INTERNATIONAL INSTITUTE OF INFORMATION TECHNOLOGY
HYDERABAD

DIGITAL SYSTEMS AND MICROCONTROLLERS

Experiment - 8 **Monsoon 2018**

Interrupt and Serial display

An interrupt is a process of forcing a microcontroller to temporarily suspend the current job and perform a higher priority task. Once the new request is served, the microcontroller resumes the original task. Interrupts are powerful tools in embedded system design, and special cares must be taken while implementing them. In this experiment you will learn how to use external interrupt of Atmega328p. Please read about interrupt priority that is which sort of interrupt takes precedence.

Serial is used for communication between the Arduino board and a computer or other devices. All Arduino boards have at least one serial port (also known as a UART or USART). It communicates on digital pins 0 (RX) and 1 (TX) as well as with the computer via USB. Thus, if you use these functions, you cannot also use pin 0 (PD0) and 1 (PD1) for digital input or output.

Atmega328p has 2 external interrupt INT0 (PD2), INT1 (PD3). We will be using INT0 to make a 4 bit counter which will take clock input from INT0 and display the counter value on Serial Monitor. The main problem you will face is bouncing of push button switch. So when you press the push button switch once counter value will increase by one or more than one. Read about analog debouncing circuit and come prepared with a circuit. Generally used header files for avr are directly included in Arduino ISP and need not be imported.

-> Header file for using interrupt is <avr/interrupt.h>
-> Registers: SREG (I bit), MCUCR, MCUCSR (ISE2 bit), GICR (INT2 bit)

Pseudo code

```
int main(void)
{
//initialize Serial Monitor & INT0
while (1)
{
//print counter value
}
}
```

ISR (INT2_vect)
{
//code for what interrupt should do
}
Command to be used for Serial & Serial Monitor:
Serial.begin(9600); // initialize Serial port with 9600 baud rate.
Serial.print(“”); // Output to Serial Monitor
Variable = Serial.read(); // Input from Serial Monitor
See online Serial library for reference.

Components: Push Button Switch (1),LED (1),330 ohm resistance (1), 10 Kohm Resistance(2),200 nF Capacitor (1)

Debouncing circuit: