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Primary Github address: https://github.com/prachi173/da\_sp18

Directory: [https://github.com/prachi173/da\_sp18/tree/master/Design Assignments/DA3A](https://github.com/prachi173/da_sp18/tree/master/Design%20Assignments/DA3A)

Youtube Link: https://www.youtube.com/watch?v=mW11FVJbRUA&frags=pl%2Cwn

The following are required for successful completion of the design assignment:

* 1. a. AVR C code that has been compiled and working.
  2. b. The C code should be well documented with explanation of every instruction.
  3. c. A word document that contains the flow chart of the assembly code along with the snapshots of the schematics, components connected on the breadboard and screen shoots.

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| 1. /\* 2. \* DA3A.c 3. \* 4. \* Created: 3/27/2019 9:37:20 PM 5. \* Author : patel 6. \*/ 7. #include <avr/io.h> 8. #include <util/delay.h> 9. #include <stdio.h> 10. #include <avr/interrupt.h> 11. #define F\_CPU 8000000UL 12. #define BAUDRATE 9600 13. #define BAUD\_PRESCALLER (((F\_CPU / (BAUDRATE \* 16UL)))-1) 14. void USART\_init(unsigned int ubrr); 15. void USART\_tx\_string(char \*data); 16. volatile int OVFCount; //declare global overflow counter 17. char outs[80]; //char limit 18. int x; //integer 19. float n; //floating number 20. char str[] = "hello world!"; //string 21. char empty[] = " "; //empty space 22. int main(void) 23. { 24. OVFCount = 0; //setup CTC timer 25. OCR0A = 240; 26. TCCR0A |= (1<<WGM01); 27. DDRC = 0X00; 28. PORTC = 0XFF; 29. DDRB = 0xFF; 30. TIMSK0 |= (1<<OCIE2A); 31. TCCR0B |= (1<<CS00) | (1<<CS02); 32. sei(); //interrupt enable 33. USART\_init(BAUD\_PRESCALLER); //initialize the USART 34. \_delay\_ms(250); 35. USART\_tx\_string("\r\nConnected!\r\n"); //we're alive! 37. while (1) 38. { 39. while(OVFCount >= 33){ //when 1 second 40. USART\_tx\_string(str); //print string 41. USART\_tx\_string(empty); //print empty 42. x = rand(); //genrate random integer 43. snprintf(outs,sizeof(outs),"%2d\r\n",x); //printing number 44. USART\_tx\_string(outs); 45. USART\_tx\_string(empty); 46. n = 1.1234; //the floating number 47. dtostrf(n, 4, 4, outs); //assign decimal limits 48. USART\_tx\_string(outs); //print it 49. USART\_tx\_string(empty); 50. OVFCount = 0; //reset counter 51. } 53. } 54. } 55. void USART\_init(unsigned int ubrr){ 56. //initializing USART RS-232 using the given code from professor 57. UBRR0H = (unsigned char)(ubrr>>8); 58. UBRR0L = (unsigned char)ubrr; 59. UCSR0B = (1 << TXEN0); 61. UCSR0C = (3 << UCSZ00); 62. } 63. void USART\_tx\_string(char \*data){ 64. //send a string to the RS-232 65. while ((\*data != '\0')){ 66. while(!(UCSR0A & (1 << UDRE0))); 67. UDR0 = \*data; 68. data++; 69. } 70. } 71. ISR(TIMER0\_COMPA\_vect) //external timer initializing 72. { 73. OVFCount++; 74. } |

**Assembled board with AVR programmer and USART RC-232**

A picture containing table, indoor

Description automatically generated

**Student Academic Misconduct Policy**

<http://studentconduct.unlv.edu/misconduct/policy.html>

“This assignment submission is my own, original work”.

Prachi Patel