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COMS 352 HW 2

3.9 Describe the actions taken by a kernel to context-switch between processes.

1. First, the kernel saves the state of the running process, and transfers control to the kernel clock interrupt handler,
2. The clock interrupt handler saves the rest of the registers, as well as other machine state in the process PCB, this stops the process.
3. OS invokes the scheduler to determine the next process to execute,
4. OS then retrieves the state of the next process from its PCB, and restores the registers.

3.12) Including the initial parent process, how many processes are created by the program shown in

n = 4;
2^n – 1 processes which is 15 processes.

3.15 Give an example of a situation in which ordinary pipes are more suitable than named pipes and an example of a situation in which named pipes are more suitable than ordinary pipes.

Ordinary pipes:

Ordinary pipes are unidirectional (producer-consumer style).

Ex: Process such that a producer writes something to a file, and consumer reads and performs some function.

Named pipes:

Named pipes are bidirectional.

Ex: Consider a situation where several processes need to write to a file. They could first write to a named pipe, then they could be read from the named pipe, and output to a file.

3.17) What output will be at Line X and Line Y?

line X : 0, -1, -4, -9, -16
line Y : 0, 1, 2, 3, 4

3.18) What are the benefits and the disadvantages of each of the following? Consider both the system level and the programmer level.

a.) A benefit of synchronous communication is that it allows a rendezvous between the sender and receiver. A disadvantage of a blocking send is that a rendezvous may not be required and the message could be delivered asynchronously.

Synchronous => blocking

asynchronous => non-blocking

b.) Automatic buffering provides a queue with indefinite length, thus ensuring the sender will never have to block while waiting to copy a message. A problem with this is there is no way to ensure the correct amount of memory is being used for the buffering, which can cause more than the required memory to be reserved, and thus wasting some.

Explicit buffering specifies how large the buffer will be. This is advantageous in the sense that memory is less likely to be wasted, but the sender may be blocked while waiting for available space.

c.) Send by copy does not allow the receiver to alter the state of the parameter. Send by reference does allow it.

A benefit of send by reference is that it allows the programmer to write a distributed version of a centralized application.

Passing a parameter by reference requires declaring the parameter as a remote object.

d.) This helps with buffering issues

A buffer with a specific size can hold a specific number of fixed sized messages

If the size of the messages is not known, then it can not be determined how many messages the buffer can hold.