EECE.4810/EECE.5730: Operating Systems

Spring 2018

Lecture 4: Key Questions
January 31, 2018

1. What are the two models of interprocess communication? What are the benefits of each?

2. Describe the basics of the producer-consumer problem.

3. Describe the following pseudo-code, which represents a bounded-buffer implementation of a producer-consumer setup using shared memory IPC.

```
// Basic setup
#define BUFFER_SIZE 10
typedef struct {
     . . .
} item;
item buffer[BUFFER_SIZE];
int in = 0;
int out = 0;


// Producer
item next_produced;
while (true) {
     /* produce an item in next produced */
     while (((in + 1) % BUFFER_SIZE) == out)
          ; /* do nothing */
     buffer[in] = next_produced;
     in = (in + 1) % BUFFER_SIZE;
}

// Consumer
item next_consumed;
while (true) {
     while (in == out)
          ; /* do nothing */
     next_consumed = buffer[out];
     out = (out + 1) % BUFFER_SIZE;
     /* consume the item in next consumed */
}
```

4. Describe the basics of shared memory IPC, using the POSIX shared memory producer/ consumer example programs in the additional handout provided. Be sure to describe (a) how a shared memory segment is established and sized appropriately, (b) how the shared segment is mapped to and removed from a process's address space, (c) how the shared segment can be read or written, and (d) how the shared segment is removed from the file system.

5. Describe message passing through direct communication.

6. Describe message passing through indirect communication.