EMBEDDED SYSTEMS CMPE-453

Department of Computer Engineering

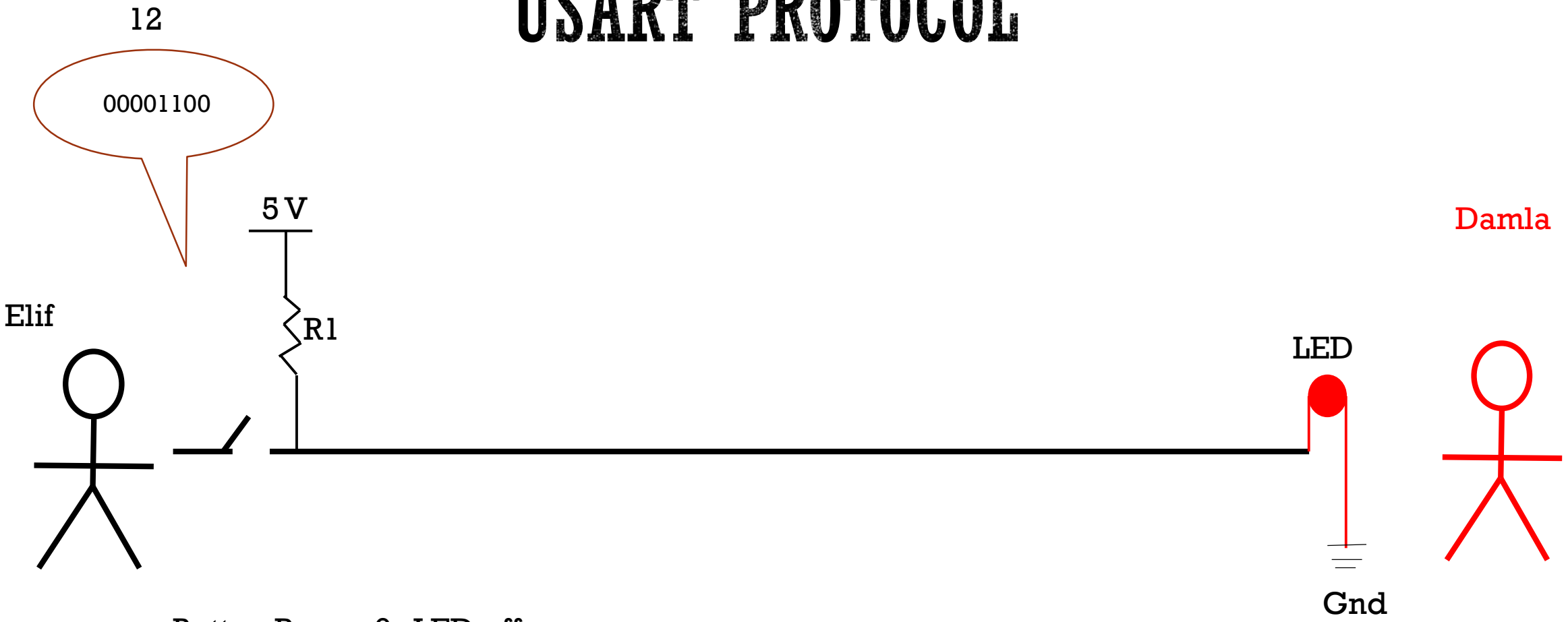
Serial Communication-1

SERIAL COMMUNICATION

- Three protocols
  - USART
  - SPI
  - I2C

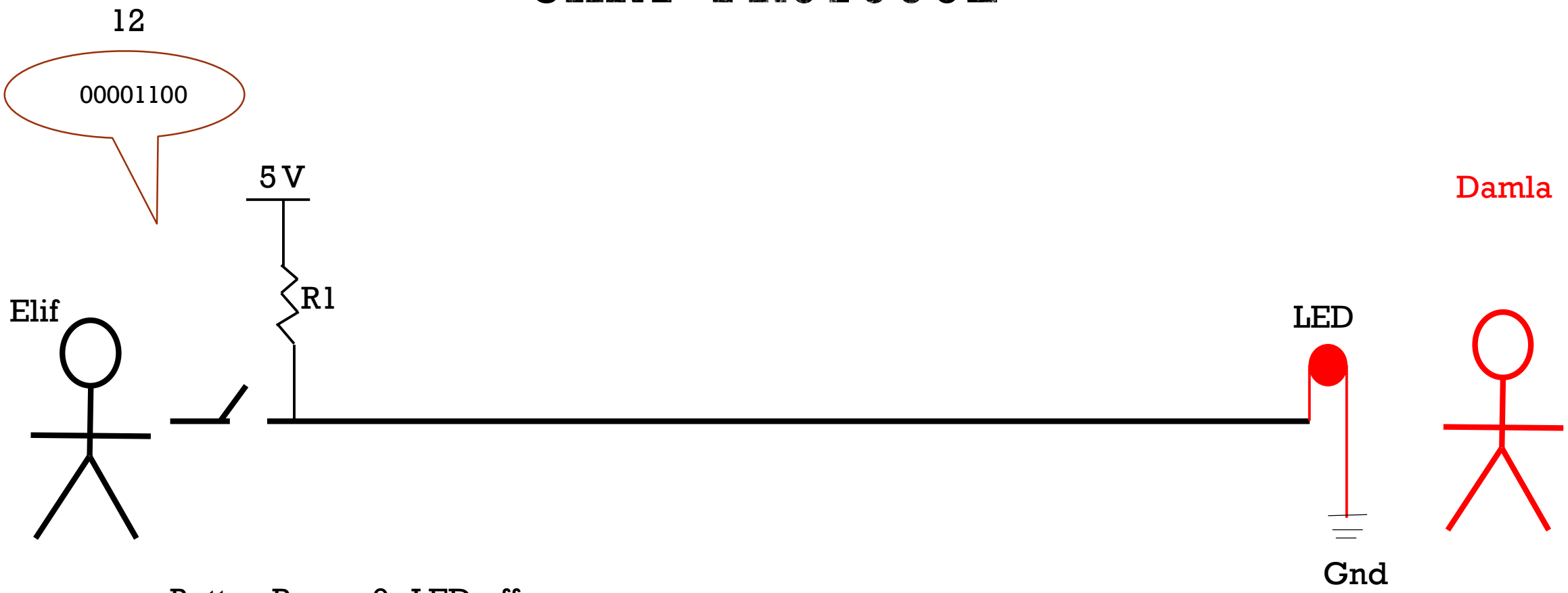
- USART: Simplest way to establish a connection between an AVR microcontroller and a computer (or another microcontroller).

USART PROTOCOL



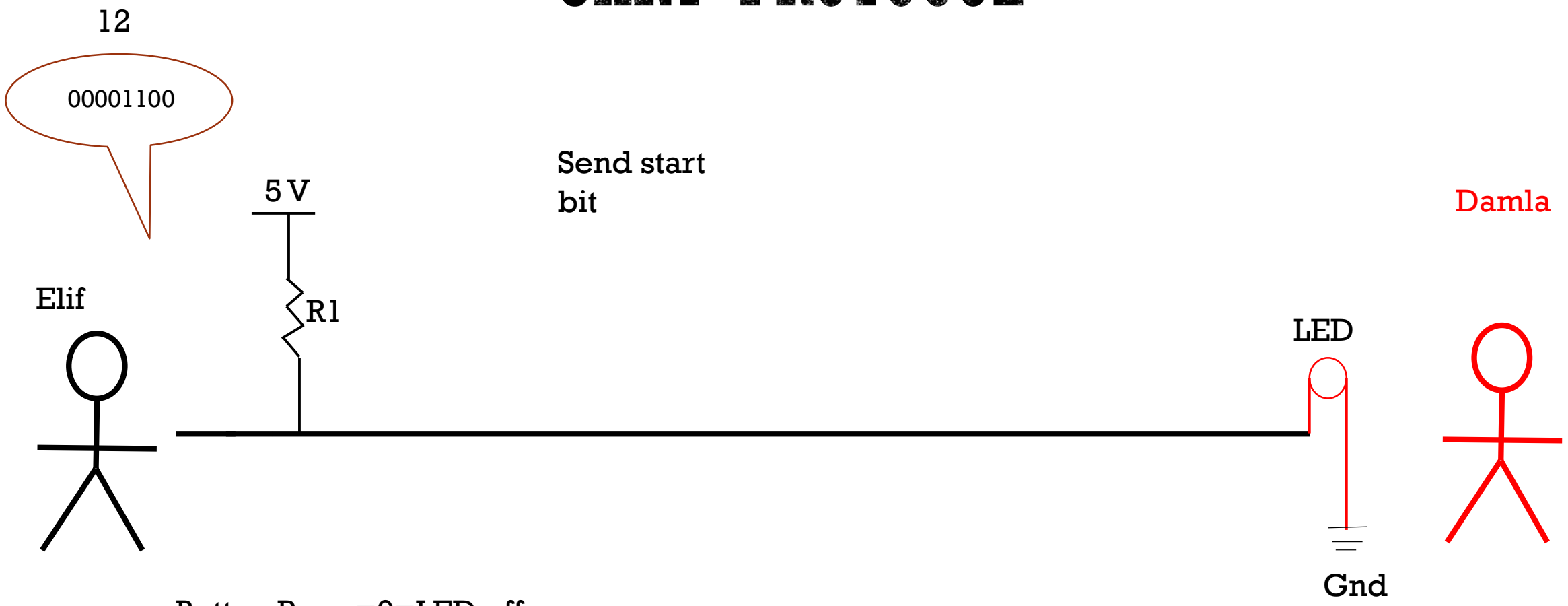
Button Press=0=LED off
No press = 1= LED on
Send LSB first
freq of button press = 1 press/sec
Start-bit = 0
Stop-bit = 1

UART PROTOCOL



Button Press=0=LED off
No press = 1= LED on
Send LSB first
freq of button press = 1 press/sec
Start-bit = 0
Stop-bit = 1

UART PROTOCOL



Button Press=0=LED off
No press = 1= LED on
Send LSB first
freq of button press = 1 press/sec
Start-bit = 0
Stop-bit = 1

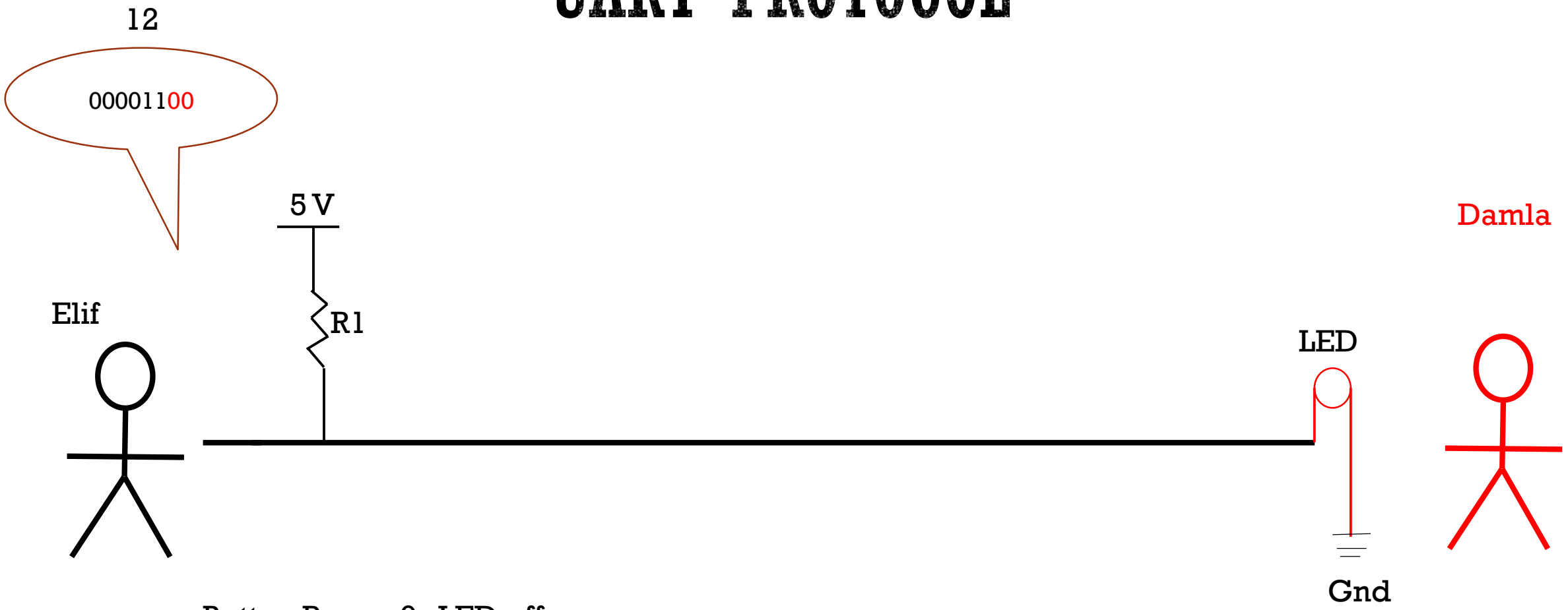
Rcvd-bits = 0

UART PROTOCOL

Button Press=0=LED off
No press = 1= LED on
Send LSB first
freq of button press = 1 press/sec
Start-bit = 0
Stop-bit = 1

Rcvd-bits = 00

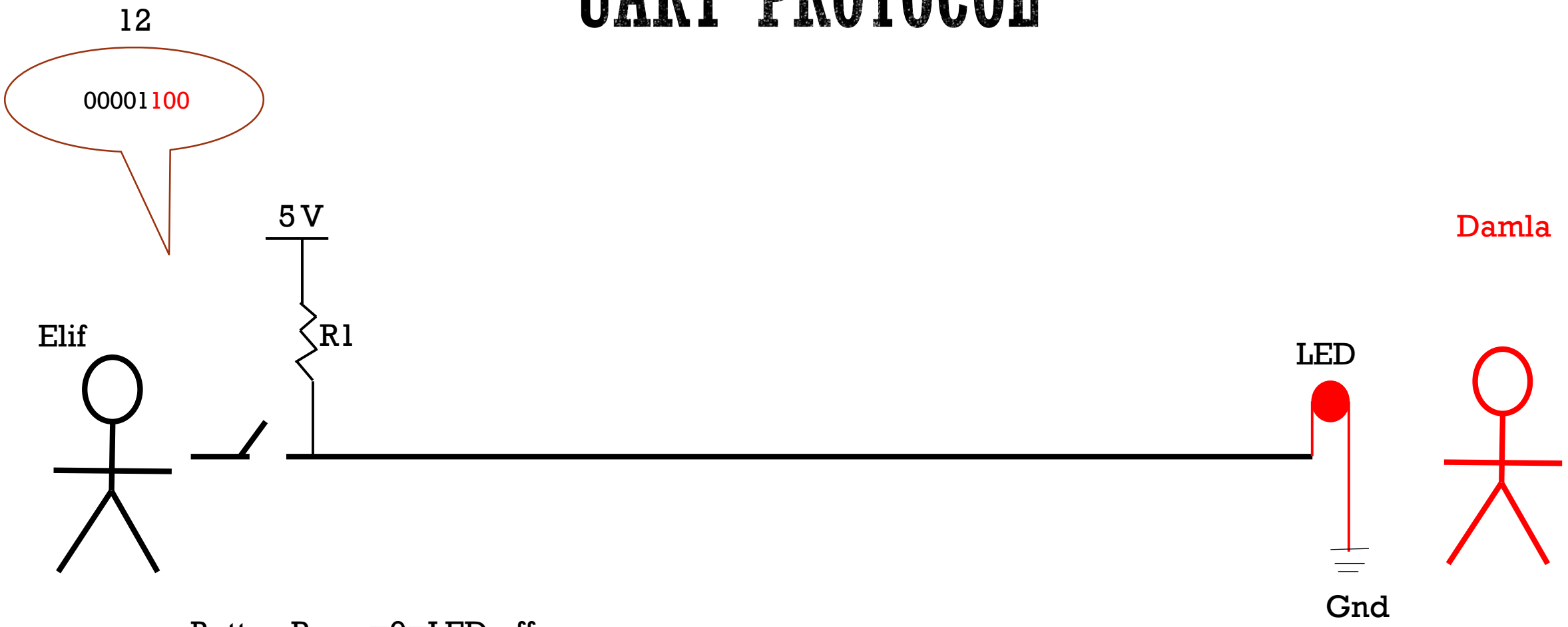
UART PROTOCOL



Button Press=0=LED off
No press = 1= LED on
Send LSB first
freq of button press = 1 press/sec
Start-bit = 0
Stop-bit = 1

Rcvd-bits = 000

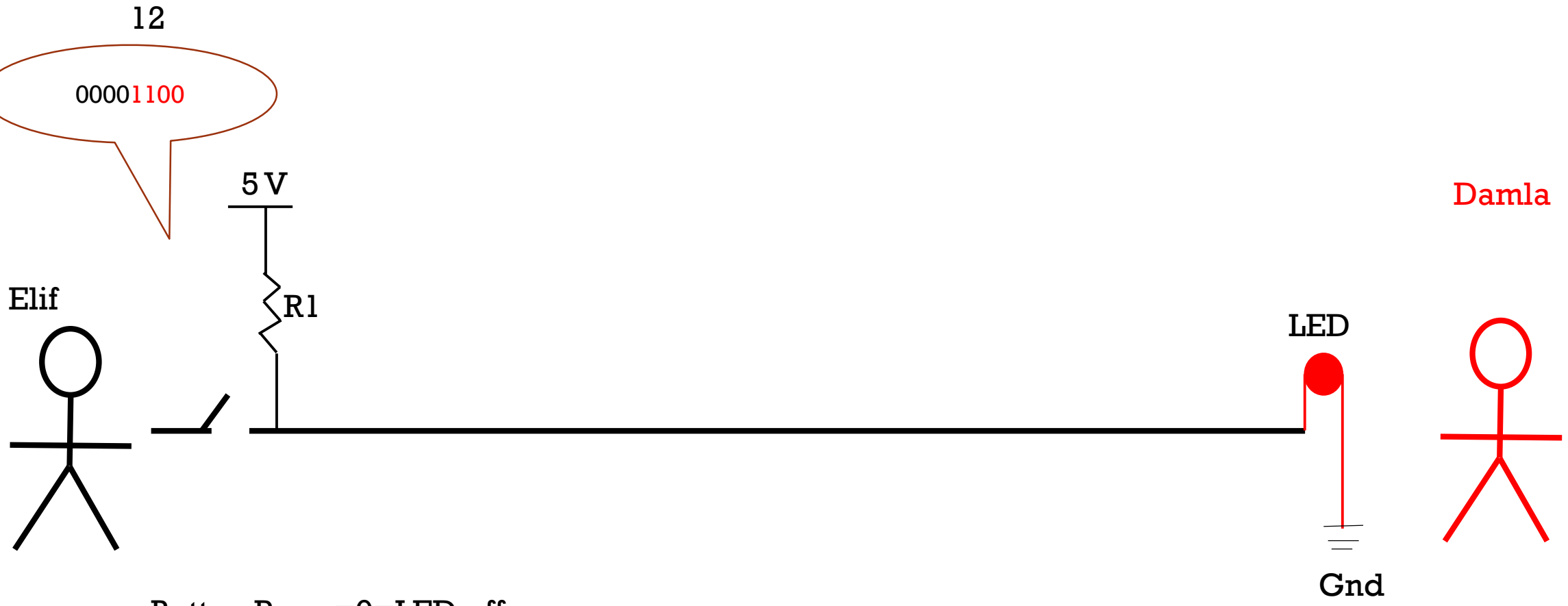
UART PROTOCOL



Button Press=0=LED off
No press = 1= LED on
Send LSB first
freq of button press = 1 press/sec
Start-bit = 0
Stop-bit = 1

Rcvd-bits = 0001

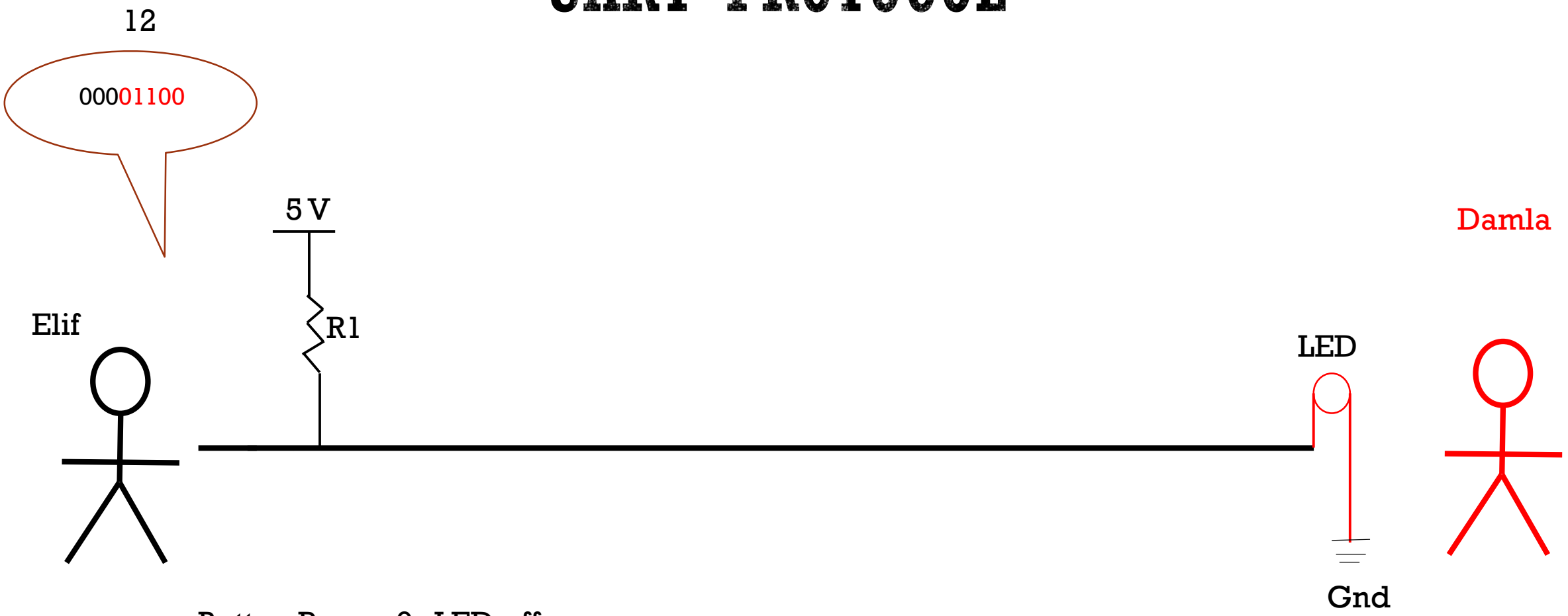
UART PROTOCOL



Button Press=0=LED off
No press = 1= LED on
Send LSB first
freq of button press = 1 press/sec
Start-bit = 0
Stop-bit = 1

Rcvd-bits = 00011

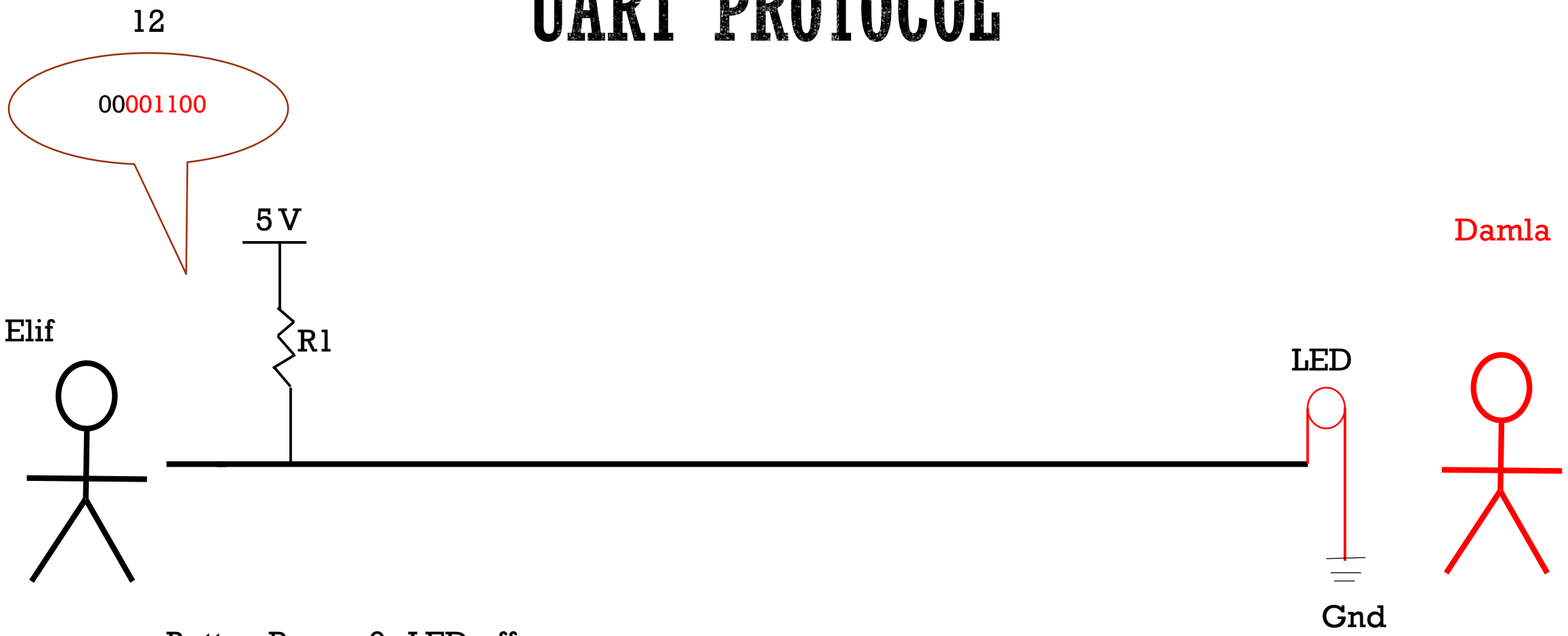
UART PROTOCOL



Button Press=0=LED off
No press = 1= LED on
Send LSB first
freq of button press = 1 press/sec
Start-bit = 0
Stop-bit = 1

Rcvd-bits = 000110

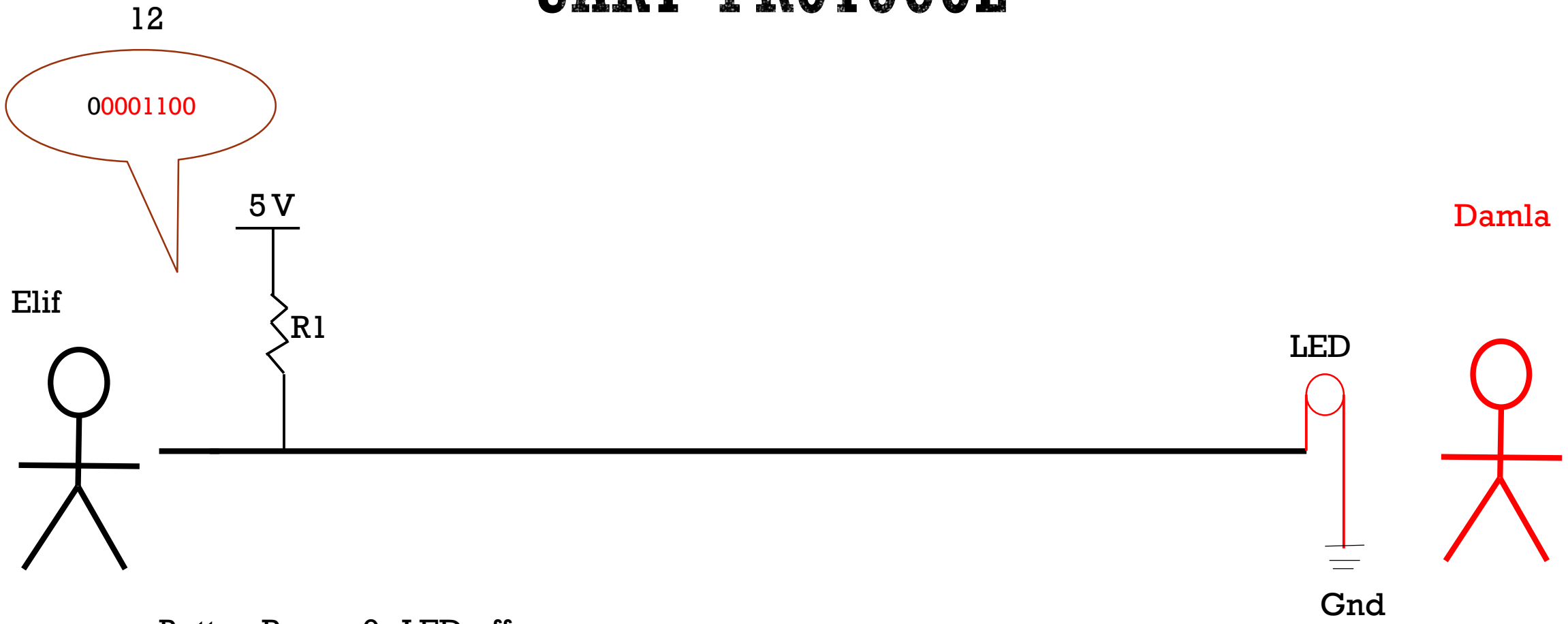
UART PROTOCOL



Button Press=0=LED off
No press = 1= LED on
Send LSB first
freq of button press = 1 press/sec
Start-bit = 0
Stop-bit = 1

Rcvd-bits = 0001100

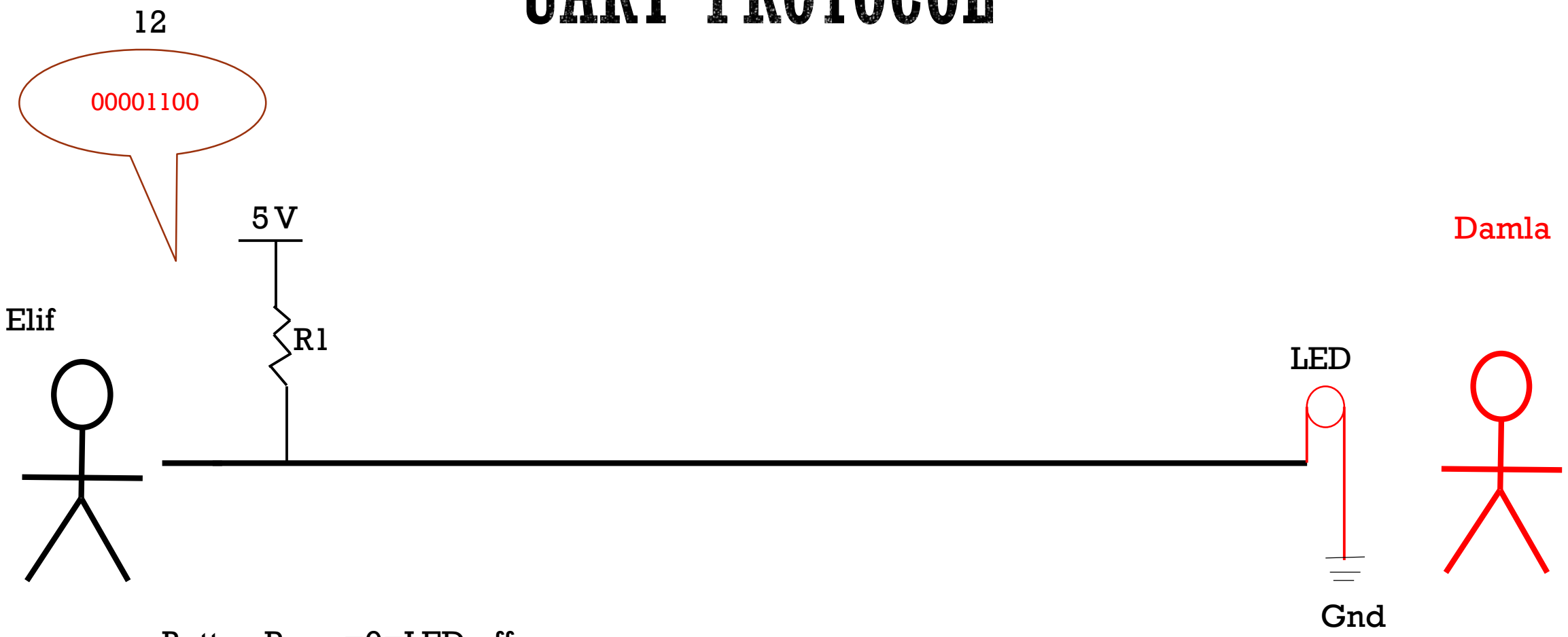
UART PROTOCOL



Button Press=0=LED off
No press = 1= LED on
Send LSB first
freq of button press = 1 press/sec
Start-bit = 0
Stop-bit = 1

Rcvd-bits = 00011000

UART PROTOCOL



Button Press=0=LED off
No press = 1= LED on
Send LSB first
freq of button press = 1 press/sec
Start-bit = 0
Stop-bit = 1

Rcvd-bits = 000110000

UART PROTOCOL

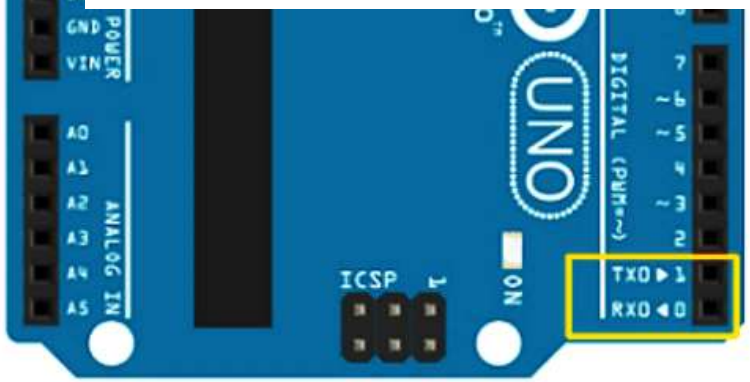
Button Press=0=LED off
No press = 1= LED on
Send LSB first
freq of button press = 1 press/sec
Start-bit = 0
Stop-bit = 1

Rcvd-bits = 0001100001

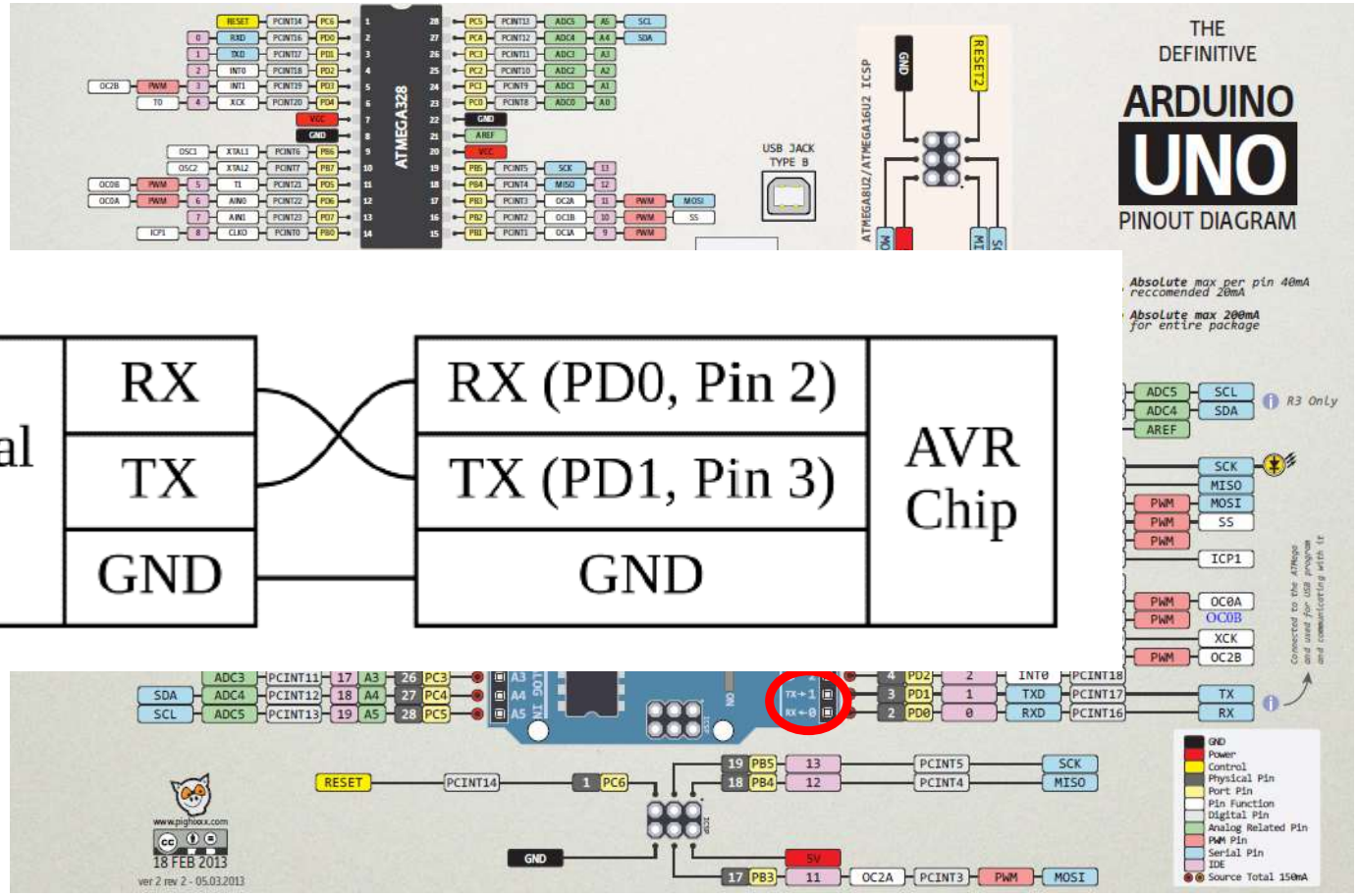
Flip the bits = 1000011000

Data-bits = 00001100 = 12

UART & ARDUINO



USART Pins



UART & ARDUINO