GP10 INTERFACING USING MSP432 LLED-SWITCH & SEVEN SEGMENT)

LAB TITLE AND CODE: EMBEDDED COMPUTING LAB (19CLE 283)
EXPERIMENT NUMBER: 2
DATE: 19/04/2022 (TUESOAY)

* AIM:

To interface external peripherals, LED and Seven Segment, using MSP432 microcontroller.

* SOFTWARE REQUIRED :

Keil pvision 5 1DE (32 bit) Publisher- ARM Hd

Versian - 5.30.0.0

* ALGORITHM (LED-SWITCH): - ()

1 Configure functionality of PII and P2.0 as simple GPIO Port.

De Configure direction of PI. 1 as input pin.

3 Enable PI I pull resistar; Pull up/down is elected by Px >00T register.

(3) Configure direction of P2.0 as autput pin.

1 Use switch I to control the RTD- LTD.

1) If not pressed, witch OFF RED-LED connected to P2.0

Else, switch ON RED- LED connected to P2.0

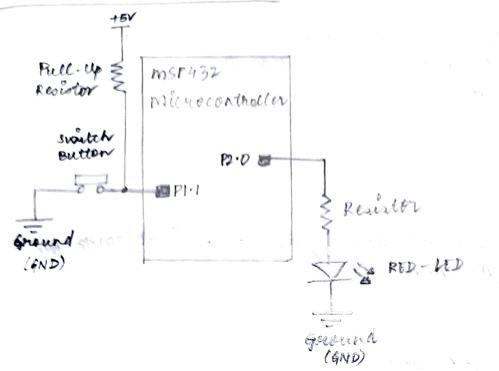
* SOURCE COOF (LED-SWITCH):

p2-5.c Read a switch and white it to the CED.

This program neads an external switch connected to PI-1 and whites the value to the RED-LED on P2-0. When switch is pressed, it connects PI-1 to ground and bit I of PIIN heads as '0'.

PI.I pin pull-up is enabled so that it is high when the switch! not pressed and bit I of PIIN reads as 'i'. The HEDs are high active (a 'i' turns ON the HED).

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Read a smitch and white it to the HED.

```
Tested with Keil 5.20 and MSP432 Device Family Pack V2.2-0 on
  XMS432P401R Rev C.
*/
#include "msp. h"
11 main Function:
int main (wid)
 PI -> SEZI &= ~2; // Configure PI.I as simple GPIO Port
 PI -> SELO & = M;
 PI - DIR & = 17; Il configure direction of PI-1 as input pin
 PI -> REN 1=2;
                  11 PI.I pull resistor enabled.
 PI -> OUT 1= 2;
                   Il Pull up I down is selected by Px - OUT hegister
 P2 -> SEL1 &= M; 11 Configure P2-0 as simple GPTO Port
 P2 -> SELO &= M)
 DI - DIR 1= 1; 11 configure direction of P2.0 as suspect pin
 Il Infinite toop (An embedded pragram does not stop);
 while (1)
   of (PI → IN 1 2) II was switch I to control the RED-LED
    P) - OUT &= ~1; If f not pressed, switch OFF RED- LED
                         connected to P2.D
  else
     P2 -> OUT 1=1: 11 Else, switch ON RED-LED connected to P2.0
```

PNO

ALGORITHM (LED - SWITTH - COUNTER): - @

Configure Pr. 1, P2.0, P2.1, P2.2 as simple GP10 Part.

Configure direction of PI.I as input pin.

Enable PII pull resistor; Pull up I down is selected by Ps - OUT register.

Configure direction of P2.0, P2.1, P2.2 as autput pis.

Use switch I to control the LEDS.

If pressed, smitch ON the LED connected to the corresponding port.

Delay

* CODE (LED - SWITCH - COUNTER):

include 'msp. R' void delayms lint n); unsigned char ?

11 main Function; int main (void)

> PI -> SELI &= ~7; Il Configure functionality of PI.1 as simple GPIO por PI → SELO &= ~2;

& = +2; Il configure direction of Pli as input pin

11 PI.1 pull resister enabled 11 Pull up I down is selected by PA > OUT register

P2 → SELI & = ~1; Il configure functionality of P2.0, P2.1, P2.2 CRED, GREEN and BLUE LEDS) as simple GP10 port

P2-> SELO R= MT; 1: 1; Il configure direction of P2.0, P2.1, P3.2 as output pin

CIRCUIT DIAGRAM (UD- SWITCH-COUNTER): mSP432 microcontroller Resistor & Switch Button P2.0 10 P2.1 2 # P1.1 (SND) green determent to Speciator & Resister & Resists GND - GND AND the the second and the second

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N Infinite toop (An embedded pragram does not stop):

while (1)

{

If (PI \rightarrow IN & 2) N we switch 1 to control the LEDS

for (i = 0: i <= 7: i+t)

{

P2 \rightarrow OUT 1= i: 11 If pressed, switch on the LED connected

to the corresponding port

delayms (500): 11 Delay of 500 ms

}

If Delay milliseconds when system clock is at 3MHz for Rev c mav:

void delayMs (int n)

l

int i, j:

for (j=0 > j<n > j+r)

pr (i= 150; 170; i-1; 11 Delay of 1 ms

Define the hexadecimal values in an unsigned character array.

configure functionality of PI-1 as simple GP10 Port.

configure direction of P1.1 as input pin

Enable PI-1 pull resistor; Pull up I down is selected by Px -> OUT register.

configure functionality of P4 as simple GP10 Port.

configure direction of Port 4 as output pins.

use snitch I to control the external peripheral.

Display and Select Tens Digit of the Seven Segment.

1 Delay

SEVEN SEGMENT INTERFACING COISPINY):

,	10	Dec	ima	Pa	int.				h	1. 7
Decimal	dp	9 P4-1	f P4.2	P43	d 14.4	C 94.5	b.	p4.7	Hex	
	P4.0									11.
0	0	0	1	1	1	1	1	1	0x3F	
1	0	0	0	0	0	10	1	0	0×06	
2	0	1	0	1	1	0	1	. 1	OX5B	State And
3	0	1	0	0	1	1	1	1	OXUF	rate Vision
4	0	1	1	0	0	1)	O	Core 66	- 4- 7 4- 70 b 1
5	0	1	1	0	1	1	D	1	OYED	
6	0	}	1	1	1	1	0	1	0×10	Carrier and Art
7	0	0	0	9	0	3	0	-	OXOT	
8	0	1	1	1	1	1	ì	e	.0×16	unte my
9	0	1	1	0	1	1	1)	DOSF	decepals u
10 (H)	0	1]	1	0)	3	0	0,147	in char
11 (1)	0	3	1)	1	8	0	0	C2 76	, , 0
m (E)	0	0	1	1	1	0	0	C	0239	42 VIII 6
13 (4)	0	2	2	1	1	1	1	0	Ox5F	1 1 2 2 mil
14 (E)	0	1	1	1	.)	0	0	- J	0×19	
15 (F)	0	1	,	1	9	10	0	1	0711	17.75

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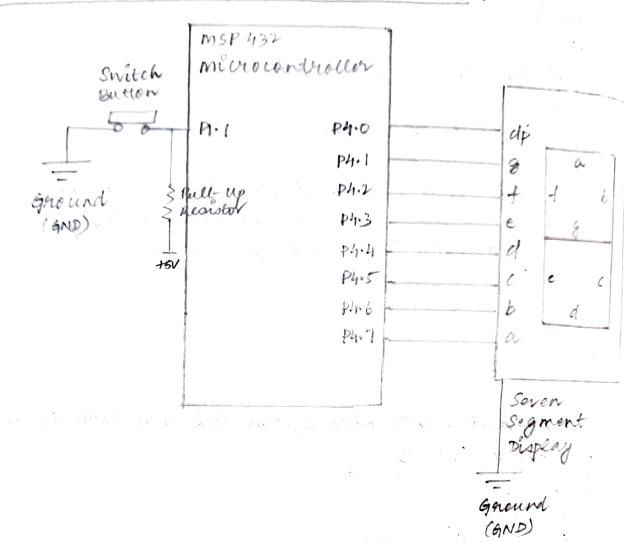
- m & 3127 6 2 7

* COURLE CODE (SWITCH - SEVEN SEGMENT); # include "msp.h" void delay ms lint n); 11 Delay Function unsigned char is Il main Function : ent main (void) const unsigned char digit Pattern [] : [0x3F, 0x06, 0x5B, 0x4F, 0x66, 0x6D, 0x7D, 0x07, 0x7F, 0x6F, 0x17, 0x1C, 0x39, 0x5E, 0x19, 0x71); 11 Hexadeamal Values PI -> SELI &= ~2; Il Configure functionality of PI-1 as simple GPIO Port PI -> SELO L. ~2; PI -> DIR &= (2) // Configure clirection of PI.1 as input pin PI -> REN 1=2; 11 PI. 1 pull resistor enabled PI -> OUT 1=2; Il Pull up I down is selected by Px -> OUT register P4 -> SELI &= NOXFF; Il configure functionality of P4 as simple P4 -> SELO Q= NOXFF; 1= 0xFF; Il configure direction of Port & as autput pers Il Infinite Loop (An embedded program does not stop): while (1) if (PI -> IN b 2) Il use switch I to control the external pergher for (1=0; 1<16; 1+1) P4 -> OUT 1, digit Pattern [1]: 11 Display Tens Digit

P5 -> OUT 1: 2; 1/ Select Tens Digit

delayms (500); 11 Delay of 500 ms

CIRCUIT DINGRAM (SWITCH - SEVEN SEGMENT):



All the positive terminals cathode) of all the regative terminals (anode) are lest alone.

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I Delay milliseconds when system clock is at SMHz for Rev C MCVS vaid delay MS (int n)

{

int i, j;

for ij = 0; j < n; j + t)

for ii = 750; j > 0; j - -); Hoelay of 1 ms
}
```

* INFERENCE:

Interface external peripherals, LED and seven segment, using MSP32 microcontroller and all simulation results were verified successfully.