

Project outline

MICROCONTROLLER AND EMBEDDED SYSTEM DEVELOPMENT

Day 1:

- * Introduction to microcontrollers and FPGAs - architectures
- * Logic electronics and FPGA – AND, OR, XOR and NOT gates and their derivatives, comparator, decoder, counter, multiplexer, demultiplexer, flip flop.
- * Instruction set
- * Titbits of embedded system dev.
- 1) Subroutines and nested subroutines
- 2) stack, push, pop.
- 3) stack overflow and underflow
- 4) flow chart
- 5) ways of putting data into the microcontroller – interrupt and polling
- 6) flags and interrupts
- 7) table read
- 8) connecting buttons to the microcontrollers
- 9) more on flags and table read using 7 segment display.
- * practice project – digital clock

Day 2:

- * Buffers, arrays and pointers
- * Matrix keypad design – numeric keypad
- * Matrix keypad expansion using decoder – alpha numeric keypad
- * Practice project – code lock access control device

Day 3:

- * ASCII character set
- * Design of displays for matrix LED and LCD
- * Practice project – LED signage (moving message display)

Day 4:

- * Multitasking
- * Real time operating system rtos
- * Practice project – LCD display with keypad

Day 5:

- * DACs, ADCs
- * Sensors
- * Pulse width modulation (pwm), R2R ladder.
- * Practice project1 – digital brightness control using pwm.
- * practice project2 – temperature alarm device