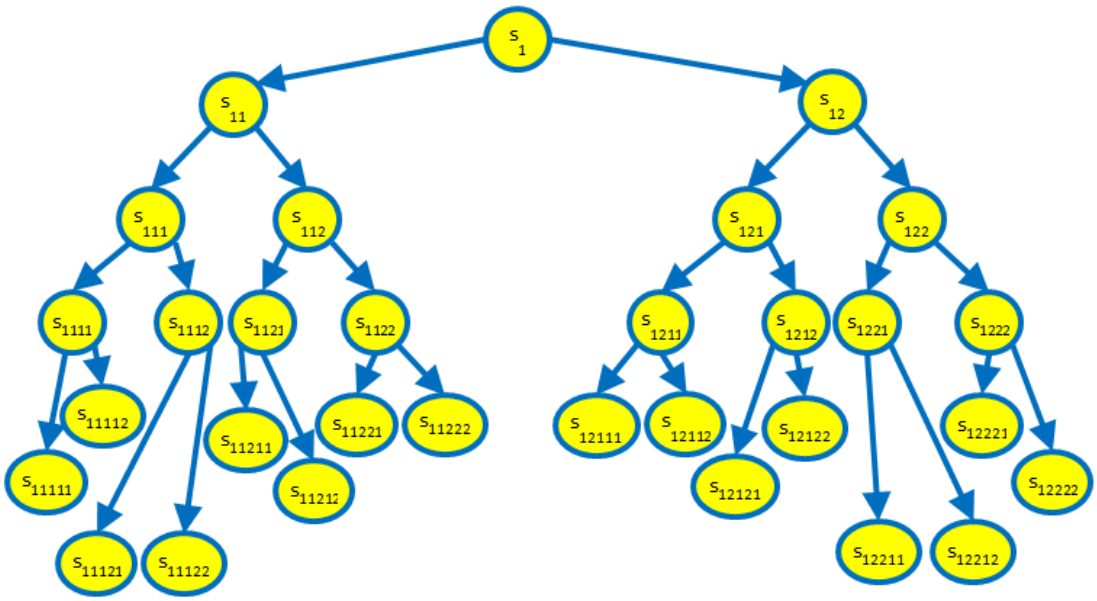
Answer: 10101 ✔

The correct answer is: 10101

Question **12**

Correct

Mark 3.00 out of 3.00



Above is the nesting structure of subroutines in some program.

Can there be a static link in subroutine s12 stack frame to subroutine s122 frame?

answer: 0-no, 1-yes

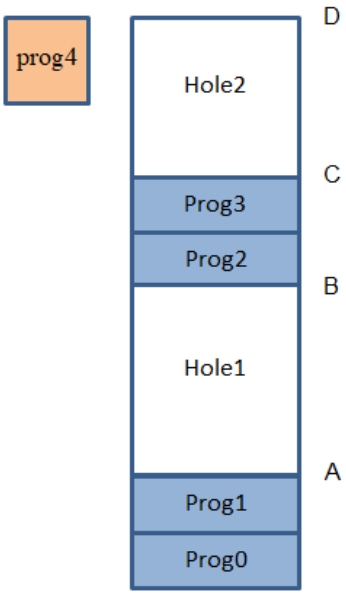
Answer: 0 ✔

The correct answer is: 0

Question 13

Correct

Mark 3.00 out of 3.00



In the above memory allocation state, 4 programs are already in memory, and 5th program is waiting to be loaded into the memory. The borders of the holes are:

A - 2K
B - 3K
C - 12K
D - 19K

The memory is allocated to the programs in the first-fit rule, without making a new hole if the allocated block is larger than the demand. The memory is scanned for the fitting hole starting from the lower addresses.

What will be the internal fragmentation after loading the program Prog4 of size 5K into memory?

Answer: 2 ✔

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The correct answer is: 2

Question **14**

Correct

Mark 3.00 out of 3.00

The virtual address consists of 7b page number and 9b offset. The page index table is shown below (index, content). For decimal address 2704, binary 0000 1010 1001 0000, enter the physical address in the form: frame number.offset (as decimal numbers, offset to 3 digits). For example, for a physical address consisting of frame 0 and offset 18, specify 0.018. If there is no physical address for the given virtual address, then -1 should be specified.

7	4
6	5
5	-1
4	11
3	6
2	9
1	-1
0	1

Answer: -1 ✔

The correct answer is: -1.000

Question **15**

Correct

Mark 3.00 out of 3.00

What is the average time in the system for tasks in the batch, using SJF algorithm?

The system is equipped with 4 processors

task	1	2	3	4
processing time	3.6	5.6	2.8	1.7

Answer: 3.425 ✔

The correct answer is: 3.4

Question 16

Incorrect

Mark 0.00 out of 3.00

The stack is full descending, that is, the stack pointer points to the most recently put element on the stack, and the stack expands towards lower addresses. Memory is byte-organized (individual bytes are addressed). Every piece of data occupies 4 bytes (also, memory cells and general-purpose registers). Parameters are pushed on the stack by C convention, starting with the last one. The static link is pushed on the stack after the parameters. The subroutine has local variables: 4, which occupy 1 memory cell each. After calling the subroutine with parameters: 3, occupying 1 memory cell each, the static link will be at the address relative to the SP (decimal number should be entered):

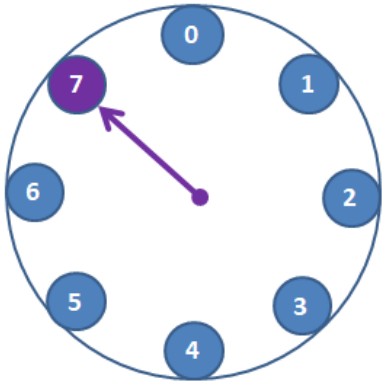
Answer: 28 ✖

The correct answer is: 24

Question 17

Correct

Mark 3.00 out of 3.00



page	3	4	5	6	7	0	1	2
R bit	1	1	1	1	1	1	1	1

Using the above list for the Clock swapping algorithm, which page will be sent to the disk first? Provide a page number.

The current position of the "arrow" is 3 (regardless of the position in the picture), and the algorithm works clockwise.

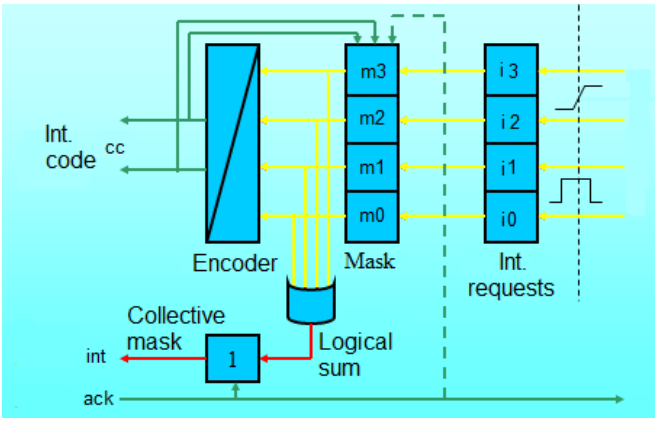
Answer: 3 ✔

The correct answer is: 3

Question 18

Correct

Mark 3.00 out of 3.00



In the given interrupt controller structure, the interrupt mask is 1111 (from m3 to m0), and interrupts 0010 (from i3 to i0) are reported.

The interrupt with index 3 has the highest priority.

What will be the new value of the interrupt mask? Provide the bits .m3m2m1m0 (mask preceded by a point) for example .0101

Answer: .1100 ✔

The correct answer is: 0.1100