Symbiosis University of Applied Sciences

Front Page of Answer Book

Enrollment Number:	2	0	1	9	B	T	C	S	0	8	8

Name of Student: YASH GUPTA

Name of Program: B. TECH **Year/Semester: 2ND YEAR/3RD SEMESTER**

Name of Paper: Microprocessors & Microcontrollers Paper Code: BTCS03CCB1

Date: 12-JULY-2021 **Day: MONDAY** **Time: 09:30 AM – 10:30 AM**

Total No. of Pages.: 07

Instructions for Examinees

1. Fill up all entries required in this page.
2. Merge this doc page with your scanned answer sheets as a first page in a single PDF file.
3. Write your answers on A4 Ruled Sheets/Register Pages.
4. Write End after the last attempted question.
5. Write the page number on every page and mentioned Total No. of Pages on front Page.
6. **If the content in the Answer Book of two students or more has found similar, in that case all copied answer will stand cancelled.**

1. **TITLE:** Assembly Program for division between two Hexa-Decimal Numbers

2. **AIM/OBJECTIVE:** The objective of this activity is to implement division between 2 Hexa-Decimal numbers on 8085 microprocessor. The real objective of division in computer science world is to perform subtraction repeated to optimize division operation very fastly & efficiently.

3. **METHODOLOGY:** So, the Algorithm which we will use:-

- Step①: Start the program by loading the HL pair registers with address of memory location.
- Step②: Move the data to B register.
- Step③: Load the second data into accumulator.
- Step④: Compare the two Numbers to check carry.
- Step⑤: Subtract two Numbers.
- Step⑥: Increement the value of carry.
- Step⑦: Check whether the repeated subtraction is CMA.
- Step⑧: Then store the results (quotient & remainder) in given memory location.
- Step⑨: Terminate the program.

4. **EXPLANATION:** Registers A, H, L, C, B are used for general purpose.

1. LXI H, 2050 will load the HL pair register with address 2050 to memory location
2. MOV B, M copies the content of memory to register B.
3. MVI C, 00 assigns 00 to C
4. INX H increment register pair HL.
5. MOV A, M copies the content of memory with accumulator.
6. CMP B compares the content of accumulator and register B.
7. JC 2011 jump to address 2011 if, carry flag is set.
8. SUB B subtract the content of accumulator with register B & store the result in accumulator.
9. INR C increment the register C.
10. JMP 2008 control will shift to memory address 2008
11. STA 3050 stores the remainder at memory location 3050
12. MOV A, C copies the content of register into accumulator.
13. STA 3051 stores the remainder at memory location 3051.
14. HLT stops executing the program & halt any further execution.

4. **BRIEF DESCRIPTION** : In above activity, we are performing the Division Algorithm for short division

Now, what is a Division Algorithm?

↳ It is an algo which give two integers N & D, computes their quotient and/or remainder, the result of Euclidean Division

$$\frac{N}{D} = (Q, R)$$

SOURCE CODE:

```
;<Assembly Program for division of two hexa decimal numbers by
Yash_Gupta_2019NTCS088>

jmp start

;data


;code
data segment
a db 28h
b db 02h
c dw ?
data ends

code segment
assume cs:code, ds:data
start:
mov ax,data
mov ds,ax
mov ax,0000h
mov bx,0000h
mov al,a
mov bl,b
div b
mov c,ax
int 3
code ends
end start
```

OUTPUT:

```
C:\TASM>masm an8div.asm
Microsoft (R) Macro Assembler Version 5.00
Copyright (C) Microsoft Corp 1981-1985, 1987.  All rights

Object filename [an8div.OBJ]:
Source listing  [NUL.LST]:
Cross-reference [NUL.CRF]:

  50402 + 450254 Bytes symbol space free

      0 Warning Errors
      0 Severe  Errors

C:\TASM>link an8div.obj

Microsoft (R) Overlay Linker  Version 3.60
Copyright (C) Microsoft Corp 1983-1987.  All rights reser

Run File [AN8DIV.EXE]:
List File [NUL.MAP]:
Libraries [.LIB]:
LINK : warning L4021: no stack segment

C:\TASM>debug an8div.exe
-g

AX=0014  BX=0002  CX=002A  DX=0000  SP=0000  BP=0000  SI=
DS=0B97  ES=0B87  SS=0B97  CS=0B98  IP=0019   NV UP EI PL
0B98:0019 CC            INT     3
-d 0B97:0000
0B97:0000  28 02 14 00 00 00 00 00-00 00 00 00 00 00 00 (
0B97:0010  B8 97 0B 8E D8 B8 00 00-BB 00 00 A0 00 00 8A 1
0B97:0020  01 00 F6 36 01 00 A3 02-00 CC FF 2A E4 50 B8 F
0B97:0030  05 50 FF 36 24 21 E8 77-63 83 C4 06 FF 36 24 2
0B97:0040  B8 0A 00 50 E8 47 5E 83-C4 04 5E 8B E5 5D C3 9
0B97:0050  55 8B EC 81 EC 84 00 C4-5E 04 26 80 7F 0A 00 7
0B97:0060  3E 8B 46 08 8B 56 0A 89-46 FC 89 56 FE C4 5E F
0B97:0070  26 8A 47 0C 2A E4 40 50-8B C3 05 0C 00 52 50 E
-q
```

SKILL_ACTIVITY_02

Title: Understanding the Arduino Based project "Car Reverse Parking Sensor"

1. What is the purpose of this activity? (Explain in 3-4 lines)

The purpose of this project is to solve various different problems such as → Autonomous Navigation, Distance Measurement, Obstacle Avoiding Robots, Human Detection, Robot Ranging, Vehicle Reverse Parking in congested lots & tiny spaces.

So, in order to solve above problems, we will use Arduino UNO and HC-SR04 Ultrasonic Sensor for creating simple prototype of a Vehicle/Car Reverse Parking Sensor.

2. Steps performed in this activity. (Explain in 5-6 lines)

In order to understand the project we —

↳ step ①: first start Reasearching & understanding about Ultrasonic Sensors. What Real industry uses in current cars.

↳ step ②: How we can solve above problems using an Arduino UNO.

↳ step ③: How to Integrate Ultrasonic sensor with Arduino UNO. Along with that, which ultrasonic sensor should be used which is efficient also & cost-friendly also.

↳ step ④: Assembling the Hardware components for our project.

3. What Resources/equipments/tools did you use for this activity?

a. Computer/Laptop
b. Web Browser – Microsoft edge
c. Internet, (Blogs), Wikipedia Page
d. Project Forums

4. What skills did you acquire?

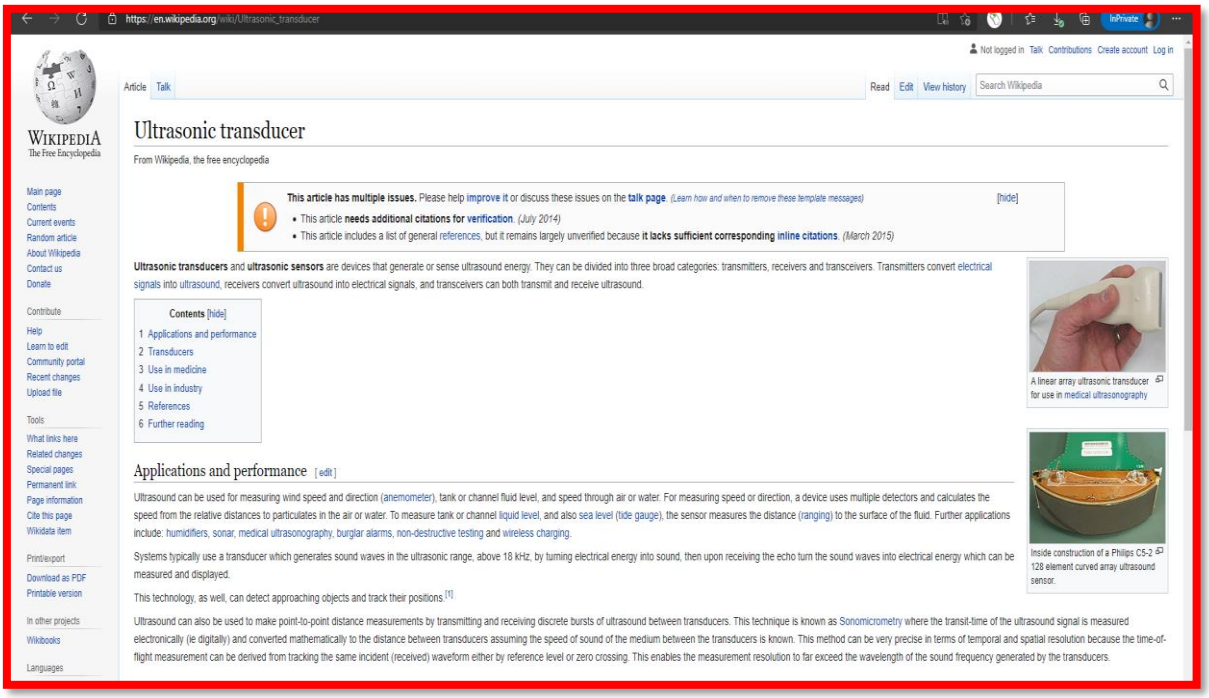
a. Working of Ultrasonic Sensor (HC-SR04)
b. Integration strategy between Arduino UNO & Ultrasonic Sensor
c. Best & easiest circuit diagram for this project.

5. Time taken to complete this activity? 02:00 (HOURS)

Yogesh A

Signature of Student

Details of Activity:



https://en.wikipedia.org/wiki/Ultrasonic_transducer

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Contents
Current events
Random article
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Recent changes
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Languages

Ultrasonic transducer

From Wikipedia, the free encyclopedia

This article has multiple issues. Please help **improve** it or discuss these issues on the **talk page**. *(Learn how and when to remove these template messages)* [hide]

- This article **needs additional citations for verification**. *(July 2014)*
- This article includes a list of general references, but it remains largely unverified because **it lacks sufficient corresponding inline citations**. *(March 2015)*

Ultrasonic transducers and **ultrasonic sensors** are devices that generate or sense ultrasound energy. They can be divided into three broad categories: transmitters, receivers and transceivers. Transmitters convert electrical signals into ultrasound, receivers convert ultrasound into electrical signals, and transceivers can both transmit and receive ultrasound.

Contents [hide]
1 Applications and performance
2 Transducers
3 Use in medicine
4 Use in industry
5 References
6 Further reading

A linear array ultrasonic transducer for use in medical ultrasonography

Inside construction of a Philips C5-2 128 element curved array ultrasound sensor.

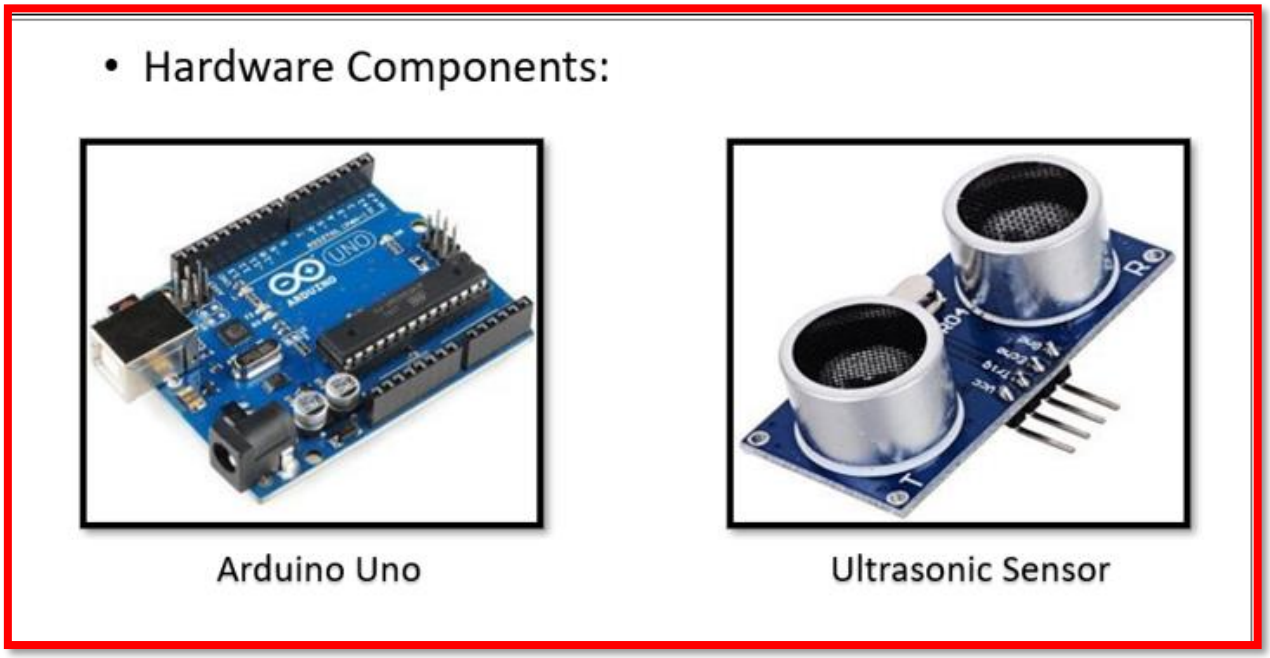
Applications and performance [edit]

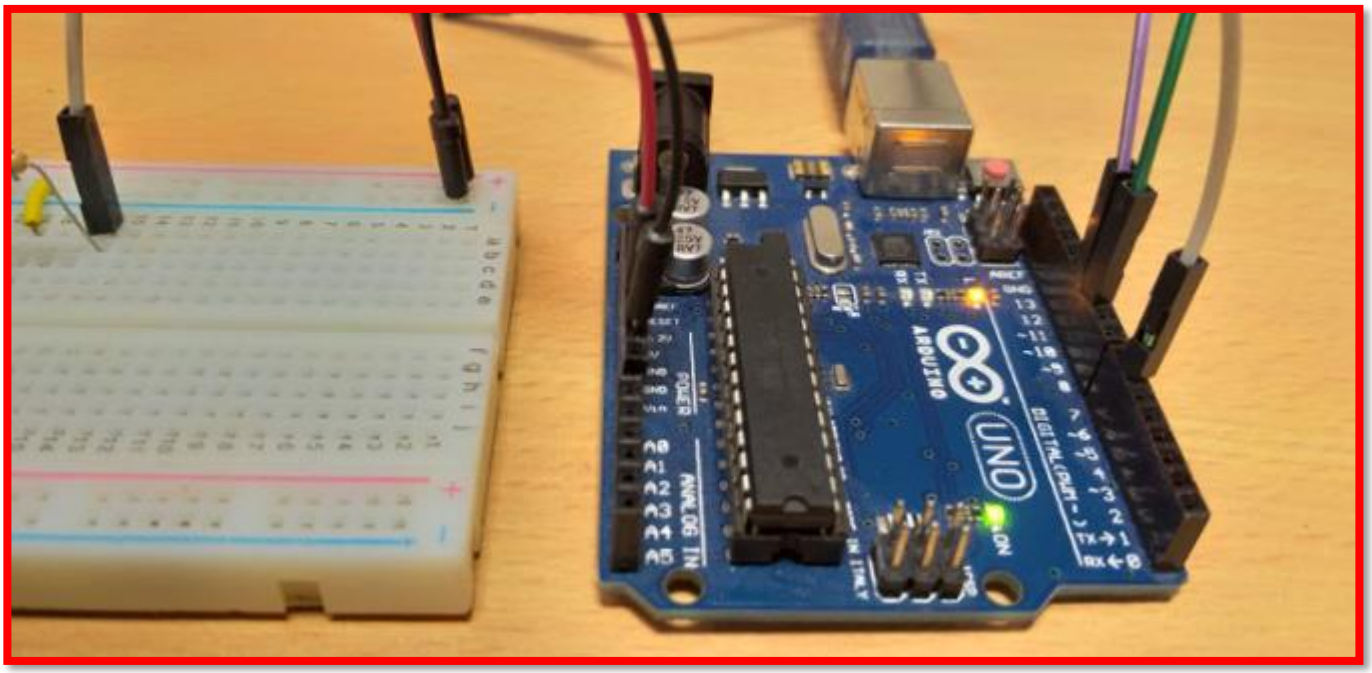
Ultrasound can be used for measuring wind speed and direction (anemometer), tank or channel fluid level, and speed through air or water. For measuring speed or direction, a device uses multiple detectors and calculates the speed from the relative distances to particulates in the air or water. To measure tank or channel liquid level, and also sea level (tide gauge), the sensor measures the distance (ranging) to the surface of the fluid. Further applications include: humidifiers, sonar, medical ultrasonography, burglar alarms, non-destructive testing and wireless charging.

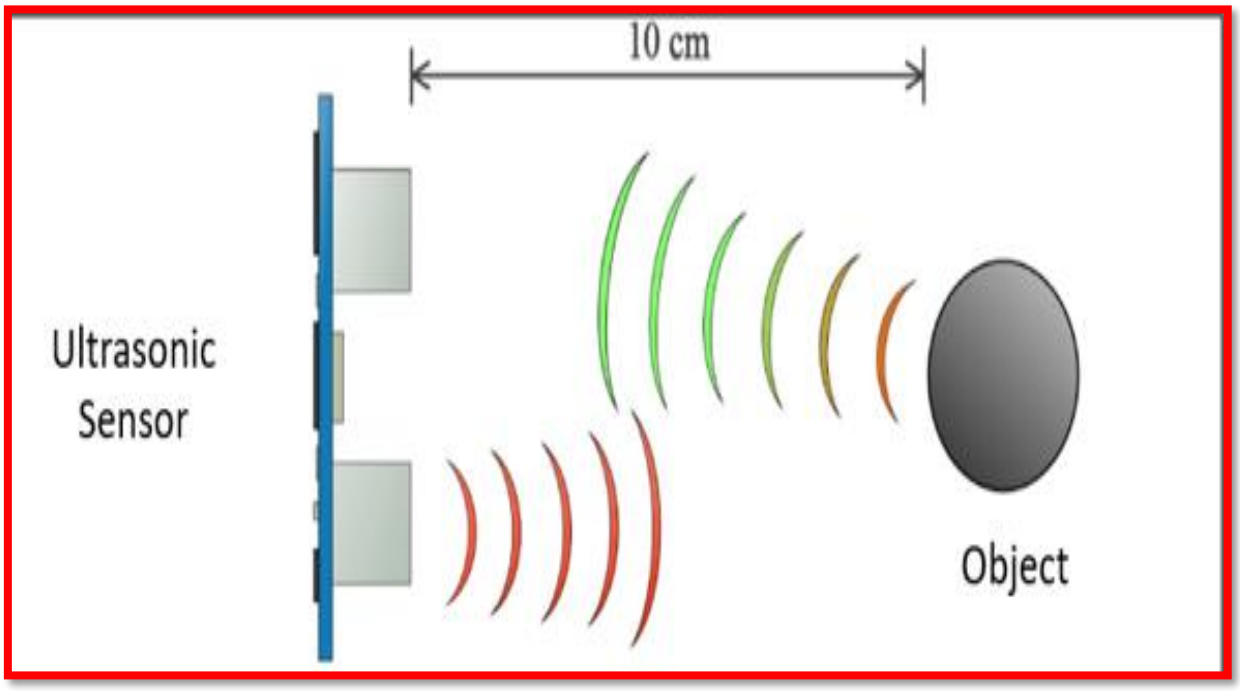
Systems typically use a transducer which generates sound waves in the ultrasonic range, above 18 kHz, by turning electrical energy into sound, then upon receiving the echo turn the sound waves into electrical energy which can be measured and displayed.

This technology, as well, can detect approaching objects and track their positions.[1]

Ultrasound can also be used to make point-to-point distance measurements by transmitting and receiving discrete bursts of ultrasound between transducers. This technique is known as Sonomicrometry where the transit-time of the ultrasound signal is measured electronically (ie digitally) and converted mathematically to the distance between transducers assuming the speed of sound of the medium between the transducers is known. This method can be very precise in terms of temporal and spatial resolution because the time-of-flight measurement can be derived from tracking the same incident (received) waveform either by reference level or zero crossing. This enables the measurement resolution to far exceed the wavelength of the sound frequency generated by the transducers.




ARDUINO
UNO


10 cm
Ultrasonic
Sensor
Object