

<b>Started on</b>	Monday, 16 June 2025, 10:06 AM
<b>State</b>	Finished
<b>Completed on</b>	Monday, 16 June 2025, 11:51 AM
<b>Time taken</b>	1 hour 44 mins
<b>Marks</b>	31.00/40.00
<b>Grade</b>	19.38 out of 25.00 (77.5%)

Question **1**

Correct

Mark 1.00 out of 1.00

When the processor is released, the scheduler selects one of the queued processes:

Select one or more:

- ☐ a. running
- ☒ b. ready ✓
- ☐ c. suspended
- ☐ d. waiting

Twoja odpowiedź jest poprawna.

The correct answer is: ready

Question **2**

Correct

Mark 1.00 out of 1.00

The thread is also called:

- ☒ a. lightweight process ✓
- ☐ b. heavy process
- ☐ c. overlay process
- ☐ d. data process

The correct answer is: lightweight process

## Question 3

Correct

Mark 1.00 out of 1.00

Which swapping algorithms use the history of page references (when was it last used or in which time slices was it used)?

Select one or more:

- ☒ a. working set ✓
- ☐ b. NRU
- ☒ c. LRU ✓
- ☐ d. clock
- ☐ e. FIFO
- ☒ f. second chance ✓
- ☒ g. LFU ✓
- ☐ h. no algorithm

Twoja odpowiedź jest poprawna.

The correct answers are: second chance, LRU, LFU, working set

## Question 4

Correct

Mark 1.00 out of 1.00

The hardware resources of a computer system are:

Select one or more:

- ☐ a. Virtual memory
- ☒ b. Processor time ✓
- ☒ c. Peripheral devioces ✓
- ☐ d. Windows on the screen

Twoja odpowiedź jest poprawna.

The correct answers are: Processor time, Peripheral devioces

## Question 5

Correct

Mark 1.00 out of 1.00

Collective interrupt mask is:

Select one or more:

- ☐ a. a register that blocks or unblocks a non-maskable interrupt
- ☒ b. a register that blocks or unblocks all interrupts ✓
- ☐ c. register in which the address of the interrupt controller is stored
- ☐ d. a combinational circuit that calculates the number of the interrupt received

Twoja odpowiedź jest poprawna.

The correct answer is: a register that blocks or unblocks all interrupts

## Question 6

Correct

Mark 1.00 out of 1.00

Page Index Table address is kept in:

Select one or more:

- ☒ a. page table base register ✓
- ☐ b. page register
- ☐ c. stack pointer
- ☐ d. program counter

Twoja odpowiedź jest poprawna.

The correct answer is: page table base register

## 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. It allows multiple programs/processes/threads to run physically simultaneously
- ☐ c. Requires the use of timer interrupts
- ☒ 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 Cyclic SCAN method, the currently being executed operation is in 49 cylinder. The direction in the Cyclic SCAN method is ascending. The next scheduled operations (in the order of their queuing) are:

Operation number	1	2	3	4	5
Cylinder number	60	43	46	53	59

For the next disk operation, enter the head travel distance (in cylinders) between the current and next operation.

Answer:  ✓

The correct answer is: 4

## Question 9

Correct

Mark 3.00 out of 3.00

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

Let's 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 01

The second program wants to open the file in mode 00 and sharing mode 00

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

Answer:



The correct answer is: 0

## Question 10

Correct

Mark 3.00 out of 3.00

page	Last used	Bit R	belongs to process
1	93	1	2
2	92	0	5
3	95	0	6
4	94	0	3
5	89	1	4
6	88	1	3
7	91	0	3
8	90	1	3

Using the above table of the history of R bit for the pages in Workset swapping algorithm, with priority frame allocation method, which page will be sent to the disk first? The current time slice number is 96, and the time range  $\tau$  for the workset is 3 (the threshold  $96 - \tau = 93$ ). Page scan starts from the top. The current process that needs a page to be loaded is 4. A process number is its priority (the greater number, the higher priority). Provide a page number to be sent to the disk.

Answer:



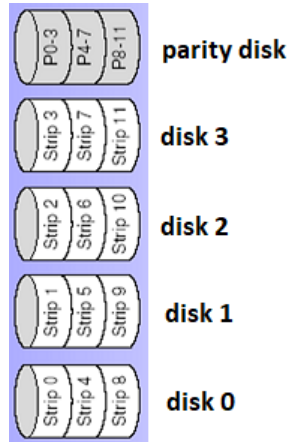
The correct answer is: 7

## Question 11

Incorrect

Mark 0.00 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	0	1	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

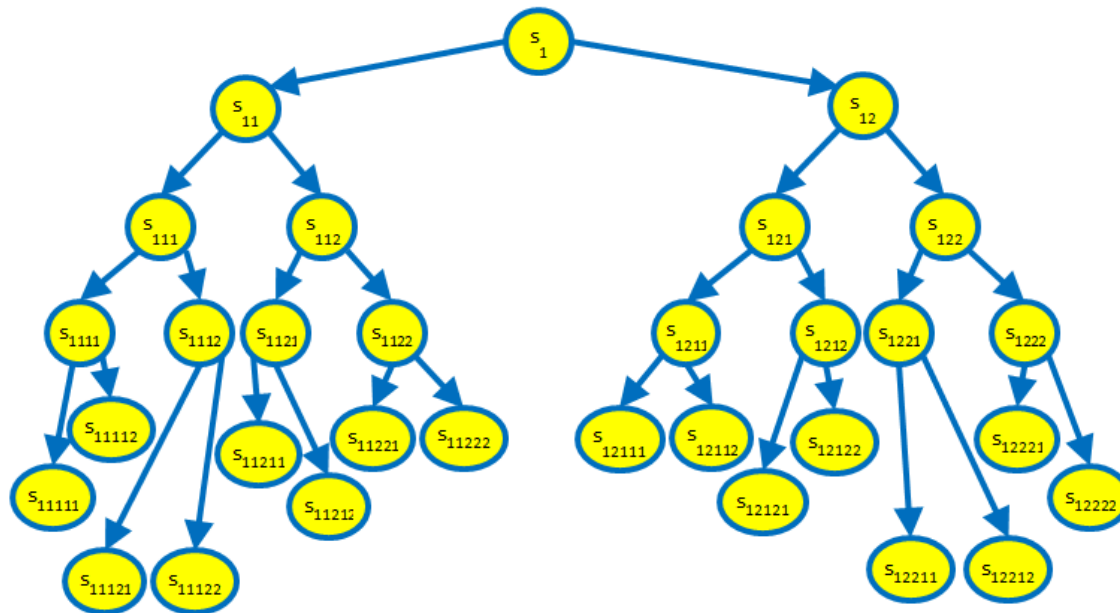
Answer:  ❌

The correct answer is: 11001

## Question 12

Correct

Mark 3.00 out of 3.00



Above is the nesting structure of subroutines in some program. Subroutine s121 calls its "parent" in the hierarchy. To what stack frame (which subroutine) will the dynamic link be made in the called subroutine frame?

Enter the name of the subroutine with the index, without the letter "s", e.g. for s11122 enter 11122

Answer:  ✓

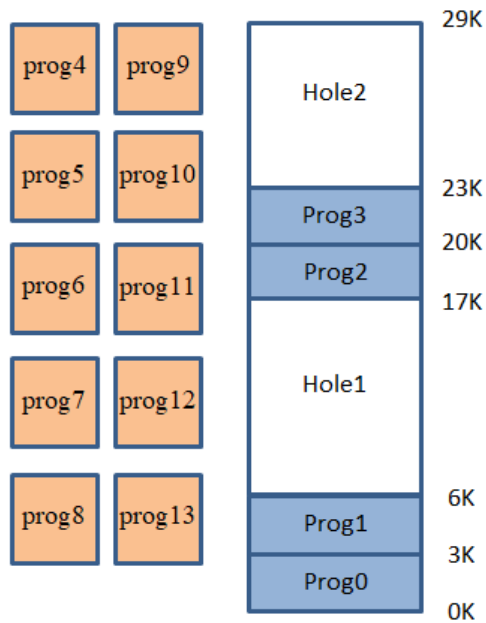
The correct answer is: 121



## Question 13

Correct

Mark 3.00 out of 3.00



In the above memory allocation state, 4 programs are already in memory, and 9 programs are waiting to be loaded into the memory, in the reverse order of their numbers. The programs waiting to be loaded into memory have the following sizes:

prog4 - 5K  
 prog5 - 7K  
 prog6 - 4K  
 prog7 - 6K  
 prog8 - 4K  
 prog9 - 4K  
 prog10 - 2K  
 prog11 - 4K  
 prog12 - 5K

The memory is allocated to the programs in the best-fit rule, with making a new hole if the allocated block is larger than the demand.

The programs are loaded into the memory in reverse order of their numbers (from 12 to 4).

Specify, which program will cause the memory compaction. Provide only the program number. If the compaction will not be needed, provide 0.

Answer:  ✓

The correct answer is: 8

Question **14**

Incorrect

Mark 0.00 out of 3.00

Assuming that the instruction is 32 bits, the data accessed in the instructions is 2 or 4 bytes, the memory access addressing is on a double word (4 bytes) boundary, and the page size is 4kB, one instruction can cause the following number of "page fault" exceptions:

Answer:  ❌

The correct answer is: 2

Question **15**

Correct

Mark 3.00 out of 3.00

We have the tasks with the following priorities in the access to a resource (a larger number is a higher priority):

Process number	1	2	3	4	5	6
Priority	40	41	32	33	33	28

The scheduling policy is preemptive, with the decision time constraint based on time slicing.

The current process is number 4. What process will get the resource in the nearest decision? Provide its priority.

Answer:  ✅

The correct answer is: 41

Question **16**

Correct

Mark 3.00 out of 3.00

The organization of memory and processor is word. A word means 16 bits (int also takes one 16-bit word). Hexadecimal values are preceded by a # character.

variable a has the value #a0c0

top of the stack (full descending, i.e. the stack pointer points to the most recently put element on the stack, and the stack expands towards lower addresses) is #c100

stack frame before calling subroutine A: #c105

address of subroutine A #1001

Calling rules: Parameters are put on the stack in accordance with the convention of the C language, i.e. starting from the last one, without a static link, the result of the function is passed in registers. The stack is shown after subroutine A is called, at label point C. Subroutine A is called A(a,a,a); from address #1050.

Regardless of the programming language, subroutine A has the form

```
A(int x,y,z);
```

```
{
```

```
    int q = x+0x20;
```

```
C: ...
```

```
}
```

Specify what cell #c0fb contains: dynamic link



Address	content	
#c100	????	
#c0ff	#a0c0	
#c0fe	#a0c0	
#c0fd	#a0c0	
#c0fc	#1051	
#c0fb	#c105	
#c0fa	#a0e0	
#c0f9	????	
#c0f8	????	

Twoja odpowiedź jest poprawna.

The correct answer is:

The organization of memory and processor is word. A word means 16 bits (int also takes one 16-bit word). Hexadecimal values are preceded by a # character.

variable a has the value #a0c0

top of the stack (full descending, i.e. the stack pointer points to the most recently put element on the stack, and the stack expands towards lower addresses) is #c100

stack frame before calling subroutine A: #c105

address of subroutine A #1001

Calling rules: Parameters are put on the stack in accordance with the convention of the C language, i.e. starting from the last one, without a static link, the result of the function is passed in registers. The stack is shown after subroutine A is called, at label point C. Subroutine A is called A(a,a,a); from address #1050.

Regardless of the programming language, subroutine A has the form

```
A(int x,y,z);
{
    int q = x+0x20;
C: ...
}
```

Specify what cell #c0fb contains:[dynamic link]

Address	content	
#c100	????	
#c0ff	#a0c0	
#c0fe	#a0c0	
#c0fd	#a0c0	
#c0fc	#1051	
#c0fb	#c105	
#c0fa	#a0e0	
#c0f9	????	
#c0f8	????	

#### Question 17

Correct

Mark 3.00 out of 3.00

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

Using the above table of the history of R bit for the pages in NRU swapping, which page will be sent to the disk first? The pages are scanned starting from the top. Provide a page number.

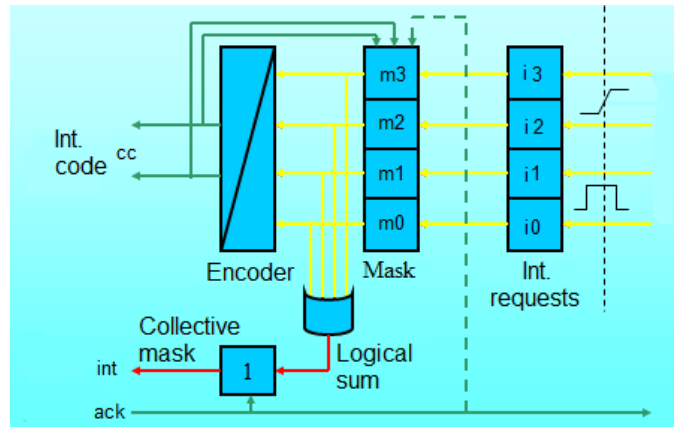
Answer:  

The correct answer is: 2

## Question 18

Incorrect

Mark 0.00 out of 3.00



In the given interrupt controller structure, the interrupt mask is 0000 (from m3 to m0), and interrupts 1010 (from i3 to i0) are reported.

The interrupt with index 3 has the highest priority.

What will be the value of the interrupt code cc sent to the processor (provide the code in decimal)?

If no interrupt is reported, enter -1

Answer:  ✖

The correct answer is: -1