# Assignment 2

**Due October 11, 14:59**

## 1.

```
#define PBIN (volatile unsigned char *) 0xFFFFFFF3
#define PBDIR (volatile unsigned char *) 0xFFFFFFF5
#define CNTM (volatile unsigned int *) 0xFFFFFFD0
#define CTCON (volatile unsigned char *) 0xFFFFFFD8
#define CTSTAT (volatile unsigned char *) 0xFFFFFFD9
#define IVECT (volatile unsigned int *) (0x20)
/* Define all neccesarry Ports Afresses */
interrupt void intserv();
unsigned char digit = 0;                    /* Digit to be displayed */


unsigned int inc_flag = 0;                  /*Flag for incrementing */
int main() {
*PBDIR = 0xF0;                              /* Set Port B direction 1111 X000 -> F0 */
*CTCON = 0x02;                              /* Stop Timer */
*CNTM = 100000000;                          /* Initialize Timer */
*IVECT = (unsigned int *) &intserv;         /* Set interrupt vector */
asm("MoveControl PSR,#0x40");               /* CPU responds to IRQ */
*CTCON = 0x11;                              /* Enable Timer interrupts and start counting */

while (1) {

while ((*PBIN & 0x01) != 0 |(*PBIN & 0x02) != 0 ) ;         /* Wait until D or E is pressed */
if(     (*PBIN & 0x01) == 0    ){                           /*  D is pressed */
inc_flag = 0;
}else if((*PBIN & 0x02) == 0){                              /*  E is pressed */
inc_flag = 1;
}else {
inc_flag = 0;
}

}
exit(0);
}
interrupt void intserv() {
*CTSTAT = 0x0;                              /* Clear "reached 0" flag */
if  (if inc_flag == 1){                     /* Only increment when the inc flag was is set ->
                                            E was pressed*/
digit = ((digit +1) % 10 + 10) % 10;
}
}
```

## 2.

```
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#define CTSTAT (volatile unsigned char *) 0xFFFFFFD9
#define IVECT (volatile unsigned int *) (0x20)
/* Define all neccesarry Ports Afresses */
interrupt void intserv();
unsigned char digit = 0;                    /* Digit to be displayed */


unsigned int inc_flag = 0;                  /*Flag for incrementing */
int main() {
               *PBDIR = 0xF0;               /* Set Port B direction 1111 X000 -> F0 */
               *CTCON = 0x02;               /* Stop Timer */
               *SCONT = 0x10;               /* Enable RBUF interrupts */
               *IVECT = (unsigned int *) &intserv;          /* Set interrupt vector */
               asm("MoveControl PSR,#0x40");                /* CPU responds to IRQ */


while (1) {

        *CNTM = 100000000;                  /* Initialize Timer */
        *CTSTAT = 0x0;                      /* Clear "reached 0" flag */
        *CTCON = 0x1;                       /* Start countdown */
        while ((*CTSTAT & 0x1) == 0);       /* Wait until 0 is reached */
        *CTCON = 0x2;                       /* Stop countdown */
        if(inc_flag == 1){
        digit = (digit + 1) % 10 ;
        *PBOUT = (digit << 4);               /* Update Port B (Digit incrementing) */
        }

}
exit(0);
}
interrupt void intserv() {
*PBOUT = *RBUF;
if ( *PBIN & 0x01) == 0)){                  /*D pressed  */
        inc_flag = 0;                       /* disable incremention */
}else if (*PBIN & 0x02) == 0){              /*D pressed  */
        inc_flag = 1;                       /* enable incremention */
}else{
inc_flag =0 ;
}
}
```