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285 Lab 10

Code:

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;Lab 10
;---------------- Lab 10 Multi-Byte Key based symmetric XOR encryption ----------------
;variable and constant definitions
keyBytesRAMaddress EQU 0x40 ; symbolic constant for base address of
; encryption key in RAM
keyLength EQU 0x30 ; variable to track length of key
keyvalIndex EQU 0xe0 ; variable to index the keyval constant array
; keyvalIndex is also an alias for accumulator
;begin section from lab 9
;vvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvv
jmp main ;jump past interrupt vector table
org 0x0030 ;put main program at rom location 0x0030
main:
;---------------- Initialization/configuration ----------------;
;keyval variable no longer used
; mov keyval, #0x23 ;load the keyval variable with encryption key
mov tmod, #0x20 ;config timer 1 mode 2
mov scon, #0x50 ;config serial 8-data, 1 start, 1 stop, no parity
mov th1, #0xFD ;9600 baud
setb tr1 ;start timer 1 to enable serial communication
;end section from lab 9
;^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^
;In the following section load the key bytes from ROM into RAM
mov r0, #keyBytesRAMaddress ;initialize RAM pointer
mov dptr, #keyvals2 ;initialize ROM pointer
mov keyvalIndex, #0x00 ;initialize keyvalIndex
LoadKey:
push keyvalIndex ;preserve keyvalIndex variable
movc a,@a+dptr;load byte of key from ROM
cjne a, #0x00, notNull ;check for null terminating character
jmp LoadDone ;if null is found, enter main_loop
notNull:
mov @r0, a ;put byte of key into ram
pop keyvalIndex;restore keyvalIndex variable
inc keyvalIndex;increment keyvalIndex
inc r0;increment RAM pointer
jmp LoadKey;continue the loop
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LoadDone:
mov @r0, #0x00 ;append null char to string
mov r0, #keyBytesRAMaddress;re-initialize RAM pointer
;---------------- END of Initialization/configuration ----------------;
;begin section from lab 9
;vvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvv
mainloop:
jnb ri, $ ;wait to receive a char
call getchar ;char received, get it!
; cjne a, #0x00, encrypt ;check for null character in string
cjne a, #0x00, checkKeyVal ;check for null character in string
jmp terminate ;terminate program if null character is recieved
;end section from lab 9
;^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^
checkKeyVal:
cjne @r0, #0x00, Encrypt;go to Encrypt if keyVal is not null
mov r0, #keyBytesRAMaddress ;re-initialize RAM pointer
;begin section from lab 9
;vvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvv
Encrypt:
xrl a, @r0 ;encrypt the character contained in the accumulator
call writechar ;write the encrypted character
inc R0          ;increment ram pointer
jmp mainloop ;jump to mainloop
terminate:
mov a, #0x00 ;load null character into accumulator
call writechar ;append the null character to text output
sjmp $ ;halt
;---------- getchar ----------;
;subroutine receives nothing before it is called
;writes the character to the serial console
;returns a byte in the accumulator
getchar:
mov a, sbuf ;get serial data (char)
clr ri ;acknowledge data received
ret ;return from subroutine call
;---------- writechar ----------;
;receives byte or character
;reads a character that has been received serially
;returns the c
writechar:
mov sbuf, a ;send data (char) serially
jnb ti, $ ;wait until data is sent
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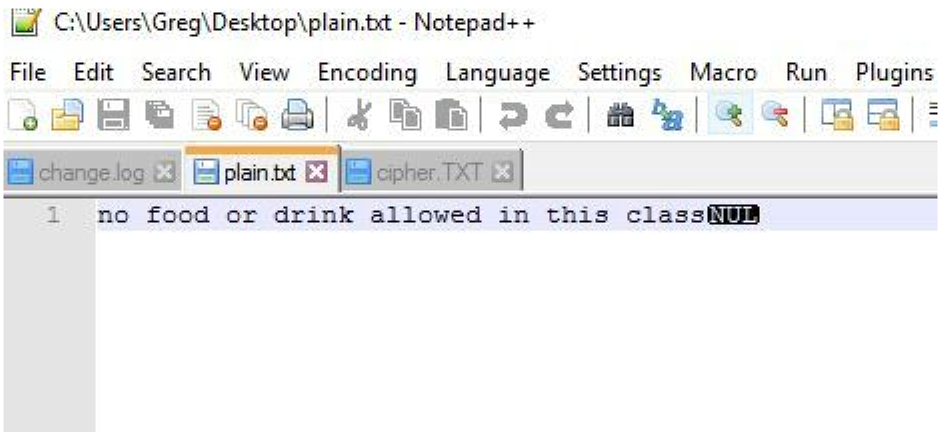
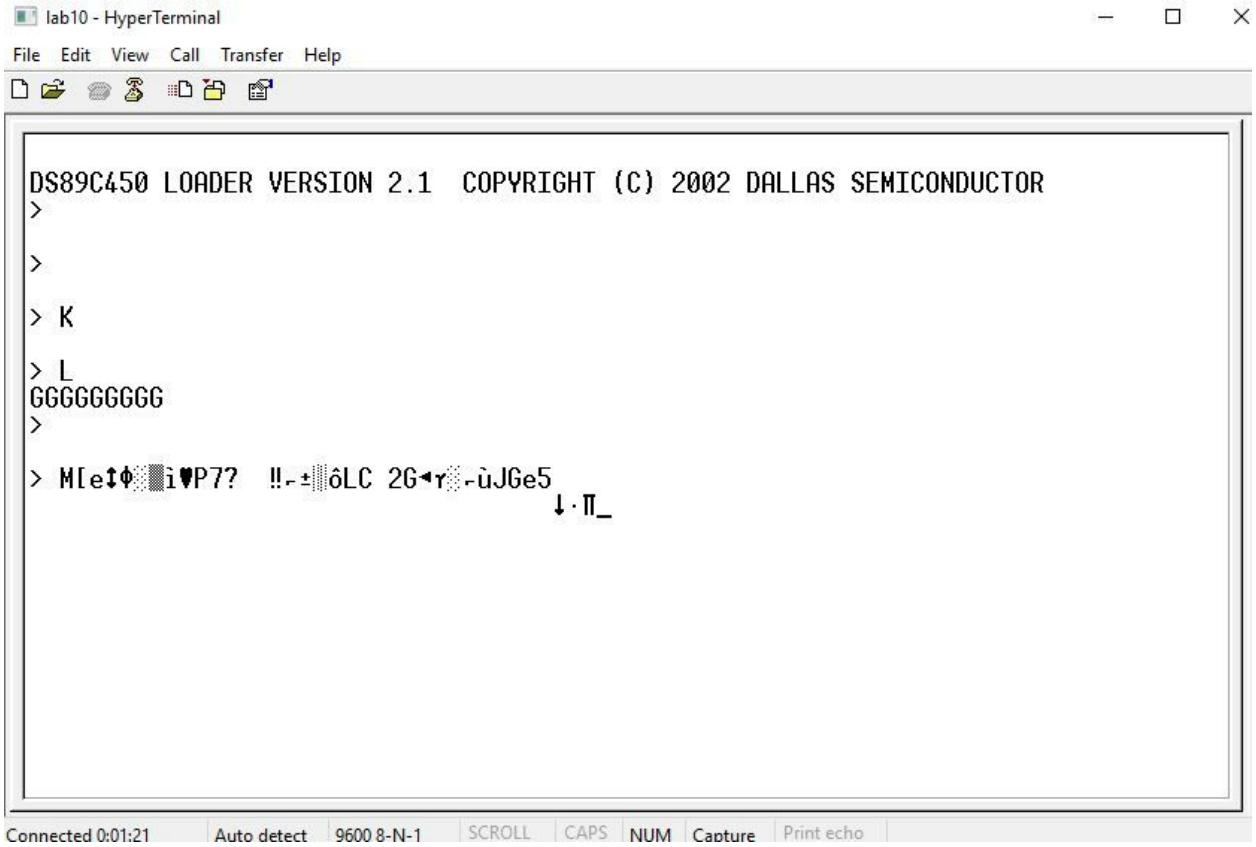
clr ti ;acknowledge data has been sent
ret ;return from subroutine call
;end section from lab 9
;^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^
;multibyte keys are defined below, only one will be used at a time
org 0x200
keyvals: db '12345678',0
keyvals2: db 0x23, 0x34, 0x45, 0x56, 0x67, 0x78,0x89,0x90, 0xDD, 0xFF, 0x00
end
```

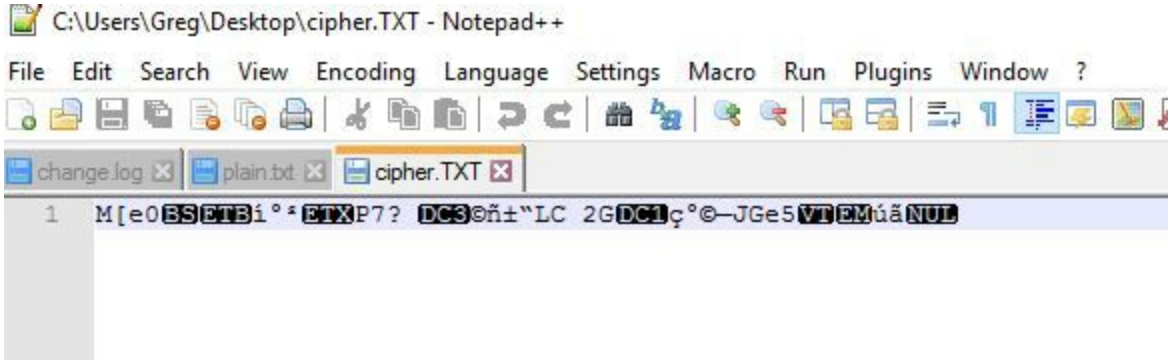
Plain text file with NUL character



Encrypted message displayed in Hyperterminal



Cipher text file with NUL character



Manual verification: