

NCSU - ECE 306- Exam 2 – March 27, 2003 - Solution

Name: _____ **KEY** _____ User ID _____ **KEY** _____

Question	1-15	16-22	23-Algo	23-Code	Total
Score	45/45	60/60	15/15	30/30	150/150

3 points for each 1-15:

- 1 b
- 2 e
- 3 b
- 4 c
- 5 b
- 6 b
- 7 a
- 8 b
- 9 b
- 10 d
- 11 b
- 12 e
- 13 c
- 14 c
- 15 e

2 points for each in 16:

- 16 1. c
- 2. a
- 3. e
- 4. d
- 5. b

1 point for each in 17:

- 17. 2,7,10,5,8,1,4,9,6,3

5 points for each 18 & 19:

- 18. Pseudo-code is a written description of the functionality for a particular software module. It should include the name of the module/subroutine, author, date, high-level description of functionality, and the actual steps.
- 19. The use of a simulator is not great for embedded program development due to the need to interface with I/O devices.

10 points for each 20 - 22:

- 20. Hardware interrupts are asynchronous; they are not related to code that is currently executing on the processor. Software interrupts are a byproduct of code, which is executing on the processor.
- 21. There were two errors in the code segment:
 - a. (5 pts) pd3_1 should have been pd3_0.
 - b. (5 pts) The `#pragma INTERRUPT timer_isr` line was missing for the timer isr.
- 22. The segment of code should resemble something of this nature:

```
char name[] = "My Name\0"; //my name
int j; //loop counter
```

```
//for each character in the name, display
for(j=0; name[j] != NULL; j++)
    disp_dataw(name[j]);
```

23. Algorithm: (15 points)

```
Transmit handshake string "Ready\n" using uart1, one character at a time
Begin waiting for reception of 'R'
    If Sw2 is pressed, turn off LED and return 1
    If R is received, break receive loop
Transmit input string using uart1, one character at a time.
```

Turn on LED and return 0 when complete.

Code: (30 points)

```
//Method: SendInfo
//Purpose: This function is used to transmit
//         the input string, pointed to by
//         str, via the RS-232 port.
//
//Parameters: char *str - pointer to string to be transmitted
//Outputs: Returns 0 if transmission is successful,
//         1 otherwise
//Assumptions: The string pointed to by str must be NULL terminated.

int SendInfo(char* str) {
    char input = 'x'; //storage for input character - initialize to garbage
    char hndsk[] = "Ready?\n"; //"handshake" message

    //transmit the handshake string char by char
    //until the NULL character is found
    for(i = 0;hndsk[i] != NULL;i++) {
        ultbl = hndsk[i]; //send a character
        while(!ti_ulcl); //wait for the transmission to complete
    }//end for loop

    //wait for an 'R' to be received or switch 2 to be pressed
    while( input != 'R') {
        while(!rl_ulcl) { //wait for a character
            //check to see if the switch is being pressed.
            //If this is the case, exit
            if(!s_s2) {
                LED_G = LED_OFF;
                return 1;
            }//end if
        }//end while loop
        input = rltbl; //get the character
    }//end while loop

    //transmit the string character by character
    //until the NULL character is found
    for(i = 0;str[i] != NULL;i++) {
        ultbl = str[i]; //send a character
        while(!ti_ulcl); //wait for the transmission to complete
    } //end for loop
    LED_G = LED_ON; //turn on the LED

    return 0;
} //end SendInfo
```

Scoring:

- - 5 pts for coding standard (comments, using correct function name)
- - 5 pts for coding standard (comments, using correct function name)
- - 5 pts. for usage of uart/LED
- - 5 pts. for aborting on S2 press
- - 5 pts. for waiting for 'R' and not breaking loop on any other character
- - 5 pts. for handling of input string (i.e. transmitting until NULL character, etc)
- - 5 pts. for transmitting handshake string