Started on	Monday, 16 June 2025, 10:20 AM
State	Finished
Completed on	Monday, 16 June 2025, 11:40 AM
Time taken	1 hour 19 mins
Marks	26.00/40.00
Grade	**16.25** out of 25.00 (**65**%)

Question **1**

Correct

Mark 1.00 out of 1.00

Interrupt request register is:

Select one or more:

- [x] a. a register where interrupt line states are stored ✔
- [ ] b. a register that blocks or unblocks individual interrupts
- [ ] c. a register that blocks or unblocks all interrupts
- [ ] d. a combinational circuit that calculates the number of the interrupt received

Twoja odpowiedź jest poprawna.

The correct answer is: a register where interrupt line states are stored

Question **2**

Incorrect

Mark 0.00 out of 1.00

Context switch is caused by:

Select one or more:

- [x] a. input/output operations ✖
- [ ] b. relocation
- [x] c. interrupts ✔
- [ ] d. paging

Twoja odpowiedź jest niepoprawna.

The correct answer is: interrupts

Question 3

Correct

Mark 1.00 out of 1.00

In a concurrent environment, the operating system decides which task the CPU gets, when, and for how long. This feature is called:

- a. task timetable planning
- b. task management
- c. task scheduling ✔
- d. traffic management

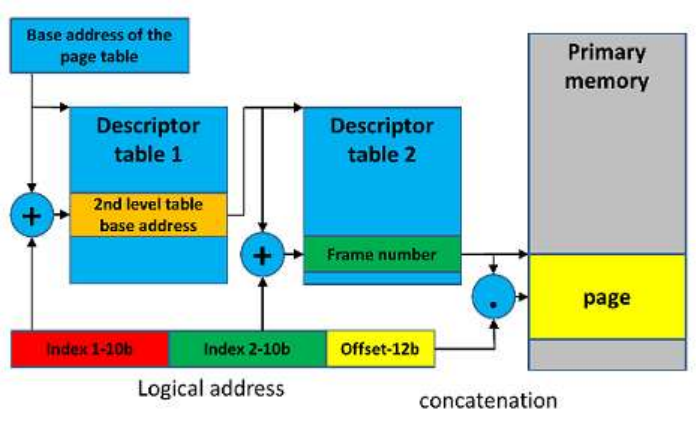
The correct answer is: task scheduling

Question 4

Incorrect

Mark 0.00 out of 1.00

Two-level TIS - place frame no:



Select one or more:

- a. in the table of the first level - on the left in the figure
- b. part in the first level table and part in the second level table
- c. none of the above answers
- d. in the table of the second level - on the right in the figure ✖

Twoja odpowiedź jest niepoprawna.

The correct answer is:
none of the above answers

Question 5

Correct

Mark 1.00 out of 1.00

Paging is in thrashing if:

- [ ] a. page cannot be swapped
- [ ] b. the system spends less time paging than execution
- [x] c. the system spends more time paging than execution ✔
- [ ] d. page faults occur

The correct answer is: the system spends more time paging than execution

Question 6

Correct

Mark 1.00 out of 1.00

What does the file system layer do?

- [ ] a. Manages remote file systems
- [ ] b. Manages relationships between files
- [x] c. Manages directories ✔
- [ ] d. Manages remote files
- [x] e. Manages free storage space ✔

The correct answers are: Manages directories, Manages free storage space

Question 7

Correct

Mark 1.00 out of 1.00

For concurrency in OS:

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

The correct answer is: interrupt handling is necessary

Question 8

Correct

Mark 3.00 out of 3.00

For the disk operation scheduling SCAN method, the currently being executed operation is in 40 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	51	32	39	44	48

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

Answer: 51 ✔

The correct answer is: 51

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 10 and sharing mode 10

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: 0 ✔

The correct answer is: 0

Question 10

Incorrect

Mark 0.00 out of 3.00

page	Last used	Bit R	belongs to process
1	89	1	4
2	90	0	4
3	91	0	2
4	92	0	3
5	93	1	2
6	94	1	3
7	95	0	2
8	96	1	4

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 97, and the time range τ for the workset is 5 (the threshold 97-τ=92). 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 smaller number, the higher priority). Provide a page number to be sent to the disk.

Answer: 3 ✖

The correct answer is: 2

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:

1	1	1	0	0	Parity disk
0	0	0	0	0	Disk 3
1	0	0	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 even.

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: 11001 ✖

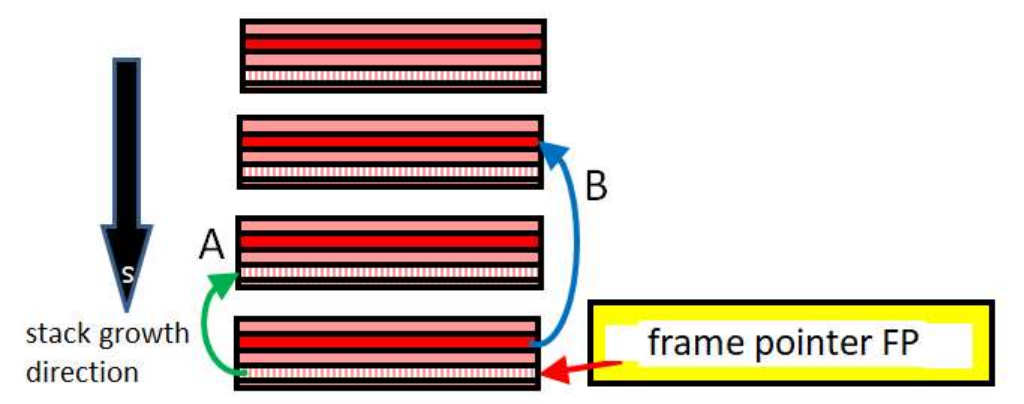
The correct answer is: 10111

Question 12

Correct

Mark 3.00 out of 3.00

In the shown "snapshot" of the program stack, the static link (B) and the dynamic link (A) are shown. The subroutine pointed by B is the "parent" of the subroutine at the top of the stack in the hierarchy. Could the subroutine on top of the stack be called recursively?



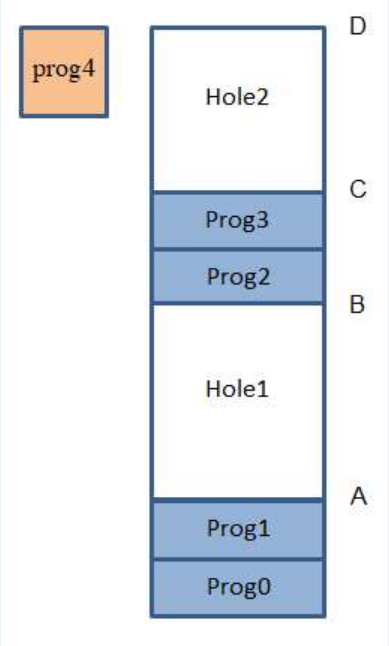
- (●) True ✔
- ( ) False

The correct answer is 'True'.

Question 13

Incorrect

Mark 0.00 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 - 6K
C - 12K
D - 17K

The memory is allocated to the programs in the worst-fit rule, without making a new hole if the allocated block is larger than the demand.

What will be the internal fragmentation after loading the program Prog4 of size 1K into memory?

Answer: 16 ✖

===== for teacher ======

4 5

The correct answer is: 4

Question **14**

Correct

Mark 3.00 out of 3.00

Assuming that the instruction is 32 bits, the data accessed in the instructions are 2, 4 or 8 bytes, the memory access addressing is on the word (2-byte) boundary, and the page size is 4kB, one instruction can cause the following number of exceptions "page fault":

Answer: 4 ✔

The correct answer is: 4

Question **15**

Correct

Mark 3.00 out of 3.00

What is the average time in the system for tasks in the batch incoming in this order, using FCFS algorithm?

The system is equipped with 4 processors

task	1	2	3	4
processing time	3.6	4.6	2.4	1.2

Answer: 2.95 ✔

The correct answer is: 2.9

Question **16**

Correct

Mark 3.00 out of 3.00

The organization of memory and processor is word-based. A word means 16 bits (int also takes 1 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) #c100

stack frame before subroutine B call #c1010

address of subroutine B #1021

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 connection, the result of the function is passed in registers. The stack is shown after subroutine B is called by itself (recursively), at label point C. Subroutine B is called for the first time B(a-2); somewhere in the program from address #1011. Label C has address #1050.

regardless of the programming language, subroutine B has the form

```
B(int i);
{
        int p=i+1;
C:      B(i-3);
}
```

The content of the cell at address #c0f9: dynamic link ✔

Address	content	
#c100	????	
#c0ff	#a0be	
#c0fe	#1012	
#c0fd	#c010	
#c0fc	#a0bf	
#c0fb	#a0bb	
#c0fa	#1051	
#c0f9	#c0fd	
#c0f8	#a0bc	
#c0f7	????	
#c0f6	????	

Twoja odpowiedź jest poprawna.

The correct answer is:

The organization of memory and processor is word-based. A word means 16 bits (int also takes 1 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) #c100

stack frame before subroutine B call #c1010

address of subroutine B #1021

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 connection, the result of the function is passed in registers. The stack is shown after subroutine B is called by itself (recursively), at label point C. Subroutine B is called for the first time B(a-2); somewhere in the program from address #1011. Label C has address #1050.

regardless of the programming language, subroutine B has the form

```
B(int i);
{
        int p=i+1;
C:      B(i-3);
}
```

The content of the cell at address #c0f9:[dynamic link]

Address	content	
#c100	????	
#c0ff	#a0be	
#c0fe	#1012	
#c0fd	#c010	
#c0fc	#a0bf	
#c0fb	#a0bb	
#c0fa	#1051	
#c0f9	#c0fd	
#c0f8	#a0bc	
#c0f7	????	
#c0f6	????	

Question **17**

Incorrect

Mark 0.00 out of 3.00

page nr	1	2	3	4	5	6	7	8	9
loaded	2	7	15	23	25	35	53	60	62
R bit	0	1	0	1	1	1	1	1	0

Using the above list for the FIFO-second chance swapping algorithm, which page will be sent to the disk first? The middle row is the number of a time slice in which a page was loaded to a frame. Provide a page number.

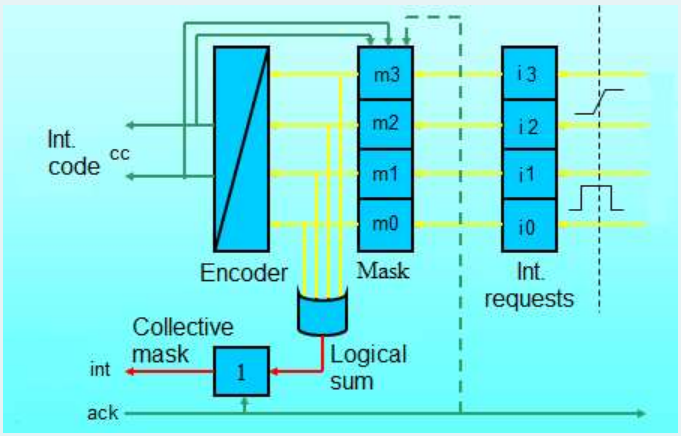
Answer: 2 ✖

The correct answer is: 1

Question 18

Correct

Mark 3.00 out of 3.00



In the given interrupt controller structure, the interrupt mask is 1100 (from m3 to m0), and interrupts 0011 (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: -1 ✔

The correct answer is: -1