

## CSSE 332 -- OPERATING SYSTEMS

## Signals

Name:

SOLUTION KEY

**Question 1.** (5 points) When running a program in a shell and you press the `ctrl-c` key combination on your keyboard, which signal is sent to the running process? What is the default behavior of the process upon receiving this signal?

**Solution:** Hitting `ctrl-c` sends the *interrupt* signal to the running process (`SIGINT`). By default, it causes the process to terminate.

**Question 2.** Assume that in our system, we have three processes  $P_1$ ,  $P_2$ , and  $P_3$ . At one point in time, both  $P_2$  and  $P_3$  send the *stop* signal to  $P_1$ .

(a) (5 points) Assume that  $P_2$  sends  $P_1$  the signal **before**  $P_3$  sends its signal. In this case, it is guaranteed that  $P_2$ 's signal will be delivered before  $P_3$ 's signal.

A. True.

**B. False.**

(b) (5 points) Assume now that  $P_1$  received  $P_2$ 's signal but has not processed (or handled) it yet. Which of the following statements is true when  $P_3$ 's signal is received?

A.  $P_3$ 's signal will be queued until  $P_2$ 's signal is handled by the receiving process.

B.  $P_3$ 's signal will be bundled with  $P_2$ 's signal since they are of the same type.

**C.  $P_3$ 's signal will be discarded.**

**Question 3.** (5 points) List and explain the five actions that can be taken by default when a process receives a certain signal.

**Solution:**

1. Terminate: Kill the process.
2. Dump: Terminate and generate a core dump.

3. Ignore: see question below.
4. Stop: Pause the process.
5. Continue: Continue a paused process.

**Question 4.** (5 points) Explain the main difference between an *ignored* signal and a *masked* signal.

**Solution:** An ignored signal is consumed and discarded while a masked signal is stored (only one of a certain type) to be handled later when the process chooses to unmask it.