DRONACHARYA
Group of Institutions

MICROPROCESSOR AND MICROCONTROLLER LAB

LABORATORY MANUAL

B.Tech. Semester –VI

Subject Code: BEE-652

Session: 2024-25, Odd Semester

Name:	
Roll.No.:	
Group/Branch:	

DRONACHARYA GROUP OF INSTITUTIONS

DEPARTMENT OF EEE

#27 KNOWLEDGE PARK 3
GREATER NOIDA

AFFILATED TO Dr. ABDUL KALAM TECHNICAL UNIVERSITY,

LUCKNOW

Table of Contents

Vision and Mission of the Institute

Vision:

Instilling core human values and facilitating competence to address global challenges by providing Quality Technical Education.

Mission:

- M1 - Enhancing technical expertise through innovative research and education, fostering creativity and excellence in problem-solving.
- M2 - Cultivating a culture of ethical innovation and user-focused design, ensuring technological progress enhances the well-being of society.
- M3 - Equipping individuals with the technical skills and ethical values to lead and innovate responsibly in an ever-evolving digital landscape.

Vision and Mission of the Department

Vision:

"To be a Centre of Excellence in Globalizing Education and Research in the field of Electrical and Electronics Engineering."

Mission:

M1: To empower technocrats with state-of-art knowledge to excel as eminent electrical engineers with multi-disciplinary skills.

M2: To emphasize social values and leadership qualities to meet the industrial needs, societal problems and global challenges.

M3: To enable the technocrats to accomplish impactful research and innovations.

Programme Educational Objectives (PEOs)

- **PEO1:** To foster strong knowledge in basic sciences and electrical engineering that enable technocrats to have successful careers**.**
- **PEO2:** Imbibed with the state of art knowledge to adapt ever transforming technical scenario.
- **PEO3:** Inspire engineers to provide innovative solutions to real-world challenging problems by applying electrical and electronics engineering principles positively.

Programme Outcomes (POs)

Engineering Graduates will be able to:

- **PO1. Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- **PO2. Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- **PO3. Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
- **PO4. Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
- **PO5. Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
- **PO6. The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
- **PO7. Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
- **PO8. Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
- **PO9. Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
- **PO10. Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write

effective reports and design documentation, make effective presentations, and give and receive clear instructions.

- **PO11. Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
- **PO12. Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes (PSOs)

PSO1: Graduates will be capable to gain knowledge in diverse areas of electrical and electronics engineering and apply that to a successful career, entrepreneurship and higher education.

PSO2: Enhance the competence of graduates to design and analyze systems used in advanced power applications, renewable energy, electrical drives in allied technical fields.

PSO3. Graduate will use advance tools to analyze, design and develop electrical and electronic systems for feasible operation and meet the industry requirements

University Syllabus

BEE-652	**MICROPROCESSOR&MICROCONTROLLERLAB**	**0L:0T:2P**	**1Credit**

SUGGESTIVELISTOFEXPERIMENTS:

1. Write a program using 8085 Microprocessor for Decimal, Hexadecimal addition and subtraction of two Numbers. ***(Through Virtual Lab Link).***
2. Write a program using 8085 Microprocessor for addition and subtraction of two BCD numbers. **(*Through Virtual Lab Link*)**
3. To perform multiplication and division of two 8 bit numbers using 8085. ***(Through Virtual Lab Link).***
4. To find the largest and smallest number in an array of data using 8085 instruction set.
5. To write a program using 8086 to arrange an array of data in ascending and descending order. **(*Through Virtual Lab Link*)**
6. To convert given Hexadecimal number into its equivalent ASCII number and vice versa using 8086 instruction set.
7. To convert given Hexadecimal number into its equivalent BCD number and vice versa using 8086 instruction set.
8. To interface 8253 programmable interval timer and verify the operation of 8253 in six different modes.
9. To write a program to initiate 8251 and to check the transmission and reception of character.
10. Serial communication between two 8085 through RS-232C port.
11. Write a program of Flashing LED connected to port1 of the 8051MicroController
12. Write a program to generate10kHz square wave using 8051.
13. Write a program to show the use of INT0 and INT1 of 8051.
14. Write a program for temperature & to display on intelligent LCD display.

VirtualLabLink:http://vlabs.iitb.ac.in/vlabs-dev/labs_local/microprocessor/labs/explist.php

Availableon:http://www.vlab.co.in/broad-area-electronics-and-communications

Course Outcomes: At the end of this course students will demonstrate the ability to:

1. Use techniques, skills, modern engineering tools, instrumentation and software/hardware appropriately to list and demonstrate arithmetic and logical operations on 8-bit data using microprocessor 8085.
2. Examine 8085 & 8086 microprocessor and its interfacing with peripheral devices.
3. State various conversion techniques using 8085 & 8086 and generate wave forms using 8085.
4. Implement programming concept of 8051 Microcontroller.
5. Design concepts to Interface peripheral devices with Microcontroller so as to design Microcontroller based projects.

Course Outcomes (COs)

Upon successful completion of the course, the students will be able to:

CO1	Use techniques, skills, modern engineering tools, instrumentation and software, hardware appropriately to list and demonstrate arithmetic and logical operations on 8 bit data using microprocessor 8085
CO2	Examine 8085 & 8086 microprocessor and its interfacing with peripheral devices
CO3	State various conversion techniques using 8085 & 8086 and generate waveforms using 8085
CO4	Implement programming concept of 8051Microcontroller.
CO5	Design concepts to Interface peripheral devices with microcontroller so as to design microcontroller based projects.

CO-PO Mapping

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO1	3	-	-	-	1	-	-	-	1	2	-	2
CO2	3	2	-	-	2	-	-	-	1	2	-	2
CO3	2	2	2	2	-	-	-	-	1	1	-	1
CO4	2	-	2	2	2	-	-	-	1	1	-	1
CO5	2	-	2	2	2	-	-	-	1	1	-	1
Course Correlation mapping	**2.2**	**1.2**	**1.4**	**1.2**	**1.4**	**-**	**-**	**-**	**1**	**1.4**	**-**	**1.6**

Correlation Levels: High-3, Medium-2, Low-1

CO-PSO Mapping

	PSO1	PSO2	PSO3
CO1	2	3	1
CO2	2	3	1
CO3	2	3	1
CO4	2	3	1
CO5	2	3	1
	2	3	1

Course Overview

The significance of the Microprocessor and Microcontroller Lab is renowned in the various fields of engineering applications. For an Electrical Engineer, it is obligatory to have the practical ideas about the Microprocessor and Microcontroller. By this perspective we have introduced a Laboratory manual cum Observation for Microprocessor and Microcontroller. The manual uses the plan, cogent and simple language to explain the fundamental aspects of Microprocessor and Microcontroller in practical. The manual prepared very carefully with our level best. It gives all the steps in executing an experiment.

List of Experiments mapped with COs

S.No.	Name of the Experiment	Course Outcome
1	Write a program using 8085 Microprocessor for Decimal, Hexadecimal addition and subtraction of two Numbers.	CO1
2	Write a program using 8085 Microprocessor for addition and subtraction of two BCD numbers.	CO1
3	To perform multiplication and division of two 8 bit numbers using 8085.	CO2
4	To find the largest and smallest number in an array of data using 8085 instruction set.	CO2
5	To write a program to arrange an array of data in ascending and descending order.	CO3
6	To convert given Hexadecimal number into its equivalent ASCII number and vice versa using 8085 instruction set.	CO5
7	To write a program to initiate 8251 and to check the transmission and reception of character.	CO4
8	To interface 8253 programmable interval timer to 8085 and verify the operation of 8253in six different modes.	CO2
9	To interface DAC with 8085 to demonstrate the generation of square, saw tooth and triangular wave.	CO3
10	Serial communication between two 8085 through RS-232C port.	CO5

Dos and DON'Ts

DOs

1. Login-on with your user name and password.
2. Log off the computer every time when you leave the Lab.
3. Arrange your chair properly when you are leaving the lab.
4. Put your bags in the designated area.
5. Ask permission to print.

DON'Ts

1. Do not share your user name and password.
2. Do not remove or disconnect cables or hardware parts.
3. Do not personalize the computer setting.
4. Do not run programs that continue to execute after you logoff.
5. Do not down load or install any programs, games or music on computer in Lab.
6. Personal Internet use chat room for Instant Messaging (IM) and Sites is strictly prohibited.
7. No Internet gaming activities are allowed.
8. Tea, Coffee, Water & Eatables are not allowed in the Computer Lab.

General Safety Precautions

Precautions (In case of Injury or Electric Shock)

1. To break the victim with live electric source, use an insulator such as fire wood or plastic to break the contact. Do not touch the victim with bare hands to avoid the risk of electrifying yourself.
2. Unplug the risk of faulty equipment. If the main circuit breaker is accessible, turn the circuit off.
3. If the victim is unconscious, start resuscitation immediately, use your hands to press the chest in and out to continue breathing function. Use mouth-to-mouth resuscitation if necessary.
4. Immediately call medical emergency and security. Remember! Time is critical; be best.

Precautions (In case of Fire)

1. Turn the equipment off. If power switch is not immediately accessible, take plug off.
2. If fire continues, try to curb the fire, if possible, by using the fire extinguisher or by covering it with a heavy cloth if possible isolate the burning equipment from the other surrounding equipment.
3. Sound the fire alarm by activating the nearest alarm switch located in the hallway.
4. Call security and emergency department immediately:

Emergency : 201(Reception)

Security : 231(GateNo.1)

Guide lines to students for report preparation

Allstudentsarerequiredtomaintainarecordoftheexperimentsconductedbythem.Guidelines for its preparation are as follows: -

1) All files must contain a title page followed by an index page. ***The files will not be signed by the faculty without an entry in the index page.***

2) Student's Name, Roll number and date of conduction of experiment must be written on all pages.

3) For each experiment, the record must contain the following

(i) Aim/Objective of the experiment
(ii) Pre-experiment work (as given by the faculty)
(iii) Lab assignment questions and their solutions
(iv) Test Cases (if applicable to the course)
(v) Results/output

Note:

1. Studentsmustbringtheirlabrecordalongwiththemwhenevertheycomeforthelab.

2. Students must ensure that their lab record is regularly evaluated.

Lab Assessment Criteria

An estimated 10 lab classes are conducted in a semester for each lab course. These lab classes are assessedcontinuously.Eachlabexperimentisevaluatedbasedon5assessmentcriteriaasshownin followingtable.Assessedperformanceineachexperimentisusedtocompute COattainmentaswell as internal marks in the lab course.

Grading Criteria	Exemplary(4)	Competent(3)	Needs Improvement(2)	Poor(1)
AC1: Designing experiments	The student chooses the Problems to explore.	The student chooses the Problems but does not set an appropriate goal For how to explore them.	The student fails to Define the problem adequately.	The student does not Identify the problem.
AC2: Collecting data through observation and/or experimentation	Develops a clear Procedure for Investigating the Problem	Observations are Completed with Necessary theoretical Calculations and proper Identification of required components.	Observations are Completed with Necessary theoretical Calculations but without Proper understanding. Obtain the correct Values for only a few Components after Calculations. Followed The given experimental Procedures but obtained Results with some errors.	Observations are In complete. Lacks the Appropriate knowledge Of the lab procedures.
AC3: Interpreting data	Decides what data and Observations are to be collected and verified	Can decide what data and observations are to be collected but lacks the Knowledge to verify	Student decides what Data to gather but not sufficient	Student has no Knowledge of what data and observations are to be collected
AC4: Drawing conclusions	Interprets and analyses The data in order to propose viable Conclusions and solutions	Incomplete analysis of Data hence the quality of conclusions drawn is not upto the mark.	Cannot analyze the data or observations for any kind of conclusions.	Lacks the required knowledge to propose viable conclusions and solutions
AC5: Lab record assessment	Well-organized and Confident presentation of record & ability to correlate the theoretical Concepts with the Concerned lab results With appropriate reasons.	Presentation of record is acceptable	Presentation of record Lacks clarity and organization	No efforts were exhibited

LAB EXPERIMENTS

EXPERIMENT– 1

OBJECTIVE:
Write a program using 8085 Microprocessor for Decimal, Hexadecimal addition and subtraction of two Numbers.

APPARATUSREQUIRED:-

Sr. no.	Name of equipments/components/software	Specification/range/rating/ version	Quantity
1	8085Microprocessorprogrammingkit, instruction coding sheet.	SCIENTECH-8085	1
2.	Power supply	A.C(230VMains)	

DESCRIPTION/ALGORITHM:-

Hexadecimal Addition: The program takes the content of 2009, adds it to200B & stores the result back at 200C.

Steps: 1.Initialize HL Reg. Pair with address where the first number is lying.
2. Store the number in accumulator.
3. Get the second number.
4. Add the two numbers and store the result in 200B.
5. Go back to

Monitor Let: (2009 H)= 80 H
(200BH)=15H

Result=80H+15H=95H
(2009 H) ⟶ A
A ⟶ B

(200BH) ⟶ A

A+ B ⟶ A

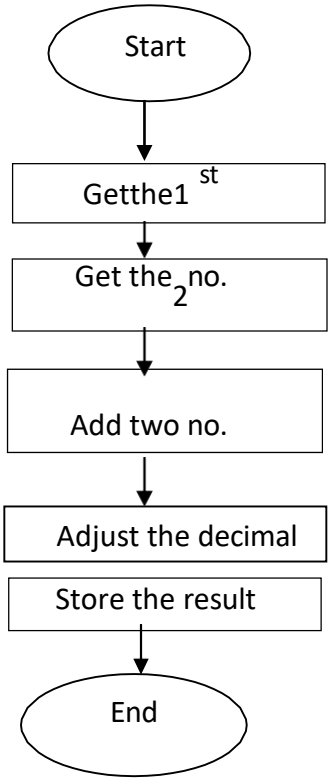
A ⟶ (200C H)

```
LXIH,2009     ;    Point 1st no.
MOVA,M        ;    Load the Acc.
INX H         ;    Adv Pointer
ADDM          ;    ADD. 2nd NO.
INXH          ;    Adv Pointer
MOVM,A        ;    Store Result
RST5
```

Decimal Addition:

Steps: 1.Initialize HL Reg. pair with address where the first number is lying.
2. Store the number in accumulator.
3. Get the second number.
4. Add the two numbers and store the result in 200B.
5. Go back to Monitor

FLOWCHART:-



```
LXIH,2009      ;    Point 1st no.
MOVA,M         ;    Load the Acc.
INX H          ;    Adv Pointer
ADDM           ;    ADD.2nd NO.
DAA            ;    Adjust the decimal
INXH           ;    Adv Pointer
MOVM,A         ;    Store Result
RST5
```

RESULTS:-Thus the numbers at 2009 H and at memory are added.

CONCLUSION:-Thus the program to add two8-bit numbers was executed.

EXPERIMENT–2

OBJECTIVE:-Write a program using 8085 Microprocessor for addition and subtraction of two BCD numbers.

APPARATUSREQUIRED:-

Sr. no.	Name of equipments/components/software	Specification/range/rating/version	Quantity
1	8085Microprocessorprogrammingkit, instruction coding sheet.	SCIENTECH-8085	1
2.	Power supply	A.C(230VMains)	

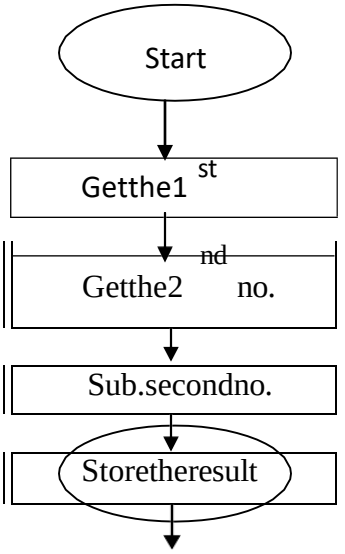
DESCRIPTION/ALGORITHM:-

Hexadecimal Subtraction: The program takes the content of 2009, subtracts it to 200B & stores the result back at 200C.

Steps:-

1. Initialize HL Reg. pair with address where the first number is lying.
2. Store the number in accumulator.
3. Get the second number.
4. Subtract second no from Acc and store the result in200B.
5. Go back to Monitor

FLOWCHART:-



End

PROGRAM:-

```
LXIH,2009   ;   Point1st no.
MOVA, M     ;   Load the Acc.
INXH        ;   Adv Pointer
```

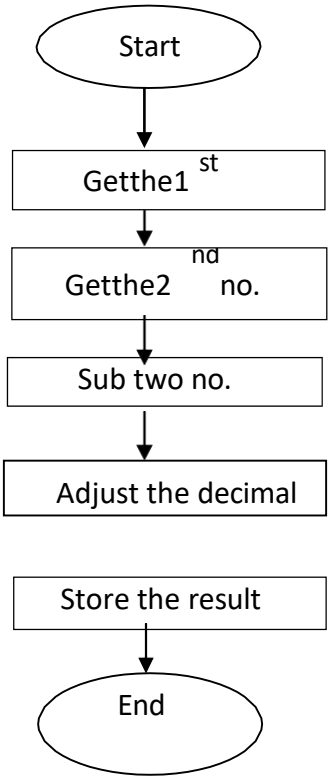
SUBM	;	Subtract 2nd NO.
INXH	;	Adv Pointer
MOVM, A RST 5	;	Store Result

Decimal Subtraction:

Steps:-

1. Initialize HL Reg. pair with address where the first number is lying.
2. Store the number in accumulator.
3. Get the second number.
4. Subtract second no from Acc and store the result in200B.
5. Adjust the decimal
6. Go back to Monitor

FLOWCHART:-



PROGRAM:-

```
LXIH,2009    ;    Point1st no.
MOVA,M       ;    Load the Acc.
INXH         ;    Adv Pointer
SUB M        ;    Subtract 2nd NO.
```

```
DAA          ;   Adjust the decimal
INX H        ;   Adv    Pointer
MOV M, A     ;   Store  Result
RST5
```

RESULTS:-Numbers at 2009 Hand in HL pairs (Memory) are subtracted.

CONCLUSION:-Thus the subtraction operation is taken out using assembly language.

EXPERIMENT–03

OBJECTIVE:-To perform multiplication and division of two 8 bit numbers using 8085.

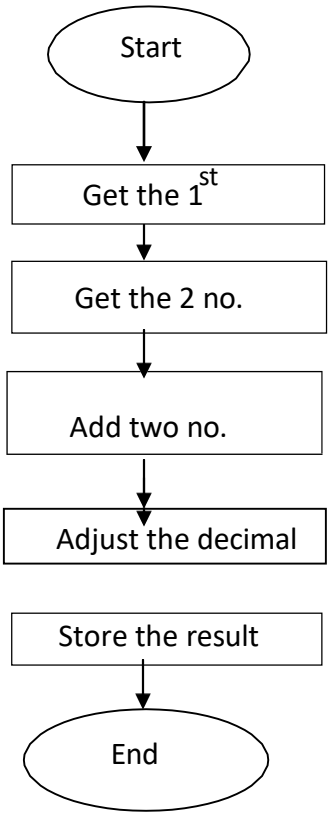
APPARATUSREQUIRED:-

Sr. no.	Name of equipments/components/software	Specification/ range/ rating/version	Quantity
1	8085Microprocessorprogrammingkit, instruction coding sheet.	SCIENTECH-8085	1
2.	Power supply	A.C(230VMains)	

DESCRIPTION/ALGORITHM:-

Steps: 1.InitializeHLReg.pairwithaddresswherethefirstnumberislying.
2. Store the number in accumulator.
3. Get the second number.
4. Add the two numbers and store the result in 200B.
5. Go back to Monitor

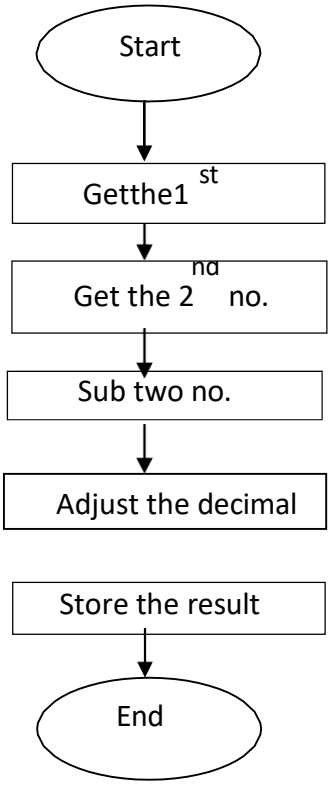
FLOWCHART:-



Steps:-

7. Initialize HL Reg. pair with address where the first number is lying.
8. Store the number in accumulator.
9. Get the second number.
10. Subtract second no from acc and store the result in 200 B.
11. Adjust the decimal
12. Go back to Monitor

FLOWCHART:-



PROGRAM:-

```
LXIH,2009    ;   Point 1st no.
MOVA, M      ;   Load the acc.
INXH         ;   Adv Pointer
SUBM         ;   Subtract 2ND NO.
DAA          ;   Adjust the decimal
INXH         ;   Adv Pointer
MOV M, A     ;   Store Result
RST 5
```

RESULTS:-

The BCD numbers at 2009H and memory are added or subtracted.

CONCLUSION:-

Thus the subtraction operation is taken out using assembly language**.**

EXPERIMENT–4

OBJECTIVE:-To find the largest and smallest number in an array of data using8085instructionset

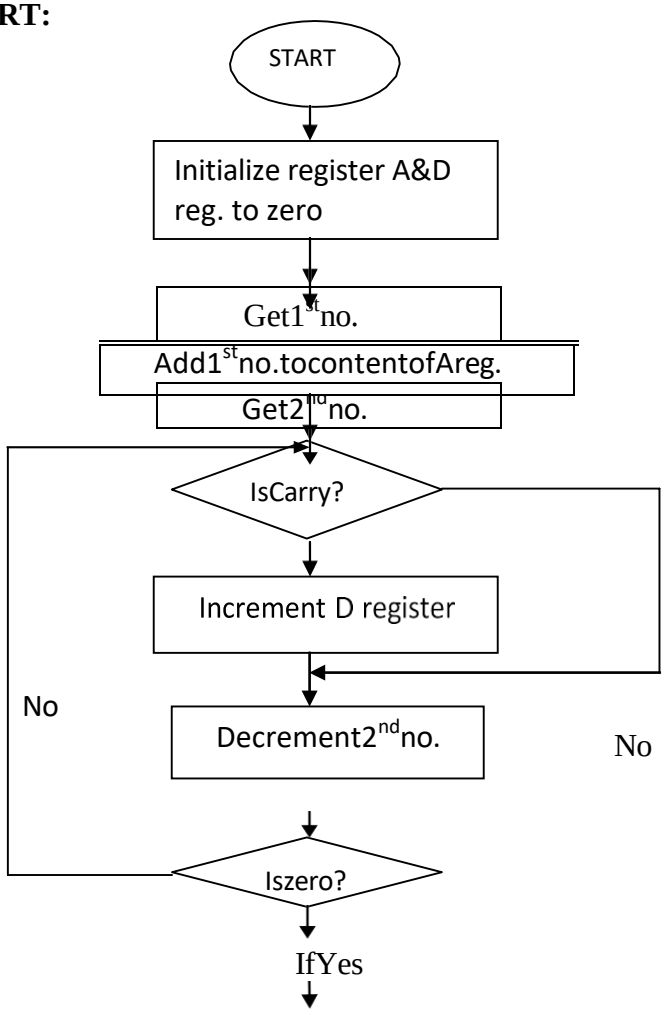
APPARATUSREQUIRED:-

Sr. no.	Name of equipments/components/software	Specification/range/rating/ version	Quantity
1	8085Microprocessorprogrammingkit, instruction coding sheet.	SCIENTECH-8085	1
2.	Power supply	A.C(230VMains)	

DESCRIPTION/ALGORITHM:-

1) Start the program by loading HL register pair with address of memory location.
2) Move the data to a register (B register).
3) Get the second data and load into Accumulator.
4) Add the two register contents.
5) Check for carry.
6) Increment the value of carry.
7) Check whether repeated addition is over and store the value of product and carry in memory location.

FLOWCHART:



PROGRAM:

```
MVID, 00        ;   InitializeregisterDto00
MVIA, 00        ;   Initialize Accumulator content to 00
LXIH,4150       ;   HLPoints4150
MOVB,M          ;   Get the first number in B-register
INXH            ;   HLPoints4151
MOVC,M          ;   Get the second number in C-reg.
LOOP:ADDB       ;   Add content of A-reg to register B.
JNCNEXT         ;   Jump on no carry to NEXT.
INR D           ;   Increment content of register D
NEXT:DCRC       ;   Decrement content of register C.
JNZLOOP         ;   Jump on no zero to address
STA4152         ;   Store the result in Memory
MOVA, D         ;   Get the carry in Accumulator
STA4153         ;   Store the MSB of result in Memory
 HLT            ;   Terminate the program.
```

RESULTS:

-

Input:	FF (4150) FF (4151)
Output:	01(4152) FE(4153)

CONCLUSION:-

Thus the multiplication process is taken out using assembly language for 8085 microprocessor

EXPERIMENT–5

OBJECTIVE:-To write a program to arrange an array of data in ascending and descending order.

APPARATUSREQUIRED:-

Sr.no.	Name of equipments/components/software	Specification/range/rating/version	Quantity
1	8085Microprocessorprogrammingkit, instruction coding sheet.	SCIENTECH-8085	1
2.	Power supply	A.C(230VMains)	

DESCRIPTION/ALGORITHM:-

1) StarttheprogrambyloadingHLregisterpairwithaddressofmemorylocation.
2) Move the data to a register (E register).
3) Get the second data and load into Accumulator.
4) Add the two register contents.
5) Check for carry.
6) Increment the value of carry.
7) Check whether repeated addition is over and store the value of product and carry in memory location.
8) Terminate the program.

EXAMPLE:

Steps	Product								Multiplier					Comments
	B_7	B_6	B_5	B_4	B_3	B_2	B_1	B_0	CY	B_3	B_2	B_1	B_0	
	0	0	0	0	0	0	0	0	0	0	1	0	1	Initial Stage
Step1	0	0	0	0	0	0	0	0	0	1	0	1	0	Shift left by 1
	0	0	0	0	0	0	0	0	0	1	0	1	0	Don't add since CY=0
Step2	0	0	0	0	0	0	0	0	1	0	1	0	0	Shift
	00		0	0	1	1	0	0	1	0	1	0	0	Add multiplicand;CY=1
Step 3	00		0	1	1	0	0	0	0	1	0	0	0	Shift left by 1
	00		0	1	1	0	0	0	0	1	0	0	0	Don't add since CY=0
Step 4	00		1	1	0	0	0	0	1	0	0	0	0	Add multiplicand;CY=1

PROGRAM:

```
LXI H, 2200 H     ;   Initialize the memory
pointer MOV E , M ;   Get multiplicand
MVID,00H          ;   Extend to 16bits
```

```
        INXH        ;   Increment memory pointer
        MOVA,M      ;   Get Multiplier
        LXIH, 0000H ;   Product=0
        MVIB,08 H   ;   Initialize counterwithcount8
LOOP:DADH           ;   Product=productX2

        RAL
        JNCXYZ      ;   Iscarryfrommultiplier1?
        DADD        ;   Yes, product=product +multiplicand
XYZ:DCRB            ;   Is counter=0
        JNZLOOP     ;   No, repeat
        SHLD2300H   ;   Store the result
        HLT
```

RESULTS:-

Multiplication has been carried out between the data of 2200 H and 2201H.

CONCLUSION:-

Thus the multiplication process for 8 bit binary numbers is taken out in 8085 microprocessor

EXPERIMENT–6

OBJECTIVE:-To convert given Hexadecimal number into its equivalent ASCII number and vicevers using 8085 instruction set.

APPARATUSREQUIRED:-

Sr. no.	Name of equipments/components/software	Specification/range/rating/version	Quantity
1	8085Microprocessorprogrammingkit, instruction coding sheet.	SCIENTECH-8085	1
2.	Power supply	A.C(230VMains)	

DESCRIPTION/ALGORITHM:-

1) StarttheprogrambyloadingHLregisterpairwithaddressofmemorylocation.
2) Move the data to a register (B register).
3) Get the second data and load into Accumulator.
4) Compare the two numbers to check for carry.
5) Subtract the two numbers.
6) Increment the value of carry.
7) Checkwhetherrepeatedsubtractionisoverandstorethevalueofproductand Carry in memory location.
8) Terminate the program.

PROGRAM:

```
        LXIH,4150
        MOV B , M     ;   Get the dividend in B–reg.
        MVI C, 00     ;   Clear C – reg for qoutient
        INX H         ;
        MOVA,M        ;   Get the divisor in A–reg.
NEXT:   CMP B         ;   Compare A-reg with register B.
        JC LOOP       ;   Jump on carry to LOOP
        SUBB          ;   Subtract A – reg from B- reg.
        INR C         ;   Increment content of register C.
        JMP NEXT      ;   Jump to NEXT
LOOP:   STA 4152      ;   Store the remainder in Memory
        MOV A, C      ;
        STA 4153      ;   Store the quotient in memory
        HLT           ;   Terminate the program.
```

RESULTS:

Input: FF(4150)

FF(4251)

Output:01(4152) ------ Remainder
FE(4153)------Quotient

EXPERIMENT-7

OBJECTIVE:-To write a program to initiate 8251and to check the transmission and reception of character.

APPARATUSREQUIRED:-

Sr. no.	Name of equipments/components/software	Specification/range/rating/version	Quantity
1	8085Microprocessorprogrammingkit, instruction coding sheet.	SCIENTECH-8085	1
2.	Power supply	A.C(230VMains)	

PROGRAM:

```
        MVIE,00 H       ;   Quotient=0
        LHLD2200H       ;   Get Dividend
        LDA2300H        ;   Get Divisor
        MOVB,A          ;   Store Divisor
        MVIC,08H        ;   Count =08
NEXT:DADH               ;   Dividend=Dividend X 2
        MOVA,E
        RLC
        MOVE,A          ;   Quotient=X2
        MOVA,H
        SUB B           ;   Is MSB of dividend>divisor
        JCSKIP          ;   No goto next step
        MOVH,A          ;   Yes subtract divisor
        INRE            ;   Quotient=Quotient+1
SKIP:DCR C              ;   Count=count – 1
        JNZNEXT         ;   Is count=0  repeat
        MOVA,E
        STA2401H        ;   Store Quotient
        MOVA,H
        STA2401H        ;   Store Remainder
        HLT             ;   End of program
```

RESULTS:-

Number at 220H is divided from the number at 2300H

CONCLUSION:-

Thus the division process is taken out in 8085 microprocessor

EXPERIMENT-8

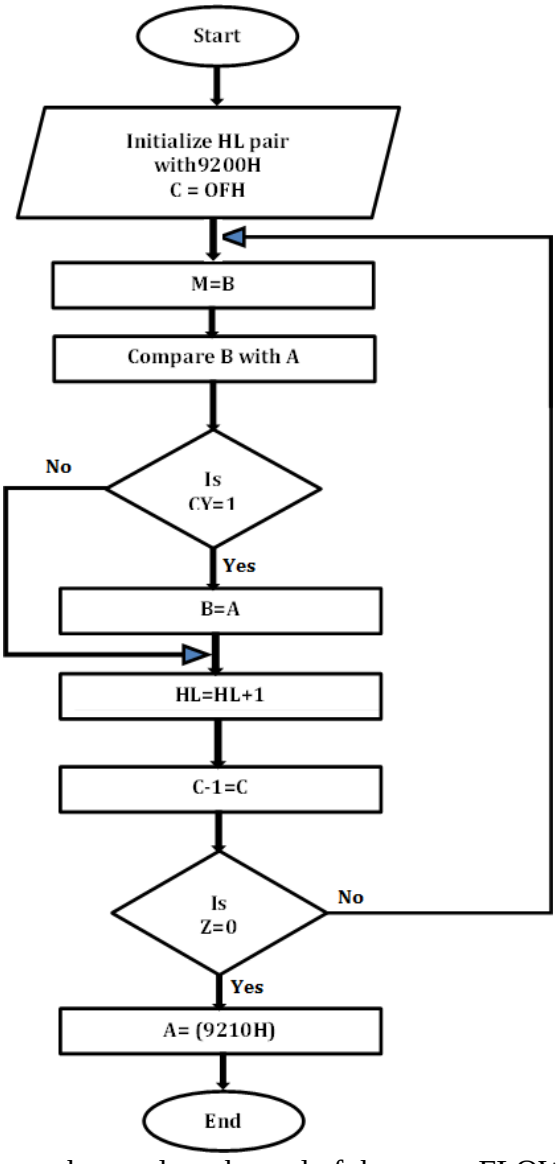
OBJECTIVE:-.To interface 8253 programm able interval timer to 8085 and verify the operation of 825 in six different modes.

APPARATUSREQUIRED:-

Sr. no.	Name of equipments/components/software	Specification/range/rating/version	Quantity
1	8085Microprocessorprogrammingkit, instruction coding sheet.	SCIENTECH-8085	1
2.	Power supply	A.C(230VMains)	

DESCRIPTION/ALGORITHM:-

Writeaprogramtofindthelargestnumberinagivenarrayof16elements.Thearrayisstoredin



Memory from 9200H onwards. Store the result at the end of the array. FLOWCHART:-

PROCEDURE:-

To find largest of given no. of a given string we compare all given no. one by one. Suppose given no. is 2, 4, 3, 1, 0 1st we compare 2 & 4 (2 is in register A & 4 is in Register B).
A<B so put B into (A) & Compare with next number i.e.3 Here A>B so directly compare 4 with1 then 0.

RESULTANDINFERENCE:-

The largest number from the array of 16 numbers from memory location 9200H is found out and stored at 9210H

PRECAUTION:-Take memory locations according model of kit.

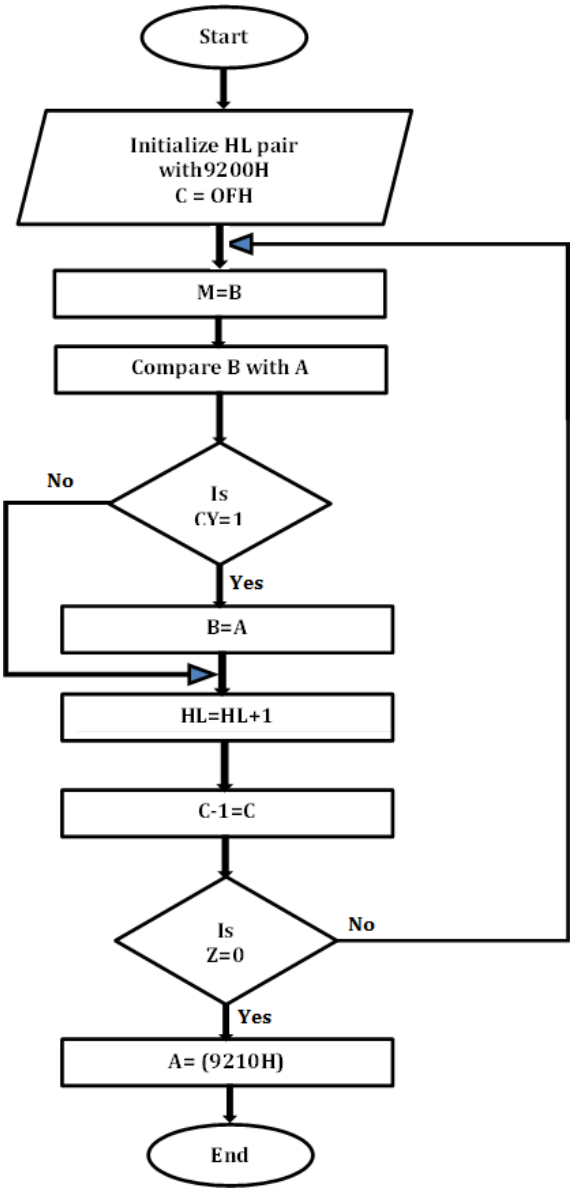
EXPERIMENT-9

AIM:-To interface DAC with 8085 to demonstrate the generation of square, saw tooth and triangular wave.

REQUIREMENT:- 8085 microprocessor programming kit, instruction coding sheet.

THEORY:- Same as largest no. we compare two number one by one but comparison process is reverse.

PROCEDURE:-



RESULTS:

Smallest number has been found out from a 16bit array starting from 9200 H and isstored at 9210H.

CONCLUSION:

Thus the smallest number has been found out from the array in assembly language for 8085 microprocessor

EXPERIMENT-10

OBJECTIVE:-Serial communication between two 8085 through RS-232 C port.

APPARATUSREQUIRED:-

Sr. no.	Name of equipments/components/software	Specification/range/rating/version	Quantity
1	8085 Microprocessor programming kit, instruction coding sheet.	SCIENTECH-8085	1
2.	Power supply	A.C(230VMains)	

DESCRIPTION/ALGORITHM:-

Steps:

1. Initialize timer IC
2. Move the mode command word to A
3. Output it to port address C2
4. Move the command instruction word to A reg.
5. Output it to port address C2
6. Move the data to be transferred to A
7. Output it to port address C0
8. Reset the system
9. Get data from input port C0
10. Store the value in memory
11. Reset the system

PROGRAM:

```
MVIA,36H

Out CEH
MVIA,0AH
OutC8HLXI
H,4200H
MVI A,4EH

Out C2H
MVIA,37H
Out C2H
MVIA,42H
OutC0H
RST 1
ORG4200H
In
C0HSTA45
00H RST 1
```

RESULT

Output at 4500=1

CONCLUSION

Thus the 8251 was initiated and the transmission and reception character was done successfully.

Microprocessor and Microcontroller Lab (BEE 652)

This lab manual has been updated by

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Please spare some time to provide your valuable feedback

Department of EEE, Dronacharya Group of Institutions, Greater Noida.