hw8: Exceptional Control Flow

Due May 1 at 11:59pm   **Points** 8   **Questions** 8
Available Apr 17 at 12am - May 2 at 11:59pm   **Time Limit** 40 Minutes
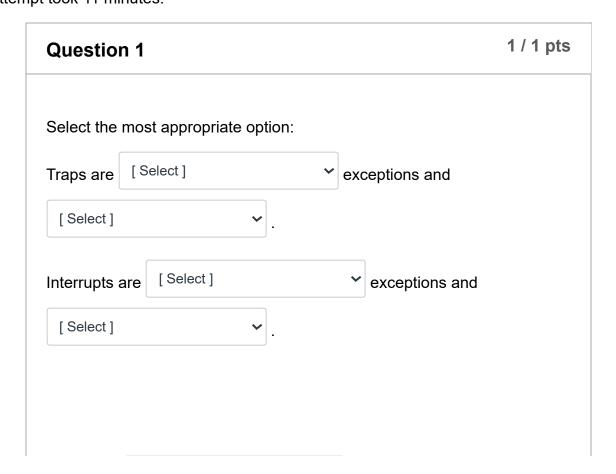**Allowed Attempts** 2

This quiz was locked May 2 at 11:59pm.

Attempt History

	Attempt	Time	Score
KEPT	[Attempt 2](#)	11 minutes	8 out of 8
LATEST	[Attempt 2](#)	11 minutes	8 out of 8
	[Attempt 1](#)	5 minutes	7 out of 8

Score for this attempt: **8** out of 8
Submitted May 1 at 6:47pm
This attempt took 11 minutes.

Question 1	1 / 1 pts

Select the most appropriate option:

Traps are [Select]   exceptions and

[Select]   .

Interrupts are [Select]   exceptions and

[Select]   .

Aborts are [Select] exceptions and

[Select] .

Faults are [Select] exceptions and

[Select] .

Answer 1:

synchronous

Answer 2:

always return to the next instruction

Answer 3:

asynchronous

Answer 4:

always return to the next instruction

Answer 5:

synchronous

Answer 6:

do not return to the user process

Answer 7:

synchronous

Answer 8:

might return to the current instruction

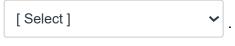Consider the following hypothetical scenario for a system with a single core cpu:

1. Process 13 starts executing after process 37 is put to sleep by the system call sleep(5).
2. Process 22 starts executing after process 13 is put to sleep by the system call sleep(10).
3. A timer exception occurs and triggers the appropriate

   [Select] ⌄ .

4. The [Select] ⌄ is invoked, which decides to

   resume execution of [Select] ⌄ .

5. The context of [Select] ⌄ is saved.

6. The context of [Select] ⌄ is restored and control

   is passed to it.
7. A timer exception occurs and triggers the appropriate

   [Select] ⌄ .

8. The [Select] ⌄ is invoked, which decides to

   resume process 13.

Select the best option to complete the statements in the scenario above.

Answer 1:

Correct!   interrupt handler

Answer 2:

Correct!   scheduler

Answer 3:

Correct!

process 37

Answer 4:

Correct!

process 22

Answer 5:

Correct!

process 37

Answer 6:

Correct!

interrupt handler

Answer 7:

Correct!

scheduler

Question 3   1 / 1 pts

Which one of the below allow the system to handle asynchronous activity on I/O devices?

○ Signals

○ Aborts

○ Traps

Correct!
⦿ Interrupts

○ Faults

Question 4   1 / 1 pts

Suppose Process A is currently running, and it doesn't have any programmer specified signal handlers. Which option corresponds to the correct ordering of steps if A references an invalid memory address?

1. Exception handler sends SIGSEGV signal to process A.
2. Exception handler sends SIGTERM signal to process A.
3. Exception handler detects invalid address.
4. Process A exits.
5. Process A resumes execution from next instruction.
6. Process A resumes execution from current instruction.

- ○ 3 1 5
- ○ 3 2 5

Correct!
- ◉ 3 1 4
- ○ 1 3 4
- ○ 3 2 6

Question 5   1 / 1 pts

Suppose a user enters `kill -19 1008` at the command prompt. This communicated to the user process with pid 1008 via:

Correct!
- ◉ SIGSTOP
- ○ SIGTSTP
- ○ SIGKILL
- ○ SIGALRM
- ○ SIGINT

Question 6

1 / 1 pts

```
movl $6, %eax
movl $10, %ebx
int $0x80
```

In Linux, the assembly code above could correspond to:

- ◉ close(10)

- ○ exit(10)

- ○ kill(6, 10)

- ○ exit(0)

- ○ alarm(10)

Question 7

1 / 1 pts

```c
#include ...

void sig_handler(){
    printf("Beep\n");
    alarm(1);
}

int main(){
    struct sigaction sa;
    sa.sa_flags = 0;
    sa.sa_handler = sig_handler;
    if(sigaction(SIGALRM, &sa, NULL) != 0){
        printf("Failed to bind handler.\n");
        exit(1);
    }
    printf("Going into an infinite loop.\n");
    alarm(1);
    while(1);
    return 0;
}
```

Suppose the above program is run for 5.5 seconds after it prints "Going into an infinite loop". The program is run multiple times where the "system load" from other processes sharing the cpu will vary from none to many other processes. Which best characterizes how many times "Beep" is printed?
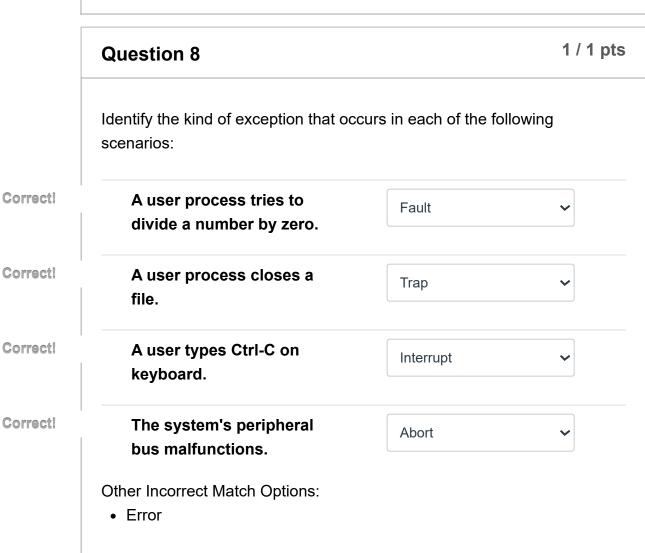
○ "Beep" is printed < 5 times (strictly less than).

○ "Beep" is printed always 5 times (exactly equal to).

○ "Beep" is printed > 5 times (strictly greater than).

○ "Beep" is printed >= 5 times (greater than or equal to).

Correct!

◉ "Beep" is printed <= 5 times (less than or equal to).

Question 8   1 / 1 pts

Identify the kind of exception that occurs in each of the following scenarios:

Correct!

A user process tries to divide a number by zero.	Fault

Correct!

A user process closes a file.	Trap

Correct!

A user types Ctrl-C on keyboard.	Interrupt

Correct!

The system's peripheral bus malfunctions.	Abort

Other Incorrect Match Options:
- Error