```c
/*
 * USART3_loopback.c
 *
 * Created: 3/25/2021 5:52:08 PM
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 */


#define BAUD_RATE 9600UL
#define F_CPU 4000000UL

#include <avr/io.h>
#include <util/delay.h>
#include <avr/interrupt.h>

char c;

int main(void)
{

    PORTB.DIRSET = PIN0_bm;
                                        // enable output on PB0.
    PORTB.DIRCLR = PIN1_bm;
                                        // enable intput on PB1.

    USART3.BAUD = BAUD_RATE;
                                        // set baud rate.
    USART3.CTRLC = USART_CMODE_ASYNCHRONOUS_gc | USART_PMODE_DISABLED_gc |
      USART_SBMODE_1BIT_gc | USART_CHSIZE_8BIT_gc;    // Asynchronous mode, no parity
      bits, single stop bit, 8 bits data.
    USART3.CTRLB = USART_TXEN_bm | USART_RXEN_bm;
                                        // enable transmission, enable receiving.
    USART3.CTRLA = USART_RXCIE_bm;
                                        // enable RX complete interrupt.

    sei();

    c = 'A';

    while ((USART3.STATUS & USART_DREIF_bm) != USART_DREIF_bm){}
                                        // wait till buffer is empty.
    USART3.TXDATAL = c;
                                        // transmit c

    while (1)
    {
    }
}

ISR (USART3_RXC_vect) {
    if ((USART3.STATUS & USART_RXCIF_bm) == USART_RXCIF_bm) {
        if (USART3.RXDATAH != 0x00) return;
```

```c
        c = USART3.RXDATAL;

        if (c >= 'A' && c <= 'Z') {
            while ((USART3.STATUS & USART_DREIF_bm) != USART_DREIF_bm){}
                                            // wait till buffer is empty.
            USART3.TXDATAL = c + 20;
                                            // send lowercase character.
        } else if (c >= 'a' && c < 'z') {
            while ((USART3.STATUS & USART_DREIF_bm) != USART_DREIF_bm){}
                                            // wait till buffer is empty.
            USART3.TXDATAL = c - 19;
                                            // send next uppercase character.
        } else if (c == 'z') {
            while ((USART3.STATUS & USART_DREIF_bm) != USART_DREIF_bm){}
                                            // wait till buffer is empty.
            USART3.TXDATAL = 'A';
                                            // send 'A'
        }
    }
}
```