Task 2

Diagram picture

In the figure there is written a general form of port pins for all AVR digital I/O ports. All of them have their individual selectable pull-up resistor with a supply-voltage invariant resistance, few protection diodes to both Vcc and Ground. There are three I/O memory address locations for each port: Data Register – PORTxn (Pxn), Data Direction Register – DDRx and Port Input Pins – PINx. A lower case “x” represents the port number, and a lower case “n” represents the bit number.

Example:

If we will define that PORTB (PORT[x] form) will handle LEDs, that means that each pin of port B (PB0, PB1, PB2, PB3, PB4, PB5, PB6, PB7) have each own Led accordingly LED port (LED0, LED1, LED2, LED3, LED4, LED5, LED6, LED7). If we setted SWITCHES to PORTA (PORT[x] form), that means that (PA0, PA1, PA2, PA3, PA4, PA5, PA6, PA7) configured to read a signal from switches (SW0, SW1, SW2, SW3, SW4, SW5, SW6, SW7) and write them to A register. And after that if we want to switch on the led with the same number as a number of pressed button, we have to read the data from PINA (PINx form) and set the value to the Data Register of Switches (PORTB).

Or in some cases we can select a necessary bit just calling that in this form:

where we call the bit number 2 in PORTB Data Register.

Port Input Pins I/O location is only for reading, two other locations can be used for reading/writing.

However, writing a logic one to a bit in the PINx Register, will result in a toggle in the corresponding bit in the Data Register. In addition, the Pull-up Disable – PUD bit in MCUCR disables the pull-up function for all pins in all ports when set.