

## Chapter 8 UART Problem Set

**Exercise 1:** The helper function read is prototyped as:

```
int read(int handle, void * buffer, unsigned int len);
```

where *handle* is 0 for standard in, *buffer* is a pointer to space allocated by open in which characters should be placed and *len* is the number of characters to be placed in the buffer. The value returned is the actual numbers read. Due to timeout conditions the number requested may not equal the number read.

Write a helper read function that tries to reads the U2RXREG and places the *len* number of chars in the location pointed to by *buffer* for *handle* 0. The timeout wait is 200 passes on testing the UART status to see if a character has been received. If a character has been received, decrement *len* and increment the returned value after placing the character in buffer. If no character is received in the timeout period, decrement *len* but do not increment the returned value. Place nothing in the buffer pointed to by *buffer*.

**Exercise 2:** The helper function write is prototyped as:

```
int write(int handle, void * buffer, unsigned int len);
```

where *handle* is 1 for standard out, *buffer* is a pointer to space allocated by open in which characters have been placed and *len* is the number of characters to be taken out of the buffer. The value returned is the actual numbers written to U2TXREG.

Write a helper write function that writes *len* characters to U2TXREG from the buffer pointed to by *buffer* for *handle* 1. There is no timeout but the code must wait until the U2TXREG is empty to transfer the next character.