Module 8
UART interface (Part 2)

termios API

termios is and Unix API for terminal IO. A typical program which talks over serial terminal contains the following:

- open() to open a serial device
- Configuring communication parameters

  tcgetattr() tcsetattr()
  cfgetispeed() cfgetospeed()
  cfsetispeed() cfsetospeed()

- Setting line-control functions

  tcdrain() tcflow() tcflush() tcsendbreak()

- read() and write() for reading/writing data from/to the serial interface
- close() to close the serial device when done

Opening and closing a serial device

- Opening:
  ```
  fd = open("/dev/ttyS0", O_RDWR | O_NOCTTY | O_NDELAY);
  if (fd == -1)
      printf("Failed to open port.\n");
  ```
- Closing:
  ```
  close(fd);
  ```

Example configuration

```
struct termios config;
...
tcgetattr(fd, &config); // get current config
cfmakeraw(&config); // raw serial communication
config.c_cc[VMIN] = 1; // at least 1 char
config.c_cc[VTIME] = 0; // no timeout
cfsetispeed(&config, B9600); // receiver baudrate
cfsetospeed(&config, B9600); // transmitter baudrate
tcsetattr(fd, TCSANOW, &config); // actualize the config
```

More information can be found on
http://man7.org/linux/man-pages/man3/termios.3.html

Example reading/writing

```
unsigned char buffer = 's';
...
while (buffer != 'q')
{
    // loopback
    if (read(fd, &buffer, 1) > 0)
        write(fd, &buffer, 1);
}
```