ASSIGNMENT-8

Q1 Suppose you are given 16 bit binary data, you are required to compute the number of 1's that the binary data have and display on a seven segment display.

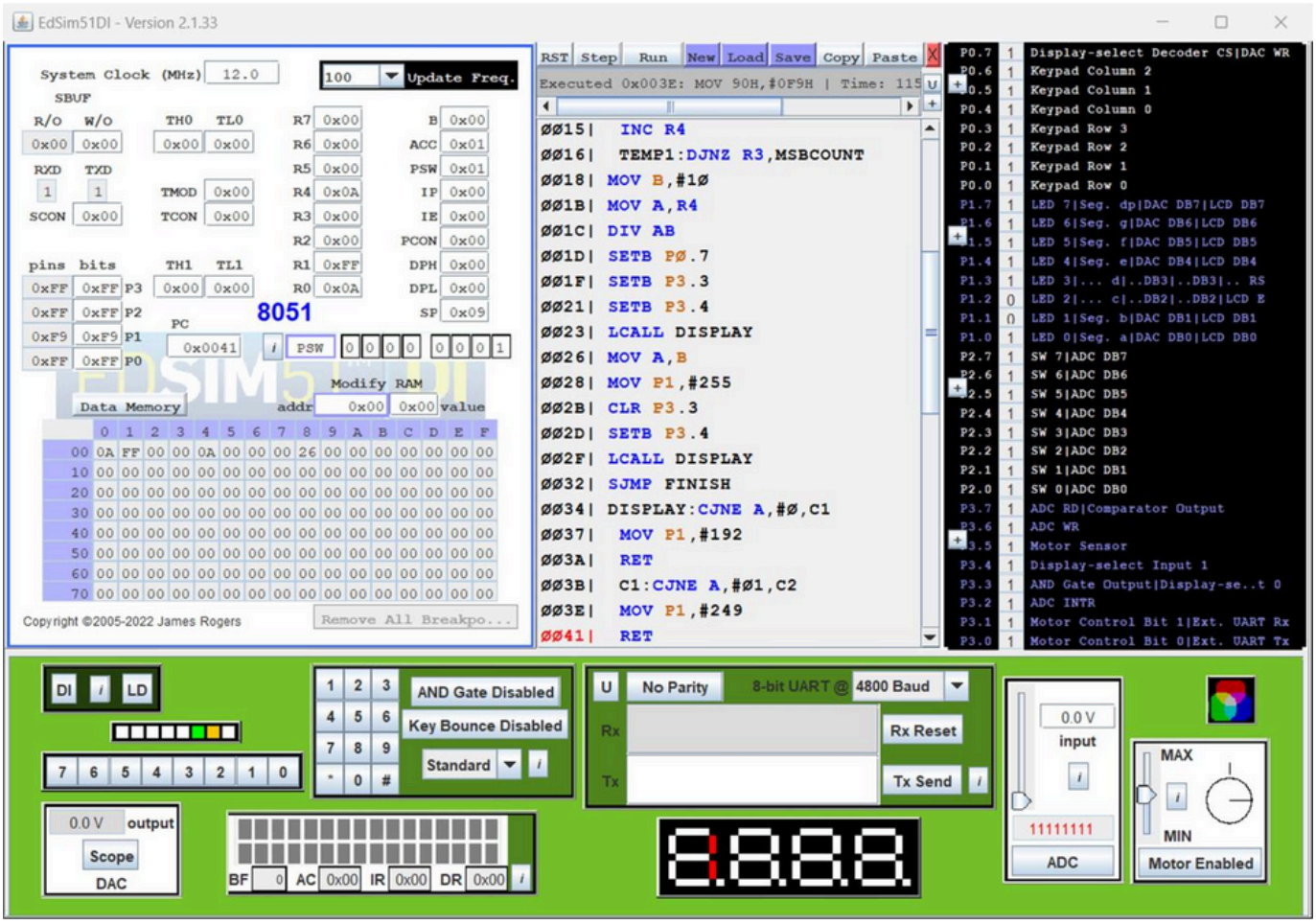
```
ORG 0
MOV R0,#0AH ;MSB
MOV R1,#0FFH ;LSB
MOV R2,#08
MOV R3,#08
MOV R4,#0
MOV A,R1
LSBCOUNT: RLC A
JNC TEMP
INC R4
TEMP:DJNZ R2,LSBCOUNT
MOV A,R0
MSBCOUNT: RLC A
JNC TEMP1
INC R4
TEMP1:DJNZ R3,MSBCOUNT
MOV B,#10
```

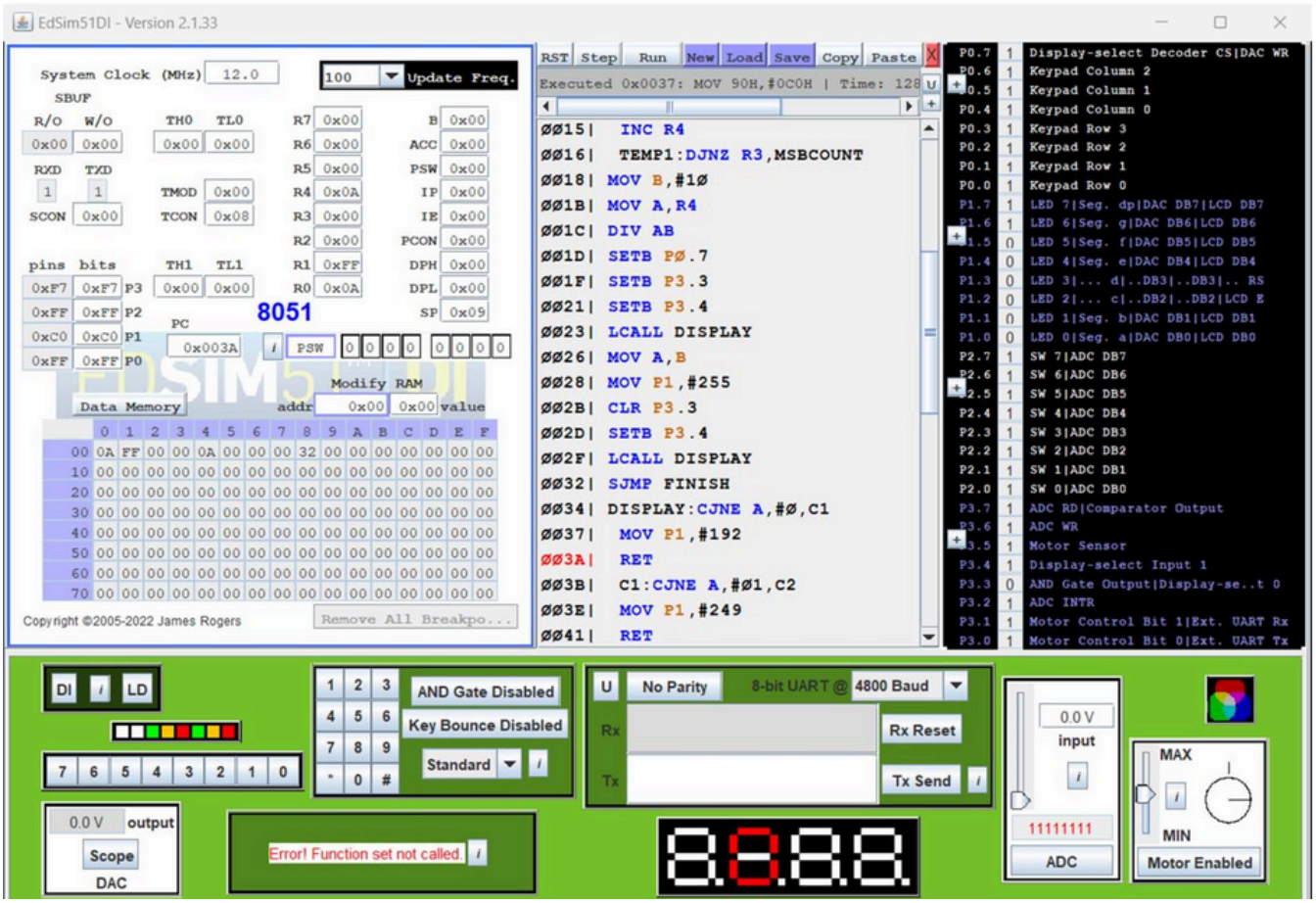
```
MOV A,R4
DIV AB
SETB P0.7
SETB P3.3
SETB P3.4
LCALL DISPLAY
MOV A,B
MOV P1,#255
CLR P3.3
SETB P3.4
LCALL DISPLAY
SJMP FINISH
DISPLAY:CJNE A,#0,C1
MOV P1,#192
RET
C1:CJNE A,#01,C2
MOV P1,#249
RET
C2:CJNE A,#02,C3
MOV P1,#164
RET
C3:CJNE A,#03,C4
MOV P1,#176
RET
```

```
 C4:CJNE A,#04,C5
MOV P1,#153
RET
C5:CJNE A,#05,C6
MOV P1,#146
RET
C6:CJNE A,#06,C7
MOV P1,#130
RET
C7:CJNE A,#07,C8
MOV P1,#248
RET
C8:CJNE A,#08,C9
MOV P1,#128
RET
C9:CJNE A,#09,OVERFLOW
MOV P1,#144
RET
OVERFLOW:RET
FINISH:
```

OUTPUT-

Input was 0AFF which is 1010 1111 1111 in binary having 10 1’s.


EdSim51DI - Version 2.1.33
System Clock (MHz) 12.0
100 Update Freq.
SBUF
8051
PC 0x0041
PSW
Data Memory
Modify RAM
addr 0x00 0x00 value
Copyright ©2005-2022 James Rogers
Remove All Breakpo...
RST Step Run New Load Save Copy Paste
Executed 0x003E: MOV 90H,#0F9H | Time: 115
ØØ15| INC R4
ØØ16| TEMP1:DJNZ R3,MSBCOUNT
ØØ18| MOV B,#1Ø
ØØ1B| MOV A,R4
ØØ1C| DIV AB
ØØ1D| SETB PØ.7
ØØ1F| SETB P3.3
ØØ21| SETB P3.4
ØØ23| LCALL DISPLAY
ØØ26| MOV A,B
ØØ28| MOV P1,#255
ØØ2B| CLR P3.3
ØØ2D| SETB P3.4
ØØ2F| LCALL DISPLAY
ØØ32| SJMP FINISH
ØØ34| DISPLAY:CJNE A,#Ø,C1
ØØ37| MOV P1,#192
ØØ3A| RET
ØØ3B| C1:CJNE A,#Ø1,C2
ØØ3E| MOV P1,#249
ØØ41| RET
P0.7 Display-select Decoder CS|DAC WR
P0.6 Keypad Column 2
P0.5 Keypad Column 1
P0.4 Keypad Column 0
P0.3 Keypad Row 3
P0.2 Keypad Row 2
P0.1 Keypad Row 1
P0.0 Keypad Row 0
P1.7 LED 7|Seg. dp|DAC DB7|LCD DB7
P1.6 LED 6|Seg. g|DAC DB6|LCD DB6
P1.5 LED 5|Seg. f|DAC DB5|LCD DB5
P1.4 LED 4|Seg. e|DAC DB4|LCD DB4
P1.3 LED 3|... d|..DB3|..DB3|.. RS
P1.2 LED 2|... c|..DB2|..DB2|LCD E
P1.1 LED 1|Seg. b|DAC DB1|LCD DB1
P1.0 LED 0|Seg. a|DAC DB0|LCD DB0
P2.7 SW 7|ADC DB7
P2.6 SW 6|ADC DB6
P2.5 SW 5|ADC DB5
P2.4 SW 4|ADC DB4
P2.3 SW 3|ADC DB3
P2.2 SW 2|ADC DB2
P2.1 SW 1|ADC DB1
P2.0 SW 0|ADC DB0
P3.7 ADC RD|Comparator Output
P3.6 ADC WR
P3.5 Motor Sensor
P3.4 Display-select Input 1
P3.3 AND Gate Output|Display-se..t 0
P3.2 ADC INTR
P3.1 Motor Control Bit 1|Ext. UART Rx
P3.0 Motor Control Bit 0|Ext. UART Tx
DI LD
AND Gate Disabled
Key Bounce Disabled
Standard
No Parity 8-bit UART @ 4800 Baud
Rx Reset
Tx Send
0.0 V input
11111111
ADC
MAX
MIN
Motor Enabled
0.0 V output
Scope
DAC
BF AC IR DR


EdSim51DI - Version 2.1.33
System Clock (MHz) 12.0
100 Update Freq.
SBUF
8051
PC 0x003A
PSW
Data Memory
Modify RAM
addr 0x00 0x00 value
Copyright ©2005-2022 James Rogers
Remove All Breakpo...
RST Step Run New Load Save Copy Paste
Executed 0x0037: MOV 90H,#0C0H | Time: 128
ØØ15| INC R4
ØØ16| TEMP1:DJNZ R3,MSBCOUNT
ØØ18| MOV B,#1Ø
ØØ1B| MOV A,R4
ØØ1C| DIV AB
ØØ1D| SETB PØ.7
ØØ1F| SETB P3.3
ØØ21| SETB P3.4
ØØ23| LCALL DISPLAY
ØØ26| MOV A,B
ØØ28| MOV P1,#255
ØØ2B| CLR P3.3
ØØ2D| SETB P3.4
ØØ2F| LCALL DISPLAY
ØØ32| SJMP FINISH
ØØ34| DISPLAY:CJNE A,#Ø,C1
ØØ37| MOV P1,#192
ØØ3A| RET
ØØ3B| C1:CJNE A,#Ø1,C2
ØØ3E| MOV P1,#249
ØØ41| RET
P0.7 Display-select Decoder CS|DAC WR
P0.6 Keypad Column 2
P0.5 Keypad Column 1
P0.4 Keypad Column 0
P0.3 Keypad Row 3
P0.2 Keypad Row 2
P0.1 Keypad Row 1
P0.0 Keypad Row 0
P1.7 LED 7|Seg. dp|DAC DB7|LCD DB7
P1.6 LED 6|Seg. g|DAC DB6|LCD DB6
P1.5 LED 5|Seg. f|DAC DB5|LCD DB5
P1.4 LED 4|Seg. e|DAC DB4|LCD DB4
P1.3 LED 3|... d|..DB3|..DB3|.. RS
P1.2 LED 2|... c|..DB2|..DB2|LCD E
P1.1 LED 1|Seg. b|DAC DB1|LCD DB1
P1.0 LED 0|Seg. a|DAC DB0|LCD DB0
P2.7 SW 7|ADC DB7
P2.6 SW 6|ADC DB6
P2.5 SW 5|ADC DB5
P2.4 SW 4|ADC DB4
P2.3 SW 3|ADC DB3
P2.2 SW 2|ADC DB2
P2.1 SW 1|ADC DB1
P2.0 SW 0|ADC DB0
P3.7 ADC RD|Comparator Output
P3.6 ADC WR
P3.5 Motor Sensor
P3.4 Display-select Input 1
P3.3 AND Gate Output|Display-se..t 0
P3.2 ADC INTR
P3.1 Motor Control Bit 1|Ext. UART Rx
P3.0 Motor Control Bit 0|Ext. UART Tx
DI LD
AND Gate Disabled
Key Bounce Disabled
Standard
No Parity 8-bit UART @ 4800 Baud
Rx Reset
Tx Send
0.0 V input
11111111
ADC
MAX
MIN
Motor Enabled
0.0 V output
Scope
DAC
Error! Function set not called.

Q2 Write a program to generate a square wave of 2 KHz frequency on Pin 1.5. You are required to use a timer in mode 1. Assume that XTAL=11.0592MHz. #include<reg51.h> sbit led = P1^5; void delay(void); void main(){ led = 1; while(1){

led=!led;

delay();

}

}

void delay(){

TMOD = 0x01;

TH0 = 0xDC;

TL0 = 0x00;

TR0 = 1;

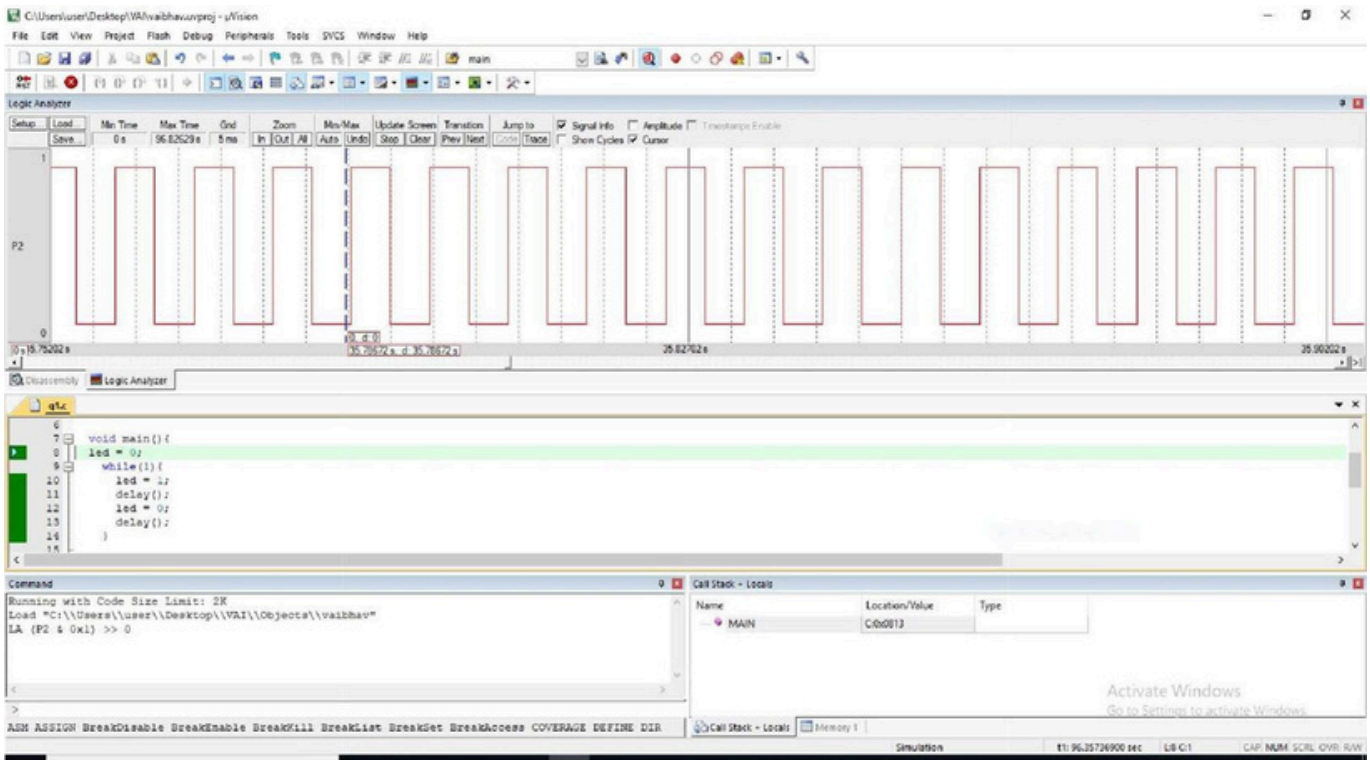
while(TF0 ==

0);

TR0 = 0;

TF0 = 0;

}



Q2 Write a program that continuously gets 8-bit data from P0 and sends i to P1 while simultaneously creating a square wave of 200 micro sec period on pin P2.1. Use timer1 to create the square wave. Assume that XTAL=11.0592MHz.

#define DELAY_200US B'1100' ; Timer 1 reload value for 200us

delay sfr P0 = 0x80; ; Port 0 sfr P1 = 0x90; ; Port 1 sfr P2 = 0xA0;

; Port 2 main:

; Set P0 as input, P1 and P2.1 as output

MOV P0DIR, #0x00 ; P0 as input

MOV P1DIR, #0xFF ; P1 all outputs

MOV P2DIR, #0xFF ; P2 all outputs (modify if other P2 bits are not used)

SETB P2.1 ; Set P2.1 initially high (optional, adjust for square wave starting state)

```
 ; Configure Timer 1 in mode 1 (16-bit)
MOV TMOD, #0x10 ; Timer 1, mode 1

; Load Timer 1 reload value for 200us delay
MOV TH1, #DELAY_200US
MOV TL1, #0x00

; Enable Timer 1 interrupt and start Timer 1
SETB ET1
SETB TR1

loop:
; Get data from P0
MOV A, P0

; Send data to P1
MOV P1, A

; Infinite loop (replace with your main program logic)
SJMP loop

Timer1_Interrupt:
; Clear Timer 1 overflow flag
CLR TF1
```

```
; Toggle P2.1 to generate square wave
    CPL P2.1 ; Toggle P2.1 (adjust for desired square wave behavior)

RET ; Return from interrupt

end:
```