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Grade	16.00 out of 26.00 (62%)

Question **1**  
Complete  
Mark 1.00 out of 1.00

Which of the following statements is/are true?

Select one or more:

- ☐ a.  
A thread does not share the resources of its parent process.
- ☐ b.  
A child process shares the resources of its parent process.
- ☒ c.  
A child process does not share the resources of its parent process.
- ☒ d.  
A thread shares the resources of its parent process.
- ☐ e.  
A thread may not create another thread.

The correct answers are:

A thread shares the resources of its parent process.

A child process does not share the resources of its parent process.

Question **2**

Complete

Mark 0.00 out of 1.00

Refer to the snippet of C code below for the following questions and assume *fork()* always succeeds:

#include <unistd.h>

#include <pthread.h>

int return\_value;

void \* thread\_routine(void \*arg)

{

static int count=3;

count--;

return\_value=count;

return &return\_value;

}

int main()

{

pthread\_t t\_id;

while(fork()==0)

{

void \*ret\_value;

int tmp;

pthread\_create(&t\_id, NULL, thread\_routine, NULL);

pthread\_join(t\_id, &ret\_value);

if((tmp=\*((int\*)ret\_value))==0) return 0;

}

fork() || fork();

return 0;

}

How many threads are created by the above code?

Select one:

- ☐ a. 14
- ☐ b. 2
- ☐ c. 3
- ☐ d. 11
- ☐ e. 15
- ☐ f. 12
- ☒ g. None of the answers.
- ☐ h. 9
- ☐ i. 5
- ☐ j. 8
- ☐ k. 6

The correct answer is: 3

Question **3**

Complete

Mark 0.00 out of 1.00

```
Refer to the snippet of C code below for the following questions and assume fork() always succeeds:

#include <unistd.h>

#include <pthread.h>

int return_value;

void * thread_routine(void *arg)
{
    static int count=3;

    count--;

    return_value=count;

    return &return_value;
}

int main()
{
    pthread_t t_id;

    while(fork()==0)
    {
        void *ret_value;

        int tmp;

        pthread_create(&t_id, NULL, thread_routine, NULL);

        pthread_join(t_id, &ret_value);

        if((tmp=*((int*)ret_value))==0) return 0;

    }

    fork() || fork();

    return 0;
}
```

How many child processes are created by the above code?

- Select one:
- ☐ a. 8
  - ☐ b. 15
  - ☐ c. 2
  - ☒ d. None of the answers
  - ☐ e. 9
  - ☐ f. 5
  - ☐ g. 12
  - ☐ h. 14
  - ☐ i. 3
  - ☐ j. 11
  - ☐ k. 6

The correct answer is: 9

Question **4**

Complete

Mark 0.00 out of 1.00

For the following, indicate whether it's true or false.

ii. In an 1:1 multi-threading model, every thread has one kernel-stack and one user-stack

Select one:

- ☐ True
- ☒ False

The correct answer is 'True'.

Question **5**

Complete

Mark 0.00 out of 1.00

For the following, indicate whether it's true or false.

i. Every function has it's own stack frame. So, if a program calls 10 different functions, it has 10 stack frames at the same time when running.

Select one:

- ☒ True
- ☐ False

The correct answer is 'False'.

Question **6**

Complete

Mark 0.00 out of 1.00

Indicate whether the following statement is true/false.

In the many to one multithreading model, all the threads in the process are scheduled by the kernel.

Select one:

- ☒ True
- ☐ False

The correct answer is 'False'.

Question **7**

Complete

Mark 1.00 out of 1.00

Indicate whether the following statement is true/false.

The number of kernel-level threads supported depends on the number of CPU cores in the system.

Select one:

- ☐ True
- ☒ False

The correct answer is 'False'.

Question **8**

Complete

Mark 1.00 out of 1.00

Indicate whether the following statement is true/false.

Context-switching between threads are faster compared with context switching between processes.

Select one:

- ☒ True
- ☐ False

The correct answer is 'True'.

Question **9**

Complete

Mark 0.00 out of 1.00

For each of the following scenario, answer how many items the OS scheduler has to schedule.

We assume a uniprocessor system for all scenarios.

There are 4 processes(each having 3 kernel threads and 4 user-level threads) currently in ready state.

Answer: 2

The correct answer is: 12

Question **10**

Complete

Mark 0.00 out of 1.00

For each of the following scenario, answer how many items the OS scheduler has to schedule.

We assume a uniprocessor system for all scenarios.

There are 4 processes(each having 3 kernel threads) currently in ready state.

Answer: 1

The correct answer is: 12

Question **11**

Complete

Mark 1.00 out of 1.00

For each of the following scenario, answer how many items the OS scheduler has to schedule.

We assume a uniprocessor system for all scenarios.

There are 4 single-threaded processes currently in ready state.

Answer: 4

The correct answer is: 4

Question 12

Complete

Mark 1.00 out of 1.00

Consider the scenario when three processes are in the ready queue and their I/O operations are free of resource contention.

The processes have the following performance requirements:

- P1: CPU(10ms), IO(2ms), CPU(5ms)
- P2: CPU(2ms), IO(7ms), CPU(2ms), IO(4ms), CPU(2ms)
- P3: CPU(4ms), IO(3ms), CPU(8ms)

Assume that the scheduling is non-preemptive shortest job first (or shortest remaining time first) and draw out the schedule in the space given below, indicating clearly when the processes are in I/O, when the processes join the ready queue and when the processes use the CPU. Only one job is scheduled at any one time.

		Interval 1	Interval 2	Interval 3	Interval 4	Interval 5	Interval 6	Interval 7	Interval 8	Interval 9
Ready Q before scheduling	P <sub>1</sub> (10) P <sub>2</sub> (2) P <sub>3</sub> (4)									
Scheduled Process	P <sub>2</sub> (2)									
Waiting Processes after scheduling										

What are the processes in Ready state before scheduling in Interval 2? Indicate the process and the required CPU time like "P1(2) P2(3)" (separate with one space) according to their order in the queue.

Answer:

P1(10) P3(4)

The correct answer is: P1(10) P3(4)

Question 13

Complete

Mark 1.00 out of 1.00

Consider the scenario when three processes are in the ready queue and their I/O operations are free of resource contention.

The processes have the following performance requirements:

- P1: CPU(10ms), IO(2ms), CPU(5ms)
- P2: CPU(2ms), IO(7ms), CPU(2ms), IO(4ms), CPU(2ms)
- P3: CPU(4ms), IO(3ms), CPU(8ms)

Assume that the scheduling is non-preemptive shortest job first (or shortest remaining time first) and draw out the schedule in the space given below, indicating clearly when the processes are in I/O, when the processes join the ready queue and when the processes use the CPU. Only one job is scheduled at any one time.

		Interval 1	Interval 2	Interval 3	Interval 4	Interval 5	Interval 6	Interval 7	Interval 8	Interval 9
Ready Q before scheduling	P <sub>1</sub> (10) P <sub>2</sub> (2) P <sub>3</sub> (4)									
Scheduled Process	P <sub>2</sub> (2)									
Waiting Processes after scheduling										

What is the process in Running state (i.e. scheduled process) in Interval 2? Indicate the process and the required CPU time like "P1(2)".

Answer:

P3(4)

The correct answer is: P3(4)

Question **14**

Complete

Mark 1.00 out of 1.00

Consider the scenario when three processes are in the ready queue and their I/O operations are free of resource contention.

The processes have the following performance requirements:

- P1: CPU(10ms), IO(2ms), CPU(5ms)
- P2: CPU(2ms), IO(7ms), CPU(2ms), IO(4ms), CPU(2ms)
- P3: CPU(4ms), IO(3ms), CPU(8ms)

Assume that the scheduling is non-preemptive shortest job first (or shortest remaining time first) and draw out the schedule in the space given below, indicating clearly when the processes are in I/O, when the processes join the ready queue and when the processes use the CPU. Only one job is scheduled at any one time.

		Interval 1	Interval 2	Interval 3	Interval 4	Interval 5	Interval 6	Interval 7	Interval 8	Interval 9
Ready Q before scheduling	P <sub>1</sub> (10) P <sub>2</sub> (2) P <sub>3</sub> (4)									
Scheduled Process	P <sub>2</sub> (2)									
Waiting Processes after scheduling										

What is the process in Waiting state (i.e. waiting process after scheduling) in Interval 2? Indicate the process and the required time like "P1(2) P2(3)".

Answer:

P2(4)

The correct answer is: P2(4)

Question **15**

Complete

Mark 1.00 out of 1.00

Consider the scenario when three processes are in the ready queue and their I/O operations are free of resource contention.

The processes have the following performance requirements:

- P1: CPU(10ms), IO(2ms), CPU(5ms)
- P2: CPU(2ms), IO(7ms), CPU(2ms), IO(4ms), CPU(2ms)
- P3: CPU(4ms), IO(3ms), CPU(8ms)

Assume that the scheduling is non-preemptive shortest job first (or shortest remaining time first) and draw out the schedule in the space given below, indicating clearly when the processes are in I/O, when the processes join the ready queue and when the processes use the CPU. Only one job is scheduled at any one time.

		Interval 1	Interval 2	Interval 3	Interval 4	Interval 5	Interval 6	Interval 7	Interval 8	Interval 9
Ready Q before scheduling	P <sub>1</sub> (10) P <sub>2</sub> (2) P <sub>3</sub> (4)									
Scheduled Process	P <sub>2</sub> (2)									
Waiting Processes after scheduling										

What are the processes in Ready state before scheduling in Interval 3? Indicate the process and the required CPU time like "P1(2) P2(3)" (separate with one space) according to their order in the queue.

Answer:

P1(10)

The correct answer is: P1(10)

Question **16**

Complete

Mark 1.00 out of 1.00

Consider the scenario when three processes are in the ready queue and their I/O operations are free of resource contention.

The processes have the following performance requirements:

- P1: CPU(10ms), IO(2ms), CPU(5ms)
- P2: CPU(2ms), IO(7ms), CPU(2ms), IO(4ms), CPU(2ms)
- P3: CPU(4ms), IO(3ms), CPU(8ms)

Assume that the scheduling is non-preemptive shortest job first (or shortest remaining time first) and draw out the schedule in the space given below, indicating clearly when the processes are in I/O, when the processes join the ready queue and when the processes use the CPU. Only one job is scheduled at any one time.

		Interval 1	Interval 2	Interval 3	Interval 4	Interval 5	Interval 6	Interval 7	Interval 8	Interval 9
Ready Q before scheduling	P <sub>1</sub> (10) P <sub>2</sub> (2) P <sub>3</sub> (4)									
Scheduled Process	P <sub>2</sub> (2)									
Waiting Processes after scheduling										

What is the process in Running state (i.e. scheduled process) in Interval 3? Indicate the process and the required CPU time like "P1(2)".

Answer:

P1(10)

The correct answer is: P1(10)

Question **17**

Complete

Mark 1.00 out of 1.00

Consider the scenario when three processes are in the ready queue and their I/O operations are free of resource contention.

The processes have the following performance requirements:

- P1: CPU(10ms), IO(2ms), CPU(5ms)
- P2: CPU(2ms), IO(7ms), CPU(2ms), IO(4ms), CPU(2ms)
- P3: CPU(4ms), IO(3ms), CPU(8ms)

Assume that the scheduling is non-preemptive shortest job first (or shortest remaining time first) and draw out the schedule in the space given below, indicating clearly when the processes are in I/O, when the processes join the ready queue and when the processes use the CPU. Only one job is scheduled at any one time.

		Interval 1	Interval 2	Interval 3	Interval 4	Interval 5	Interval 6	Interval 7	Interval 8	Interval 9
Ready Q before scheduling	P <sub>1</sub> (10) P <sub>2</sub> (2) P <sub>3</sub> (4)									
Scheduled Process	P <sub>2</sub> (2)									
Waiting Processes after scheduling										

What is the process in Waiting state (i.e. waiting process after scheduling) in Interval 3? Indicate the process and the required time like "P1(2) P2(3)".

Answer:

P2(3) P3(3)

The correct answer is: P2(3) P3(3)



Question **18**

Complete

Mark 1.00 out of 1.00

Consider the scenario when three processes are in the ready queue and their I/O operations are free of resource contention.

The processes have the following performance requirements:

- P1: CPU(10ms), IO(2ms), CPU(5ms)
- P2: CPU(2ms), IO(7ms), CPU(2ms), IO(4ms), CPU(2ms)
- P3: CPU(4ms), IO(3ms), CPU(8ms)

Assume that the scheduling is non-preemptive shortest job first (or shortest remaining time first) and draw out the schedule in the space given below, indicating clearly when the processes are in I/O, when the processes join the ready queue and when the processes use the CPU. Only one job is scheduled at any one time.

		Interval 1	Interval 2	Interval 3	Interval 4	Interval 5	Interval 6	Interval 7	Interval 8	Interval 9
Ready Q before scheduling	P <sub>1</sub> (10) P <sub>2</sub> (2) P <sub>3</sub> (4)									
Scheduled Process	P <sub>2</sub> (2)									
Waiting Processes after scheduling										

What are the processes in Ready state before scheduling in Interval 4? Indicate the process and the required CPU time like "P1(2) P2(3)" (separate with one space) according to their order in the queue.

Answer:

P2(2) P3(8)

The correct answer is: P2(2) P3(8)

Question **19**

Complete

Mark 1.00 out of 1.00

Consider the scenario when three processes are in the ready queue and their I/O operations are free of resource contention.

The processes have the following performance requirements:

- P1: CPU(10ms), IO(2ms), CPU(5ms)
- P2: CPU(2ms), IO(7ms), CPU(2ms), IO(4ms), CPU(2ms)
- P3: CPU(4ms), IO(3ms), CPU(8ms)

Assume that the scheduling is non-preemptive shortest job first (or shortest remaining time first) and draw out the schedule in the space given below, indicating clearly when the processes are in I/O, when the processes join the ready queue and when the processes use the CPU. Only one job is scheduled at any one time.

		Interval 1	Interval 2	Interval 3	Interval 4	Interval 5	Interval 6	Interval 7	Interval 8	Interval 9
Ready Q before scheduling	P <sub>1</sub> (10) P <sub>2</sub> (2) P <sub>3</sub> (4)									
Scheduled Process	P <sub>2</sub> (2)									
Waiting Processes after scheduling										

What is the process in Running state (i.e. scheduled process) in Interval 4? Indicate the process and the required CPU time like "P1(2)".

Answer:

P2(2)

The correct answer is: P2(2)

Question **20**

Complete

Mark 1.00 out of 1.00

Consider the scenario when three processes are in the ready queue and their I/O operations are free of resource contention.

The processes have the following performance requirements:

- P1: CPU(10ms), IO(2ms), CPU(5ms)
- P2: CPU(2ms), IO(7ms), CPU(2ms), IO(4ms), CPU(2ms)
- P3: CPU(4ms), IO(3ms), CPU(8ms)

Assume that the scheduling is non-preemptive shortest job first (or shortest remaining time first) and draw out the schedule in the space given below, indicating clearly when the processes are in I/O, when the processes join the ready queue and when the processes use the CPU. Only one job is scheduled at any one time.

		Interval 1	Interval 2	Interval 3	Interval 4	Interval 5	Interval 6	Interval 7	Interval 8
	Interval 9								
Ready Q before scheduling	P <sub>1</sub> (10) P <sub>2</sub> (2) P <sub>3</sub> (4)								
Scheduled Process	P <sub>2</sub> (2)								
Waiting Processes after scheduling									

What is the process in Waiting state (i.e. waiting process after scheduling) in Interval 4? Indicate the process and the required time like "P1(2) P2(3)".

Answer:

P1(2)

The correct answer is: P1(2)

Question **21**

Complete

Mark 0.00 out of 1.00

Consider the scenario when three processes are in the ready queue and their I/O operations are free of resource contention.

The processes have the following performance requirements:

- P1: CPU(10ms), IO(2ms), CPU(5ms)
- P2: CPU(2ms), IO(7ms), CPU(2ms), IO(4ms), CPU(2ms)
- P3: CPU(4ms), IO(3ms), CPU(8ms)

Assume that the scheduling is non-preemptive shortest job first (or shortest remaining time first) and draw out the schedule in the space given below, indicating clearly when the processes are in I/O, when the processes join the ready queue and when the processes use the CPU. Only one job is scheduled at any one time.

		Interval 1	Interval 2	Interval 3	Interval 4	Interval 5	Interval 6	Interval 7	Interval 8
	Interval 9								
Ready Q before scheduling	P <sub>1</sub> (10) P <sub>2</sub> (2) P <sub>3</sub> (4)								
Scheduled Process	P <sub>2</sub> (2)								
Waiting Processes after scheduling									

What are the processes in Ready state before scheduling in Interval 5? Indicate the process and the required CPU time like "P1(2) P2(3)" (separate with one space) according to their order in the queue.

Answer:

P1(5) P3(8)

The correct answer is: P3(8) P1(5)

Question **22**

Complete

Mark 1.00 out of 1.00

Consider the scenario when three processes are in the ready queue and their I/O operations are free of resource contention.

The processes have the following performance requirements:

- P1: CPU(10ms), IO(2ms), CPU(5ms)
- P2: CPU(2ms), IO(7ms), CPU(2ms), IO(4ms), CPU(2ms)
- P3: CPU(4ms), IO(3ms), CPU(8ms)

Assume that the scheduling is non-preemptive shortest job first (or shortest remaining time first) and draw out the schedule in the space given below, indicating clearly when the processes are in I/O, when the processes join the ready queue and when the processes use the CPU. Only one job is scheduled at any one time.

		Interval 1	Interval 2	Interval 3	Interval 4	Interval 5	Interval 6	Interval 7	Interval 8	Interval 9
Ready Q before scheduling	P <sub>1</sub> (10) P <sub>2</sub> (2) P <sub>3</sub> (4)									
Scheduled Process	P <sub>2</sub> (2)									
Waiting Processes after scheduling										

What is the process in Running state (i.e. scheduled process) in Interval 5? Indicate the process and the required CPU time like "P1(2)".

Answer:

P1(5)

The correct answer is: P1(5)

Question **23**

Complete

Mark 1.00 out of 1.00

Consider the scenario when three processes are in the ready queue and their I/O operations are free of resource contention.

The processes have the following performance requirements:

- P1: CPU(10ms), IO(2ms), CPU(5ms)
- P2: CPU(2ms), IO(7ms), CPU(2ms), IO(4ms), CPU(2ms)
- P3: CPU(4ms), IO(3ms), CPU(8ms)

Assume that the scheduling is non-preemptive shortest job first (or shortest remaining time first) and draw out the schedule in the space given below, indicating clearly when the processes are in I/O, when the processes join the ready queue and when the processes use the CPU. Only one job is scheduled at any one time.

		Interval 1	Interval 2	Interval 3	Interval 4	Interval 5	Interval 6	Interval 7	Interval 8	Interval 9
Ready Q before scheduling	P <sub>1</sub> (10) P <sub>2</sub> (2) P <sub>3</sub> (4)									
Scheduled Process	P <sub>2</sub> (2)									
Waiting Processes after scheduling										

What is the process in Waiting state (i.e. waiting process after scheduling) in Interval 5? Indicate the process and the required time like "P1(2) P2(3)".

Answer:

P2(4)

The correct answer is: P2(4)

Question **24**

Complete

Mark 0.00 out of 1.00

Consider the scenario when three processes are in the ready queue and their I/O operations are free of resource contention.

The processes have the following performance requirements:

- P1: CPU(10ms), IO(2ms), CPU(5ms)
- P2: CPU(2ms), IO(7ms), CPU(2ms), IO(4ms), CPU(2ms)
- P3: CPU(4ms), IO(3ms), CPU(8ms)

Assume that the scheduling is non-preemptive shortest job first (or shortest remaining time first) and draw out the schedule in the space given below, indicating clearly when the processes are in I/O, when the processes join the ready queue and when the processes use the CPU. Only one job is scheduled at any one time.

		Interval 1	Interval 2	Interval 3	Interval 4	Interval 5	Interval 6	Interval 7	Interval 8	Interval 9
Ready Q before scheduling	P <sub>1</sub> (10) P <sub>2</sub> (2) P <sub>3</sub> (4)									
Scheduled Process	P <sub>2</sub> (2)									
Waiting Processes after scheduling										

What are the processes in Ready state before scheduling in Interval 6? Indicate the process and the required CPU time like "P1(2) P2(3)" (separate with one space) according to their order in the queue.

Answer:

P2(2) P3(8)

The correct answer is: P3(8) P2(2)

Question **25**

Complete

Mark 1.00 out of 1.00

Consider the scenario when three processes are in the ready queue and their I/O operations are free of resource contention.

The processes have the following performance requirements:

- P1: CPU(10ms), IO(2ms), CPU(5ms)
- P2: CPU(2ms), IO(7ms), CPU(2ms), IO(4ms), CPU(2ms)
- P3: CPU(4ms), IO(3ms), CPU(8ms)

Assume that the scheduling is non-preemptive shortest job first (or shortest remaining time first) and draw out the schedule in the space given below, indicating clearly when the processes are in I/O, when the processes join the ready queue and when the processes use the CPU. Only one job is scheduled at any one time.

		Interval 1	Interval 2	Interval 3	Interval 4	Interval 5	Interval 6	Interval 7	Interval 8	Interval 9
Ready Q before scheduling	P <sub>1</sub> (10) P <sub>2</sub> (2) P <sub>3</sub> (4)									
Scheduled Process	P <sub>2</sub> (2)									
Waiting Processes after scheduling										

What is the process in Running state (i.e. scheduled process) in Interval 6? Indicate the process and the required CPU time like "P1(2)".

Answer:

P2(2)

The correct answer is: P2(2)

Question **26**

Complete

Mark 0.00 out of 1.00

Consider the scenario when three processes are in the ready queue and their I/O operations are free of resource contention.

The processes have the following performance requirements:

- P1: CPU(10ms), IO(2ms), CPU(5ms)
- P2: CPU(2ms), IO(7ms), CPU(2ms), IO(4ms), CPU(2ms)
- P3: CPU(4ms), IO(3ms), CPU(8ms)

Assume that the scheduling is non-preemptive shortest job first (or shortest remaining time first) and draw out the schedule in the space given below, indicating clearly when the processes are in I/O, when the processes join the ready queue and when the processes use the CPU. Only one job is scheduled at any one time.

		Interval 1	Interval 2	Interval 3	Interval 4	Interval 5	Interval 6	Interval 7	Interval 8
	Interval 9								
Ready Q before scheduling	P <sub>1</sub> (10) P <sub>2</sub> (2) P <sub>3</sub> (4)								
Scheduled Process	P <sub>2</sub> (2)								
Waiting Processes after scheduling									

What is the average waiting time according to the above shortest-job first schedule? Answer rounds to two decimal places.

- Select one:
- ☐ a. 9.33

☐ b. None of the answers

☐ c. 10.66

☐ d. 11

☐ e. 9.66

☐ f. 9

☒ g. 10.33

☐ h. 11.66

☐ i. 11.33

☐ j. 10

☐ k. 12

The correct answer is: 10.66

◀ Quiz 2

Jump to...

⌵

How many child processes and threads?  
▶