#1 Review: Consumer-Producer practice question

Consumer-Producer using a fixed size ring buffer. Assume s1 is initialized to 100 and s2 is initialized to zero.
i) Can it deadlock, if so, under what conditions?
ii) Is underflow possible? (underflow=Able to read/write before the start e.g. dequeue succeeds even though the data structure is empty)
iii) Is overflow possible? (overflow=Able to read/write after the end e.g. enqueue succeeds even though data structure is full)

Consider the following attempt. Assume buffer has 256 entries.

enqueue(value)	dequeue()
mutex_lock(m)	sem_wait(s2)
sem_wait(s1)	sem_post(s1)
sem_post(s2)	mutex_lock(m)
buffer[(in++) & 255] = value	result=buffer[(out++) & 255]
mutex_unlock(m)	mutex_unlock(m)
	return result

#2 Review: pthread practice question. What can the following code print? Assume puts is atomic.

```
void* funcA(void* ptr) { pthread_exit(((char*)ptr) + 1); }
void* funcB(void* ptr) { puts(ptr); }

int main() {
  pthread_create(&tidA,NULL,funcA,"ABC");
  pthread_create(&tidB,NULL,funcB,"XYZ");
  pthread_join(tidA, &result);
  puts(result);
  // pthread_exit(NULL)
}
```

#3 Would your answer change if main also called pthread_exit(NULL) ?

#4 Working with errors: errno, strerror,perror

What is `errno` and when is it set?

What about multiple threads?

When is errno set to zero?

What are the gotchas of using errno?

How can you print out the string message associated with a particular error number?

What are the gotchas of using strerror?

#5 Interrupted system calls. AKA Correctly Handing EINTR

What is EINTR? What does it mean for sem_wait? read? write? sleep?

#6 Restarting interrupted sleep calls
e.g. SIGCHILD interrupted the sleeping parent!

```
01      ssize_t sleep_restart(int seconds) {
02      //unsigned int remain = sleep(seconds)
03
04
```

Correctly using `write (IMPORTANT FOR NETWORKING)`
i) May not send all bytes for slow devices (=network)
ii) May return -1 and errno is EINTR

```
01      ssize_t write_all(int fd, void*buffer, size_t len) {
02      //Can't just call write(fd, buffer,len);
03
04
```

If there's time....

What is IP4?

What is 127.0.0.1?

What is a port?

Can my programs listen on any port?

What is UDP? When is it used?

What is TCP? When is it used?