Sri Indu
College of Engineering & Technology
UGC Autonomous Institution
Recognized under 2(f) & 12(B) of UGC Act 1956,
NAAC, Approved by AICTE &
Permanently Affiliated to JNTUH

NAAC
NATIONAL ASSESSMENT AND ACCREDITATION COUNCIL

HANDOUT

First Year ECE Semester I

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

ACADEMIC YEAR 2022-23

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

HANDOUT- INDEX

SRI INDU COLLEGE OF ENGINEERING & TECHNOLOGY

(An Autonomous Institution under UGC, Affiliated to JNTUH)
Sheriguda (V), Ibrahimpatnam (M), R.R. Dist-501510

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

INSTITUTION VISION

To be a premier Institution in Engineering & Technology and Management with competency, values and social consciousness

INSTITUTION MISSION

IM_1 Provide high quality academic programs, training activities and research facilities.

IM_2 Promote Continuous Industry-Institute interaction for employability, Entrepreneurship, leadership and research aptitude amongstakeholders.

IM_3 Contribute to the economical and technological development of the region, state and nation.

DEPARTMENT VISION

To be a centre of excellence in Electronics and Communication Engineering Education to produce professionals for ever-growing needs of society.

DEPARTMENT MISSION

The Department has following Missions:

DM1: To promote and facilitate student- centric learning.

DM2: To involve in activities that enable overall development of stakeholders.

DM3: To provide holistic environment with state-of-art facilities for students to develop solutions for various social needs.

DM4: Organize trainings in embedded systems with Industry interaction.

PROGRAM EDUCATIONAL OBJECTIVES(PEO'S)

PEO	Statements
PEO1	accomplish technical proficiency for the efficaciousECE Professional.
PEO2	pursue higher studies with emphasizing design, test and development of the systems to meet the industry and societal needs.
PEO3	Become entrepreneur by practicing ethics, professional integrity and leadership qualities.

PROGRAM SPECIFIC OUTCOMES (PSO'S)

PSO1:	To nurture and empower the SICET-ECE students strong in practical, technical and research domains in the areas of Signal/Image processing, VLSI and wireless Communication.
PSO 1:	To design and develop a prototype system that will incorporate user requirements using modern devices and emerging technology for industry automations.
PSO 3:	To make the SICET-ECE students as successful **industry ready engineers** by imparting essential **interpersonal skills and widespread exposure** on multi-disciplinary technologies.

PROGRAM OUTCOMES (PO'S)

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.

COs MAPPING WITH POs & PSOs

I YEAR SEMESTER – I (REGULATION – R22)

ACADEMIC YEAR: 2022-2023

Course Code & Name: R22CSE1127 & C PROGRAMMING FOR ENGINEERS

Course outcomes: After learning the contents of this paper the student must be able to,

Course Name	Course Outcomes
C119.1	Write algorithms and to draw flowcharts for solving problems and translate the algorithm/flowcharts to programs(in C language) .(L3-Apply)
C119.2	Use functions to develop modular reusable code .(L4-Analyze)
C119.3	Use arrays, pointers, strings and structures to formulate algorithms and programs. (L4-Analyze)
C119.4	Understand searching and sorting algorithm. (L3-Apply)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C119.1	3	2	1	1	1	1	-	-	1	-	1	1	1	2	-
C119.2	3	2	3	2	1	2	-	-	1	-	1	1	1	1	-
C119.3	3	3	2	1	1	2	-	-	1	-	1	1	-	1	-
C119.4	3	3	3	2	1	1	-	-	1	-	1	-	1	1	-
C119	3	2.5	2.25	1.5	1	1.5	-	-	1	-	1	0.75	0.75	1.25	-

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Sheriguda (V), Ibrahimpatnam, R.R.Dist, Hyderabad - 501 510

D4

BR-22

Lr.No.SICET/AUTO/DAE/BR-22/Academic Cal./655/2022

Date: 27.10.2022

I B.TECH. ACADEMIC CALENDAR
ACADEMIC YEAR : 2022-2023

Dr.G. SURESH,
Principal,

To,
All the HODs
Sir,

Sub: SICET (Autonomous) - Academic & Evaluation - Academic Calendar for **I B.Tech - I & II Semester** for the academic year **2022-23** – Reg.

****

The approved Academic Calendar for **I B.Tech – I & II Semester** for the academic year **2022-23** is given below:

I SEMESTER

S.NO.	EVENT	PERIOD	DURATION
1.	Induction & Orientation Programme	**03.11.2022**	
2.	1st Spell of Instructions for covering First Two and a half Units	03.11.2022 – 28.12.2022	8 Weeks
3.	I Mid Examinations	29.12.2022 – 04.01.2023	1 Week
4.	Submission of I Mid Term Examination Marks to the Autonomous Section on or before	10.01.2023	
5.	2nd Spell of Instructions for covering Remaining Two and a half Units	05.01.2023 – 02.03.2023	8 Weeks
6.	II Mid Examinations	03.03.2023 – 09.03.2023	1 Week
7.	Preparation & Practical Examinations and Remidial Mid Test (RMT)	10.03.2023 – 16.03.2023	1 Week
8.	Submission of II Mid Term Examination Marks Marks to the Autonomous Section on or before	16.03.2023	
9.	I Semester End Examinations	17.03.2023 – 01.04.2023	2 Weeks
Commencement of Class-Work for I B.Tech - II Semester 03.04.2023			

II SEMESTER

S.NO.	EVENT	PERIOD	DURATION
1.	Commencement of II Sem Class Work	**03.04.2023**	
2.	1st Spell of Instructions for covering First Two and a half Units (Including Summer Vacation)	03.04.2023 – 10.06.2023	10 Weeks
	Summer Vacation	15.05.2023 – 27.05.2023	2 Weeks
3.	I Mid Examinations	12.06.2023 – 17.06.2023	1 Week
4.	Submission of I Mid Term Examination Marks to the Autonomous Section on or before	23.06.2023	
5.	2nd Spell of Instructions for covering Remaining Two and a half Units	19.06.2023 – 12.08.2023	8 Weeks
6.	II Mid Examinations	14.08.2023 – 19.08.2023	1 Week
7.	Preparation & Practical Examinations and Remidial Mid Test (RMT)	21.08.2023 – 26.08.2023	1 Week
8.	Submission of II Mid Term Examination Marks Marks to the Autonomous Section on or before	26.08.2023	
9.	II Semester End Examinations	28.08.2023 – 09.09.2023	2 Weeks
Commencement of Class Work for II B.Tech – I Semester - 11.09.2023			

ACE **CE** **DEAN** **PRINCIPAL**

Copy to all the Heads of the Depts. and AO.

CONTROLLER OF EXAMINATIONS
Sri Indu College of Engineering & Technology
(An Autonomous Institution under JNTUH)
Sheriguda (V), Ibrahimpatnam, R.R. Dist-501510.

DIRECTOR
(Academic Audit)
Sri Indu College of Engineering & Technology
Sheriguda, IBP, R.R. Dist-501510.

PRINCIPAL
Sri Indu College of Engineering & Technology
(An Autonomous Institution Under JNTUH)
Sheriguda (V), Ibrahimpatnam, R.R. Dist-501510.

SRI INDU COLLEGE OF ENGINEERING AND TECHNOLOGY (AUTONOMOUS)
DEPARTMENT OF HUMANITIES & SCIENCES
DEPARTMENT CALENDAR – 2022-2023 (I B.Tech – I SEMESTER)

DAYS	NOVEMBER -22		DECEMBER - 22		JANUARY -23		FEBRUARY - 23		MARCH - 23		APRIL - 23	
											1	I SEMESTER END EXAMINATIONS
SUNDAY					1	NEW YEAR/ HOLIDAY					2	HOLIDAY
MONDAY					2	MID I EXAM					3	COMMENCEMENT OF II SEMESTER CLASSES- I MID
TUESDAY	1				3	MID I EXAM					4	BABU JAGJEEVAN RAM B'DAY
WEDNESDAY	2				4	MID I EXAM	1		1		5	
THURSDAY	3	INDUCTION & ORIENTATION PROGRAM	1		5	I SEMESTER CLASSES- II MID	2		2		6	
FRIDAY	4		2		6		3		3	MID II EXAM	7	GOOD FRIDAY
SATURDAY	5	I SEMESTER CLASSES- I MID	3		7		4		4	MID II EXAM	8	
SUNDAY	6	HOLIDAY	4	HOLIDAY	8	HOLIDAY	5	HOLIDAY	5	HOLIDAY	9	HOLIDAY
MONDAY	7	INDUCTION & ORIENTATION PROGRAM	5		9		6		6	MID II EXAM	10	
TUESDAY	8		6		10		7		7	MID II EXAM	11	
WEDNESDAY	9	I SEMESTER CLASSES- I MID	7		11		8		8	HOLI	12	
THURSDAY	10		8		12		9		9	MID II EXAM	13	
FRIDAY	11		9		13		10		10	PREPARATION & LAB END EXAMINATIONS	14	AMBEDKAR JAYANTHI
SATURDAY	12		10		14	BHOGI/ HOLIDAY	11		11		15	
SUNDAY	13	HOLIDAY	11	HOLIDAY	15	PONGAL/ HOLIDAY	12	HOLIDAY	12	HOLIDAY	16	HOLIDAY
MONDAY	14		12		16	KANUMA/ HOLIDAY	13		13		17	
TUESDAY	15		13		17		14		14	PREPARATION & LAB END EXAMINATIONS	18	
WEDNESDAY	16		14		18		15		15		19	
THURSDAY	17		15		19		16		16		20	
FRIDAY	18		16		20		17		17	I SEMESTER END EXAMINATIONS	21	
SATURDAY	19		17		21		18	SIVARATHRI/ HOLIDAY	18		22	RAMZAN
SUNDAY	20	HOLIDAY	18	HOLIDAY	22	HOLIDAY	19	HOLIDAY	19	HOLIDAY	23	HOLIDAY
MONDAY	21		19		23		20		20		24	
TUESDAY	22		20		24		21		21	I SEMESTER END EXAMINATIONS	25	
WEDNESDAY	23		21		25		22		22	UGADI	26	
THURSDAY	24		22		26	REPUBLIC DAY	23		23		27	
FRIDAY	25		23		27		24		24	I SEMESTER END EXAMINATIONS	28	
SATURDAY	26		24		28		25		25		29	
SUNDAY	27	HOLIDAY	25	X-MAS	29	HOLIDAY	26	HOLIDAY	26	HOLIDAY	30	HOLIDAY
MONDAY	28		26	BOXING DAY/ HOLIDAY	30		27		27			
TUESDAY	29		27		31		28		28	I SEMESTER END EXAMINATIONS		
WEDNESDAY	30		28						29			
THURSDAY			29						30	SRI RAMA NAVAMI		
FRIDAY			30	MID I EXAM					31	I SEMESTER END EXAMINATIONS		
SATURDAY			31	MID I EXAM								

C PROGRAMMING FOR ENGINEERS LABORATORY

SRI INDU COLLEGE OF ENGINEERING & TECHNOLOGY

(An Autonomous Institution under UGC, New Delhi)

B.Tech. - I Year – I Semester

L	T	P	C
0	0	2	1

(R22CSE1127) C PROGRAMMING FOR ENGINEERS LABORATORY

Course Outcomes: Upon completing this course, the students will be able to

1. Write algorithms and to draw flowcharts for solving problems and translate thealgorithms/flowcharts to programs (in C language).
2. Use functions to develop modular reusable code.
3. Use arrays, pointers, strings and structures to formulate algorithms and programs.
4. Understand Searching and sorting algorithms

Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	1	1	1	1	-	-	1	-	1	1
CO2	3	2	3	2	1	2	-	-	1	-	1	1
CO3	3	3	2	1	1	2	-	-	1	-	1	1
CO4	3	3	3	2	1	1	-	-	1		1	

List of Experiments:

1. Write a C program to find the sum of individual digits of a positive integer.
2. Fibonacci sequence is defined as follows: the first and second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence.
3. Write a C program to generate the first n terms of the sequence.
4. Write a C program to generate all the prime numbers between 1 and n, where n is a valuesupplied by the user.
5. Write a C program to find the roots of a quadratic equation.
6. Write a C program to find the factorial of a given integer.
7. Write a C program to find the GCD (greatest common divisor) of two given integers.
8. Write a C program to solve Towers of Hanoi problem.
9. Write a C program, which takes two integer operands and one operator from the user, performs the operation and then prints the result. (Consider the operators +,-,*, /, % and use Switch Statement)
10. Write a C program to find both the largest and smallest number in a list of integers.
11. Write a C program that uses functions to perform the following:
    i) Addition of Two Matrices ii) Multiplication of Two Matrices
12. Write a C program that uses functions to perform the following operations:
    i) To insert a sub-string in to a given main string from a given position.
    ii) To delete n Characters from a given position in a given string.
13. Write a C program to determine if the given string is a palindrome or not
14. Write a C program that displays the position or index in the string S where the string T begins, or **– 1 if S doesn"t contain T.**
15. Write a C program to count the lines, words and characters in a given text.
16. Write a C program to generate Pascal's triangle.

17. Write a C program to construct a pyramid of numbers
18. Write a C program to read in two numbers, x and n, and then compute the sum of this geometricprogression:
    $1+x+x^2+x^3+\ldots\ldots\ldots +x^n$
    For example: if n is 3 and x is 5, then the program computes 1+5+25+125.
    Print x, n, the sum
    Perform error checking.
    For example, the formula does not make sense for negative exponents – if n is less than 0.
    Have your program print an error message if n<0, then go back and read in the next pair of numbers of without computing the sum. Are any values of x also illegal ? If so, test for them too.
19. 2's complement of a number is obtained by scanning it from right to left and complementing all the bits after the first appearance of a 1. Thus 2's complement of 11100 is 00100. Write a C program to find the 2's complement of a binary number.
20. Write a C program to convert a Roman numeral to its decimal equivalent.
21. Write a C program that uses functions to perform the following operations:
    i) Reading a complex number
    ii) Writing a complex number
    iii) Addition of two complex numbers
    iv) Multiplication of two complex numbers
    (Note: represent complex number using a structure.)
22. i. Write a C program which copies one file to another.
    ii. Write a C program to reverse the first n characters in a file.
    (Note: The file name and n are specified on the command line.)
23. i. Write a C program to display the contents of a file.
    ii. Write a C program to merge two files into a third file (i.e., the contents of the first filefollowed by those of the second are put in the third file)
24. Write a C program that implements the following sorting methods to sort a given list of integers inascending order i) Bubble sort ii) Selection sort iii)Insertion sort
25. Write C programs that use both recursive and non recursive functions to perform the followingsearching operations for a Key value in a given list of integers:
    i) Linear search ii) Binary search

SRI INDU COLLEGE OF ENGINEERING & TECHNOLOGY

B.TECH – DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Academic Year: 2022-2023 B.Tech I Year I Sem

(R22CSE1127)C PROGRAMMING FOR

ENGINEERSLABORATORY

LIST OF PROGRAMS

S. No	Name Of The Experiment
1	Write a C program to find the sum of individual digits of a positive integer.
2	Fibonacci sequence is defined as follows: the first and second terms in the sequence are 0 and1.Subsequent terms are found by adding the preceding two terms in the sequence.
3	Write a C program to generate the first n terms of the sequence.
4	Write a C program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.
5	Write a C program to find the roots of a quadratic equation.
6	Write a C program to find the factorial of a given integer.
7	Write a C program to find the GCD (greatest common divisor) of two given integers.
8	Write a C program to solve Towers of Hanoi problem.
9	Write a C program, which takes two integer operands and one operator from the user, performs the operation and then prints the result. (Consider the operators +,-,*, /, % and use Switch Statement)
10	Write a C program to find both the largest and smallest number in a list of integers.
11	Write a C program that uses functions to perform the following: i) Addition of Two Matrices ii) Multiplication of Two Matrices
12	Write a C program that uses functions to perform the following operations: i) To insert a sub-string in to a given main string from a given position. ii) To delete n Characters from a given position in a given string.
13	Write a C program to determine if the given string is a palindrome or not
14	Write a C program that displays the position or index in the string S where the string T

	begins, or – 1 if S doesn't contain T.
15	Write a C program to count the lines, words and characters in a given text.
16	Write a C program to generate Pascal's triangle.
17	Write a C program to construct a pyramid of numbers
18	Write a C program to read in two numbers, x and n, and then compute the sum of this geometric progression: $1+x+x^2+x^3+.....+x^n$ For example: if n is 3 and x is 5, then the program computes 1+5+25+125.Print x, n, the sum Perform error checking. For example, the formula does not make sense for negative exponents – if n is less than 0. Have your program print an error message if n<0, then go back and read in the next pair of numbers of without computing the sum. Are any values of x also illegal ? If so, test for them too.
19	2's complement of a number is obtained by scanning it from right to left and complementing all the bits after the first appearance of a 1. Thus 2's complement of 11100 is 00100. Write a C program to find the 2's complement of a binary number.
20	Write a C program to convert a Roman numeral to its decimal equivalent.
21	Write a C program that uses functions to perform the following operations: i) Reading a complex number ii) Writing a complex number Multiplication of two complex numbers (Note: represent complex number using a structure.)
22	i. Write a C program which copies one file to another. ii. Write a C program to reverse the first n characters in a file. (Note: The file name and n are specified on the command line.)
23	i. Write a C program to display the contents of a file. ii. Write a C program to merge two files into a third file (i.e., the contents of the first file followed by those of the second are put inthe third file)
24	Write a C program that implements the following sorting methods to sort a given list of integers in ascending order

	i) Bubble sort ii) Selection sort iii)Insertion sort
25	Write C programs that use both recursive and non recursive functions to perform the following searching operations for a Key value in a given list of integers: i) Linear search ii) Binary search

	SRI INDU COLLEGE OF ENGG & TECHNOLOGYLESSON PLAN **(Regulation :R22)** **Department of Electronics and Communication Engineering**	**preparedon:2.2.2022**
	Sub. Code & Title	**(R22CSE1127) C PROGRAMMING FOR ENGINEERS LABORATORY**
	Academic Year:2022-23	**Year/Sem./Section** **I-I/ECE**
	Faculty Name & Designation	**G.Anitha, Asst.Professor**

S.No.	Topic (s)	Book Reference	Page (s) From	Page (s) To	Teaching Methodology	Proposed No. of hours	Actual Date of Handled	CO/RBT
						33		
1	Write a C program to find the sum of individual digits of a positive integer.	Manual			BlackBoard & Demonstration On Projector	3		CO1/L3
2	Fibonacci sequence is defined as follows: the first and second terms in the sequence are 0 and1.Subsequent terms are found by adding the preceding two terms in the sequence.	Manual			Demonstration On Projector			CO1/L3
3	Write a C program to generate the first n terms of the sequence.	Manual			Demonstration On Projector	3		CO1/L3
4	Write a C programto generate all the prime numbers between 1 and n, where n is avaluesupplied by the user.	Manual			Demonstration On Projector			CO1/L3
5	Write a C program to find the roots of a quadratic equation.	Manual			Demonstration On Projector			CO1/L3
6	Write a C program to find the factorial of a given integer.	Manual			Demonstration on Projector	3		CO2/L3
7	Write a C program to find the GCD (greatest common divisor) of two given integers.	Manual			Demonstration on Projector			CO2/L3
8	Write a C program to solve Towers of Hanoi problem.	Manual			Black Board &Demonstrat ion on Projector			CO2/L6

9	Write a C program, which takes two integer operands and one operator from the user, performs the operation and then prints the result. (Consider the operators +,-,*, /, % and use Switch Statement)	Manual			Black Board	3		CO1/L3
10	Write a C program to find both the largest and smallest number in a list of integers.	Manual			Black Board	3		CO3/L3
11	Write a C program that uses functions to perform the following: i) Addition of Two Matrices ii) Multiplication of Two Matrices	Manual			Black Board &Demonstration on Projector			CO3/L3
12	Write a C program that uses functions to perform the following operations: To insert a sub-string in to a given main string from a given position. To delete n Characters from a given position in a given string	Manual			Black Board	3		CO3/L4
13	Write a C program to determine if the given string is a palindrome or not	Manual			Black Board &Demonstration on Projector			CO3/L3
14	Write a C program that displays the position or index in the string S where the string T begins, or –1 if S doesn‟t contain T.	Manual			Black Board &Demonstration on Projector			CO3/L3
15	Write a C program to count the lines, words and characters in a given text.	Manual			Black Board &Demonstration on Projector	3		CO3/L3
16	Write a C program to generate Pascal‘s triangle.	Manual			Black Board & Demonstration on Projector			CO3/L3
17	Write a C program to construct a pyramid of numbers	Manual			Black Board & Demonstration on Projector			CO1/L4
18	Write a C program to read in two numbers, x and n, and then compute the sum of this geometric progression:$1+x+x^2+x^3+.....+x^n$ For example: if n is 3 and x is 5, then the program computes 1+5+25+125.Print x, n, the sum Perform error checking. For example, the formula does not make	Manual			Black Board & Demonstration on Projector			CO1/L6

	sense for negative exponents – if n is less than 0. Have your program print an error message if n<0, then go back and read in the next pair of numbers of without computing the sum. Are any values of x also illegal ? If so, test for them too.							
19	2‘s complement of a number is obtained by scanning it from right to left and complementing all the bits after the first appearance of a 1. Thus 2‘s complement of 11100 is 00100. Write a C program to find the 2‘s complement of a binary number.	Manual			Black Board	3		CO1/L3
20	Write a C program to convert a Roman numeral to its decimal equivalent.	Manual			Black Board			CO1/L6
21	Write a C program that uses functions to perform the following operations: i) Reading a complex number ii) Writing a complex number iii)Addition of two complex numbers iv)Multiplication of two complex numbers (Note: represent complex number using a structure.)	Manual			Black Board &Demonstration on Projector			CO3/L3
22	i) Write a C program which copies one file to another. ii) Write a C program to reverse the first n characters in a file	Manual			Black Board	3		CO3/L3
23	i) Write a C program to display the contents of a file. ii) Write a C program to merge two files into a third file	Manual			Black Board &Demonstration on Projector			CO3/L3
24	Write a C program that implements the following sorting methods to sort a given list of integers in ascending order i) Bubble sort ii) Selection sort iii)Insertion	Manual			Black Board &Demonstration on Projector	3		CO4/L3
25	Write C programs that use both recursive and non recursive functions to perform the following searching operations for a Key value in a given list of integers: i) Linear search ii) Binary search	Manual			Black Board			CO4/L3

SRI INDU COLLEGE OF ENGINEERING & TECHNOLOGY

B.TECH-DEPARTMENT OF HUMANITIES & SCIENCES

PROGRAMMING FOR PROBLEM SOLVING LAB

I B.TECH-I SEMESTER 2022-2023

PPS LAB ROOM NO F-105(I-FLOOR)

TIME TABLE

DAY/ TIME	9:40am to 10:30am I	10:30 am to 11:20am II	11:20am to 12:10pm III	12:10pm to 12:40pm	12:40pm to 1:45pm IV	1:45pm to 2:50pm V	2:50pm to 4:00pm VI
MON	AI&DS(SECTION-B)			L U N C H	ECE(SECTION-A)MECH		
TUE	DS(SECTION-B)				CSIT		
WED	CSE(SECTION-C)				CS(SECTION-A)		
THUR	CSE(SECTION-B)				AIML(SECTION-B)		
FRI	AIML(SECTION-A)				DS(SECTION-A)		
SAT	IT				CSE(SECTION-A)		

BRANCH /SECTION	NAME OF THE FACULTY
CSE-A	D.MOUNIKA/E.RAJENDRA
CSE-B	K.S.ARCHANA/ CHITTI
CSE-C	G.LAVANYA/ E.RAJENDRA
CS-A	TEJASREE
CS-B,EEE	G.LAVANYA/ E.RAJENDRA
DS-A	TEJASREE/
DS-B	TEJASREE/CHITTI
AIML-A	Dr.P.RAMESH/ CHITTI
AIML-B	Dr.P.Ramesh Kumar/ E.RAJENDRA
AI&DS-B	K ARCHANA/CHITTI
IT	K.S.ARCHANA/ E.RAJENDRA
CSIT	
ECE-A	D.MOUNIKA

HOD **PRINCIPAL** **LAB-INCHARGE**

SRI INDU COLLEGE OF ENGINEERING & TECHNOLOGY

B.TECH-DEPARTMENT OF HUMANITIES & SCIENCES

PROGRAMMING FOR PROBLEM SOLVING LAB

I B.TECH-I SEMESTER 2021-2022

PPS LAB ROOM NO F-205(II-FLOOR)

TIME TABLE

DAY/ TIME	9:40am to 10:30am I	10:30 am to 11:20am II	11:20am to 12:10pm III	12:10pm to 12:40pm	12:40pm to 1:45pm IV	1:45pm to 2:50pm V	2:50pm to 4:00pm VI
MON	CSE(SECTION-D)			L U N C H	ECE(SECTION-B)CIVIL		
TUE							
WED							
THUR					IOT		
FRI	AIDS(SECTION-A)						
SAT							

BRANCH /SECTION	NAME OF THE FACULTY
CSE-D	K.S.ARCHANA
MECH	E.RAJENDRA/
CIVIL	E.RAJENDRA/
IOT	G.LAVANYA/
AIDS-A	K.ARCHANA
ECE-B	ANITHA

HOD **PRINCIPAL** **LAB-INCHARGE**

C PROGRAMMING FOR ENGINEERS LABORATORY MANUAL

1. Write a C program to find the sum of individual digits of a positive integer.Algorithm

Step 1: Get number by user

Step 2: Get the modulus/remainder of the number

Step 3: sum the remainder of the number

Step 4: Divide the number by 10

Step 5: Repeat the step 2 while number is greater than 0.

Program

```
#include<stdio.>
#include<conio.h>
void main()
{
intn,sum=0;
printf("enter a +ve integer"); // enter a integer
valuescanf("%d",&n);
while(n>0)  // checks the condition
{
sum=sum+n%10; // sum + remainder value
n=n/10; }
printf("sum of individual digits of a positive integer is %d",sum);  // prints the sum of individual
digitsgetch();
}
```

OUTPUT:

```
enter a +ve integer456
sum of individual digits of a positive integer is 15
```

2. Fibonacci sequence is defined as follows: the first and second terms in the sequenceare 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence. Write a C program to generate the first n terms of the sequence.

Algorithm

Step 1: start

Step 2 : read ‘n’ value

Step 3: initialize a=0 and b=1

Step 4: print values of a,b

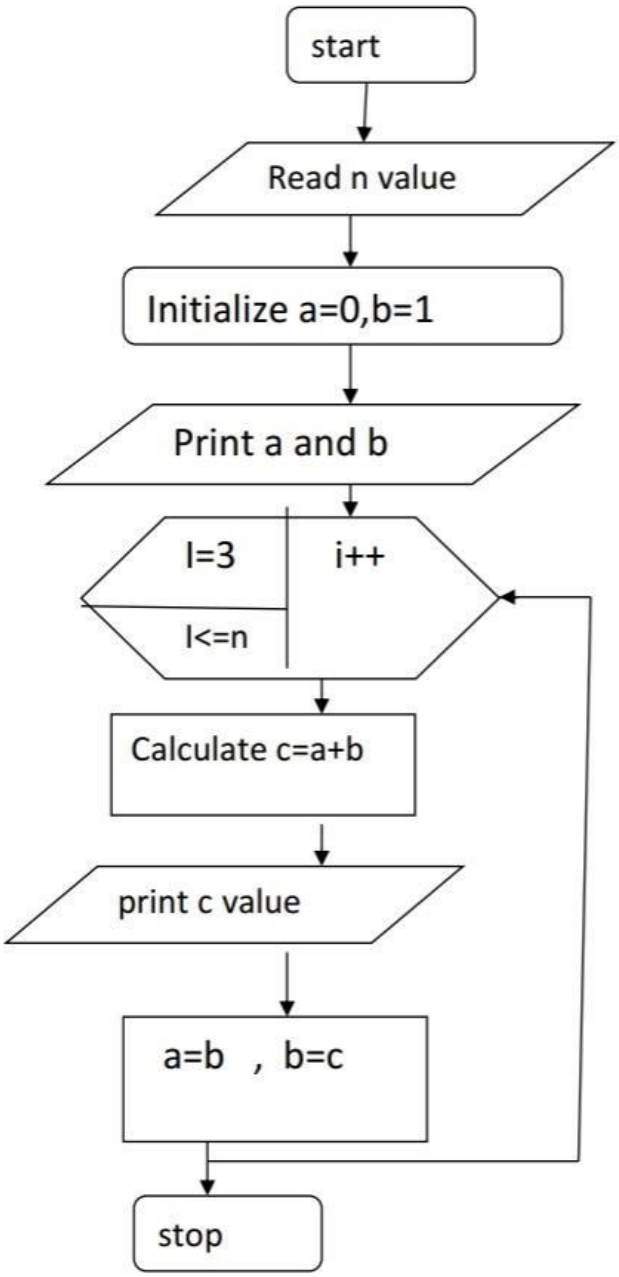
Step 5: initialize i=3

Step 6: if i<=n then c=a+b and print ‘c’ value

Step 7: a=b, b=c then i++ and goto step 6 else goto step 8

Step 8: stop

Flow chart



program

```
    #include<stdio.h
     >
     #include<conio.h
     >void main()
    {
inta,b,c,n,
i;clrscr();
```

```
printf("enter the length of
series(n):");scanf("%d",&n);
  a=0
  ;
  b=1
  ;
printf("\n the fibonacci series upto %d terms is:
\n",n);printf(" \n %d \t \n %d \t ",a,b);
  for(i=3;i<=n;i++)
{
c=a+b;
printf(" \n \n %d\t
",c);a=b;
b=c;
}
getch();
}
```

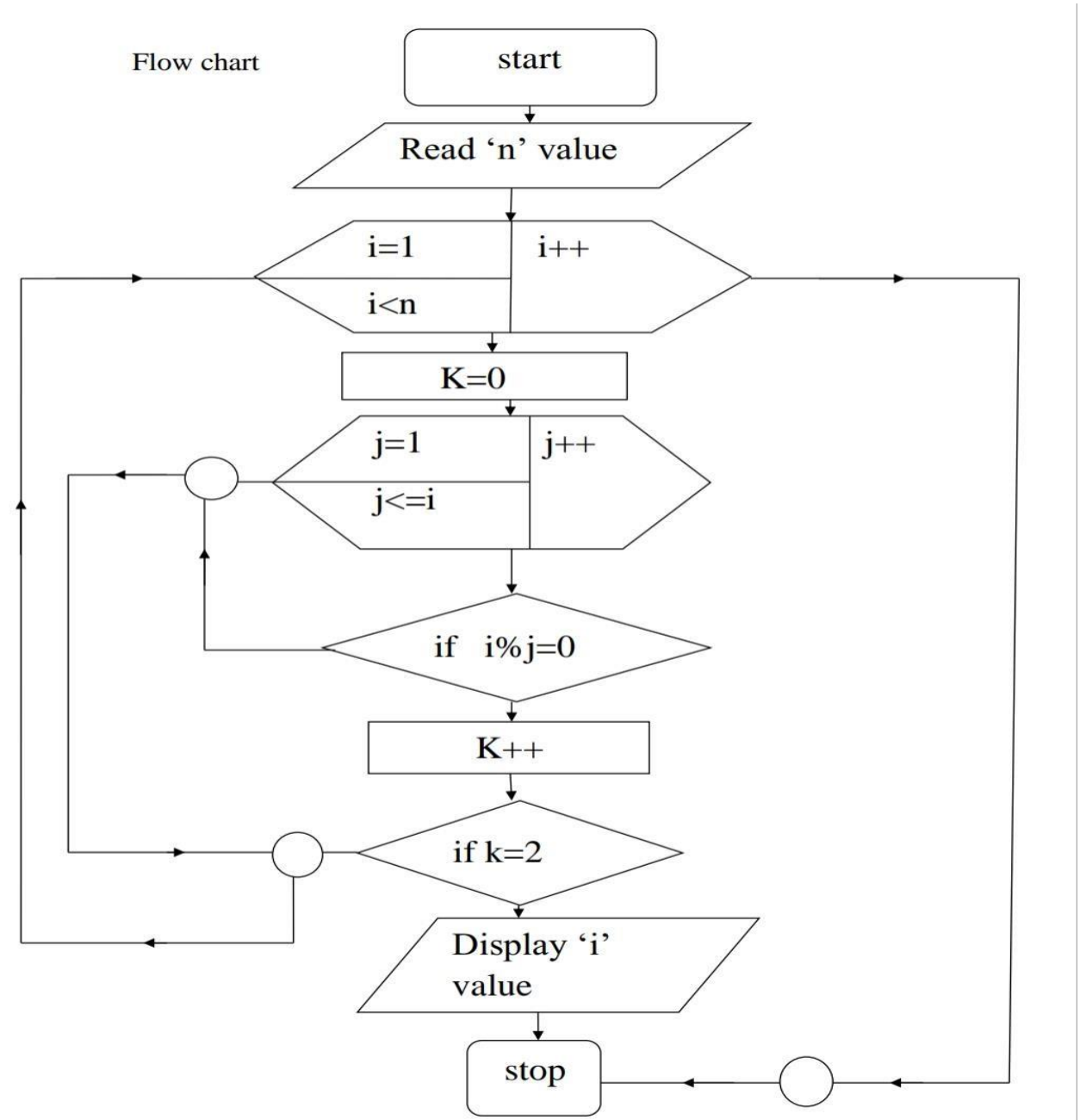
Output:

```
enter the length of series(n):  5
The fibonacci series upto 5 terms is:
0
1
1
2
3
```

3. Write a C program to generate all the prime numbers between 1 and n, where n is avalue supplied by the user.

Algorithm

Step 1 : start
Step 2 : read ‘n’
value Step 3 :
initialize i=1 Step 4 :
if i<n then k=0Step 5
: initialize j=1
Step 6 : if j<=i then if(i%j=0) then
k++Step 7 : j++ goto step 6
Step 8 : else if j<=i is false then i++ goto
step 4Step 9: if k=2 then print ‘i’ value
Step 10 : else i<n is false then goto
step11
Step 11 : stop



Program

```
#include<stdio.h>
#include<conio.h>
void main()
{
int n,i,k,j;
```

```
clrscr();
printf("enter n values
\n");scanf("%d",&n);
    for(i=1;i<n;i++)
  {
    k=0;
    for(j=1;j<=i;j++)
{
 if(i%j==0
 )k++;
}
 if(k==2)
printf("\n
%d",i);
 }
getch();
 }
```

Output:

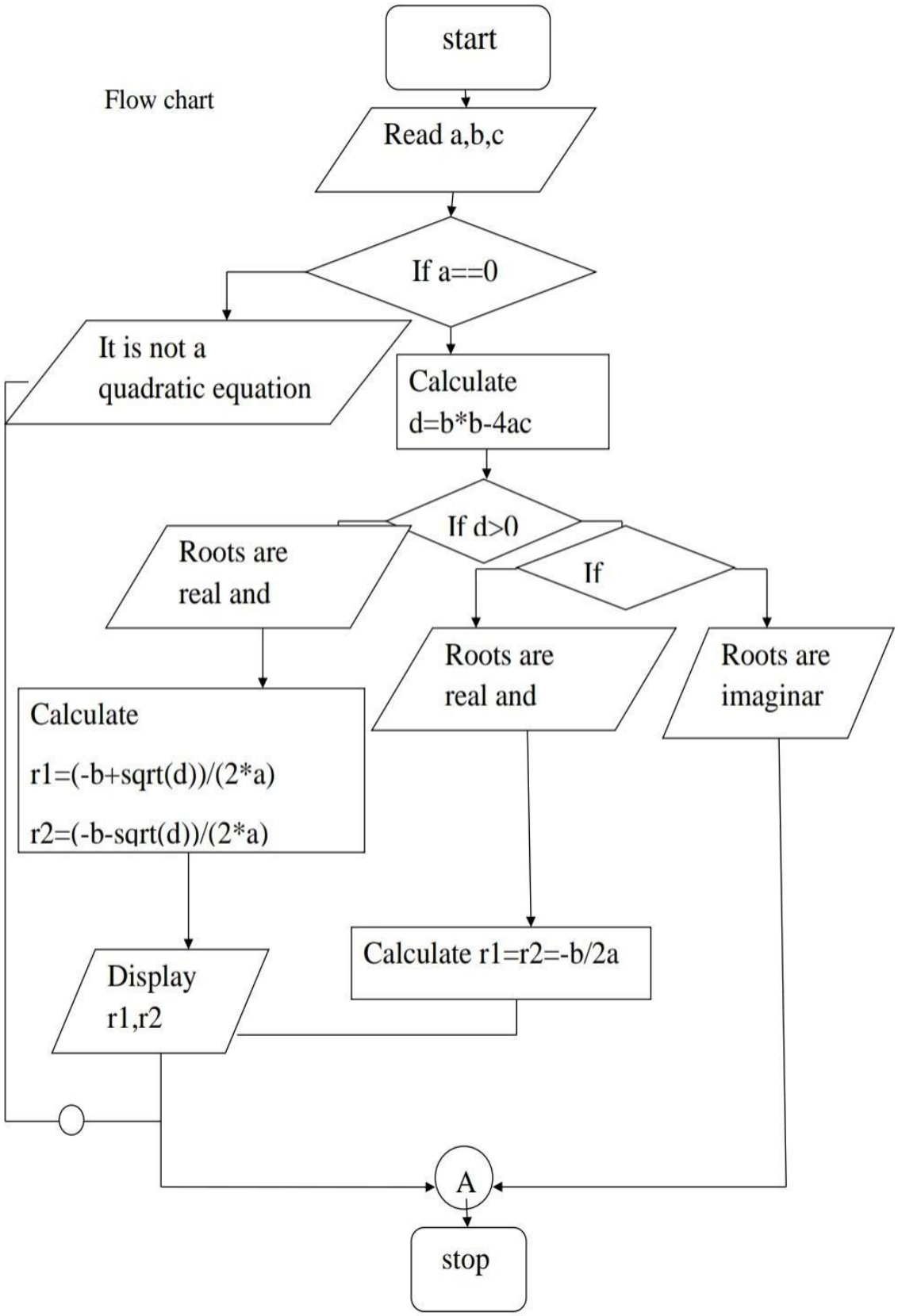
Enter n value
72
3
5

4. Write a C program to find the roots of a quadratic equation.

Algorithm

Step 1 : start
Step 2 : read a,b,c values
Step 3 : if a=0 then print this is not a quadratic equation and goto step 9Step 4 : else calculate d=b*b-4*a*c
Step 5 : if d>0 then print roots are real and unequal and calculater1=(-b+sqrt(d))/(2*a)
r2=(-b-sqrt(d))/(2*a)
Step 6 : else if d=0 then print roots are real and equal and calculater1=r2=-b/2*a then goto step 8
Step 7 : else print roots are imaginary and goto step 9
Step 8 : display r1,r2
Step 9 : stop

Flow chart




```
#include<conio.h>

#include<math.h>void main()
```

```
 {
Int a,b,c;
float
d,r1,r2;
clrscr();
printf("enter the coefficient values for a,b,c:
\n");scanf("%d%d%d",&a,&b,&c);
if(a==0)
 {
printf("\n this is not a quadratic equation");
 }
else
 {
d=b*b-4*a*c;
printf("descriminant is %f"
,d);
if(d>0)
{
printf("\n roots are real and
 unequal");r1=(-b+sqrt(d))/(2*a);
 r2=(-b-sqrt(d))/(2*a);
printf("\n roots are r1=%f \n r2=%f",r1,r2);
}
else if(d==0)
{
printf("\n roots are real and equal");
r1=r2=-b/(2*a);
printf("\n roots are r1=%f \n r2=%f",r1,r2);
 }
 else
printf("\n roots are imaginary");
}
getch();
 }
```

Output

```
1) Enter the coefficient values for
    a,b,c;1
    2
    3
Descriminant is -
 8.0000Roots are
 imaginary
2) Enter the coefficient values for
      a,b,c;2
      7
       5
Descriminant is 9.000
Roots are real and
unequalRoots are r1= -
1.000
 R2= -2.5000
3) Enter the coefficient values for
```

a,b,c;2
4
2
Descriminant is 0.000
Roots are real and
equalRoots are r1= -
1.000 R2= -1.000

4) Enter the coefficient values for
a,b,c;0
1
2
This is not a quadratic equation

5. Write a C program to find the factorial of a given integer.

Program

```
#include<stdio.h>
#include<conio.h
>int factorial(int
n); void main()
 {
intres,x
;
clrscr()
;
printf("\n enter a number for
factorial: ");scanf("%d",&x);
res=factorial(x);
printf(" \n factorial of %d is
%d",x,res);getch();
}
int factorial(int n)
{
if(n==0)
return 1;
else
 return(n*factorial(n-1));
 }
```

Output

Enter a number for
factorial:5Factorial of 5 is
120.

6. write a c program to find the GCD(greatest common divisor)of two given integers

Program

```
#include<stdio.h
>
#include<conio.h
>intgcd(int,int);
void main()
{
inta,b,g;
clrscr();
printf("\n enter 2
numbers:");
scanf("%d%d",&a,&b);
if(a>b)
g=gcd(a,b
);else
g=gcd(b,a
);
printf("gcd=%d",g
);getch();
}
intgcd(intm,int n)
{
int r;
r=m%n;
while(r!=0
)
{


        m
=n;
n=r;
r=m%n
;
}
return(n);
}
```

Output:

```
  Enter 2 numbers
2
4
Gcd=2
```

7. Write a C program to solve Towers of Hanoi problem.
Program

```
#include<stdio.h>
#include<conio.h>
void hanoinonrecursion(intnum,char ndl1,char ndl2,char ndl3)
 {
 if(num==1)
 {
printf("move top disk from needle %c to needle %c ",ndl1,ndl2);
 }
 if(num==2)
 {
printf("\n move top disk from needle %c to needle %c",ndl1,ndl2);printf("\n
move top disk from needle %c to needle %c",ndl1,ndl3);printf("\n move top
disk from needle %c to needle %c",ndl2,ndl3);
 }
 if(num==3)
 {
printf("\n move top disk from needle %c to needle %c",ndl1,ndl3);printf("\n
move top disk from needle %c to needle %c",ndl1,ndl2);printf("\n move top
disk from needle %c to needle %c",ndl3,ndl2);printf("\n move top disk from
needle %c to needle %c",ndl1,ndl3);printf("\n move top disk from needle %c
to needle %c",ndl2,ndl1);printf("\n move top disk from needle %c to needle
%c",ndl2,ndl3);printf("\n move top disk from needle %c to needle
%c",ndl1,ndl3);
 }
 }
 void main()
 {
int no;
clrscr();
printf("enter the number of disks to be transfered");
scanf("%d",&no);
if((no<1)||(no>3))
printf("\n there is nothing to move");else
printf("\n non recursion");
hanoinonrecursion(no,'A','B','C');getch();
 }
```

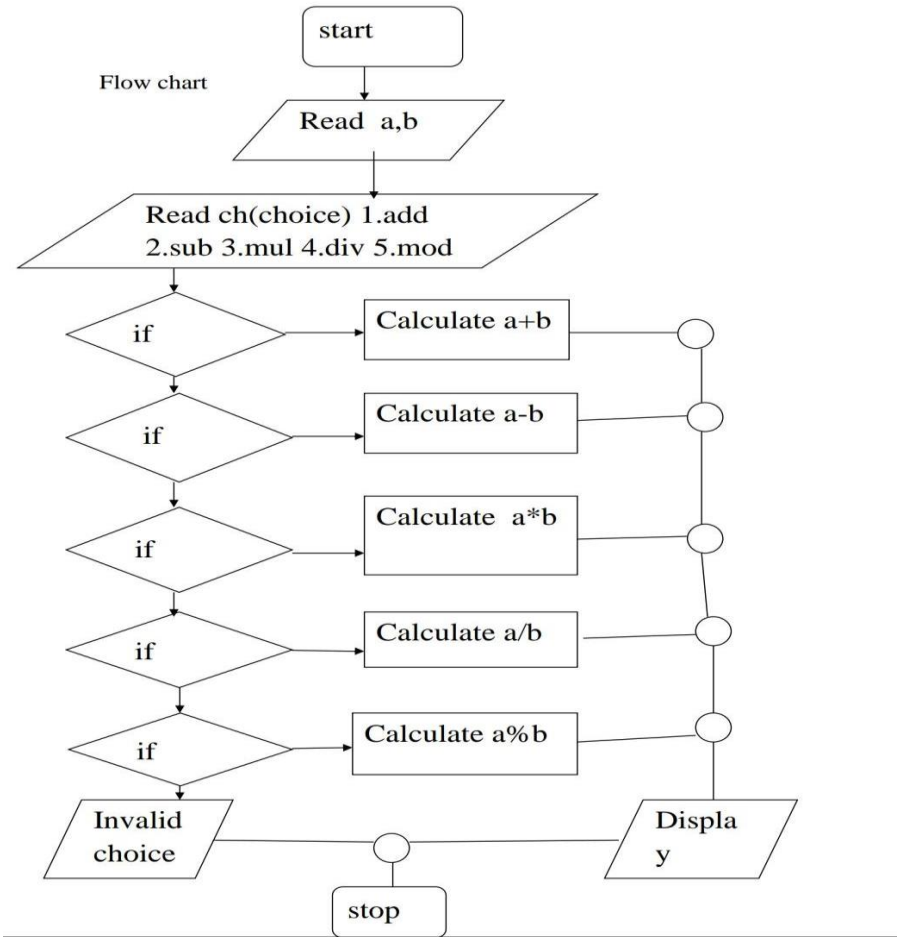
Output

Enter the number of disks to be transferred 1Non
recursion
Move top disk from needle A to needle B

8. Write a C program, which takes two integer operands and one operator from the user,performs

Algorithm

Step 1 : start
Step 2 : read a,b values and choice(ch)Step 3 :
read choice as
1.addition 2. Substraction 3. Multiplication
4. division 5. modulus
Step 4 : if choice is 1 (ch=1) then print addition of 2 num (a+b) and gotostep 10
Step 5 : if ch=2 then print substraction of 2 num (a-b) and goto step 10
Step 6 : if ch=3 then print multiplication of 2 num (a*b) and goto step 10
Step 7 : if ch=4 then print dividion of 2 num (a/b) and goto step 10
Step 8 : if ch=5 then print modulus of 2 num(a%b) and goto step 10
Step 9 : else if choice entered is invalid then display invalid choic
Step 10 : stop



Program

```
#include<stdio.h>
#include<conio.h>
```

```
void main()
  {
  inta,b,ch;
  clrscr();
  printf("enter the value of a,b");
  scanf("%d%d",&a,&b);
  printf("enter your choice:\n 1.add \n 2.sub \n 3.mul \n 4.div \n 5.mod \n6.exit");
  scanf("%d",&ch);do
  {
  switch(ch)
  {
   case 1:printf("\n addition=%d",a+b);break;
   case 2:printf("\n subtraction=%d",a-b);break;
   case 3:printf("\n multiplication=%d",a*b);break;
   case 4:printf("\n division=%d",a/b);
  break;
   case 5:printf("\n modules=%d",a%b);break;
   case 6:exit(0);
  break;
  default:printf("invalid choice");
   }
   }while(ch!=7);
  getch();
  }
```

Output:

1) Enter the value for a,b8
4
Enter your choice:
1.add
2.sub
3.mul
4.div
5.mod
The choice is: 1
Addition= 12
2) Enter the value for a,b

8
4
Enter your choice:
1.add
2.sub
3.mul
4.div
5.mod
The choice is: 2
Subtraction= 4
3) Enter the value for a,b8
4
Enter your choice:
1.add
2.sub
3.mul
4.div
5.mod
The choice is: 3
Multiplication= 32
4) Enter the value for a,b8
4
Enter your choice:
1.add
2.sub
3.mul
4.div
5.mod
The choice is: 4
Division= 2
5) Enter the value for a,b8
4
Enter your choice:
1.add
2.sub
3.mul
4.div
5.mod
The choice is: 5
Modulus= 0

6) Enter the value for a,b8
4
Enter your choice:
1.add
2.sub
3.mul
4.div
5.mod
The choice is: 6
Invalid choice

9. Write a C program to find both the largest and smallest number in a list of integers.
Program

```
int main()

{
inta,b,c,d,e;
printf("ENTER THE FIVE NUMBERS");
scanf("%d %d %d %d %d",&a,&b,&c,&d,&e);
  if(a>b && a>c &&  a>d && a>e)
printf("%d is largest", a);
  else
if(b>c && b>d && b>e)
  printf("%d is largest",
  b); else
  if(c>d && c>e)
printf("%d is largest", c);
else
  if(d>e)
printf("%d is largest", d);

  else

printf("%d is largest", e);
  return 0;
}

for(j=0;j<c1;j++)
scanf("%d",&a[i][j]);
}

printf("enter elements of matrix B:");
 for(i=0;i<r2;i++)
```

```
 {

 for(j=0;j<c2;j++)
scanf("%d",&b[i][j]);
 }

 for(i=0;i<r1;i++)

 {

 for(j=0;j<c1;j++)
 c[i][j]=a[i][j]+b[i][j];
 }

printf("\n addition of matrices a&b is:\n");
for(i=0;i<r1;i++)
 {
 for(j=0;j<c1;j++)
printf("%3d",c[i][j]);
printf("\n");
 }
 }
else
printf("addition is not possible\n");
getch();
}
```

Output 1

Enter order of matrix A
2 2
Enter order of matrix B
2 2
Enter elements of matrix A

1 1 1 1
Enter elements of matrix B
1 1 1 1
Addition of matrix A&b is
2 2
2 2
Output 2
Enter order of matrix A
1
2
Enter order of matrix B

2
3
Addition is not possible

i) Multiplication of Two Matrices

Program

```
#include<stdio.h>
#include<conio.h>
void main()
{
int i,j,k,r1,r2,c1,c2,a[10][10],b[10][10],c[10][10];
clrscr();
printf("\n enter the order of matrix A: \n");
scanf("%d%d",&r1,&c1);
printf("\n enter the order of matrix B: \n");
scanf("%d%d",&r2,&c2);
 if(c1==r2)
 {
printf("enter the elements of matrix A:\n");
 for(i=0;i<r1;i++)
 {
for(j=0;j<c1;j++)
scanf("%d",&a[i][j]);
 }
printf("enter the elements of matrix B: \n");
 for(i=0;i<r2;i++)
 {
 for(j=0;j<c2;j++)
scanf("%d",&b[i][j]);
 }
 // printf("multiplication is:\n");
for(i=0;i<r1;i++)
{
 for(j=0;j<c2;j++)
 {
 c[i][j]=0;
 for(k=0;k<r2;k++)
c[i][j]=c[i][j]+a[i][k]*b[k][j];

 }
```

10. Write a C program that uses functions to perform the following:
i) Addition of Two Matrices
ii) Multiplication of Two Matrices

ii) Addition of Two Matrices

Program

```
#include<stdio.h>
#include<conio.h>
void main()
 {

int a[10][10],b[10][10],c[10][10],i,j,r1,r2,c1,c2;

clrscr();

printf("enter order of matrix A:\n");
scanf("%d%d",&r1,&c1);
printf("enter order of matrix B:\n");
scanf("%d%d",&r2,&c2);
if((r1==r2) && (c1==c2))
 {

printf("\n enter element of matrix A:");
 for(i=0;i<r1;i++)
{


}
printf("resultant matrix is:\n");
 for(i=0;i<r1;i++)
 {
for(j=0;j<c2;j++)
printf("%d \t",c[i][j]);
printf("\n");
 }
 }
else
printf("multiplication is not possible");
getch();
}
```

Output

```
Enter the order of matrix A
2 2
Enter the order of matrix B
```

2 2
Enter the elements of matrix A
1
2
3
4
Enter the elements of matrix B
1
2
3
4
Resultant matrix is
7 10
12 22
Output 2
Enter the order of matrix A
2 2
Enter the order of matrix B
3 3
Multiplication is not possible

11. Write a C program that uses functions to perform the following operations:
i) To insert a sub-string in to a given main string from a given position.
ii) To delete n Characters from a given position in a given string.

i)To insert a sub-string in to a given main string from a given position
Program:

```
#include<stdio.h> #include<string.h>

void insertStr(char m[100],char s[100],intpos); int main()
{
char m[100],s[100]; intpos,n;


printf("\n enter main string for insertion:"); gets(m);
printf("\nenter sub string:"); gets(s);
printf("\nEnter position:"); scanf("%d",&pos); insertStr(m,s,pos);
printf("\nMain string after insertion: %s",m); getch();
return(0);
}
void insertStr(char m[100],char s[100],intpos)
{
inti,lm=strlen(m),ls=strlen(s); for(i=lm;i>=pos;i--) m[i+ls]=m[i]; for(i=0;i<ls;i++) m[i+pos]=s[i];
}
```

OUTPUT:
enter main string for insertion:comer enter sub string:put
Enter position:3

ii) To delete n Characters from a given position in a given string.

Program

```
#include<stdio.h> #include<string.h>
void deleteStr(char m[100],intn,intpos); int main()
{
char m[100],s[100]; intpos,n; printf("\nEnter main string for deletion:"); gets(m);printf("\nEnter no of characters to be deleted:"); scanf("%d",&n);
printf("\nEnter position:"); scanf("%d",&pos); deleteStr(m,n,pos);printf("\nmain
string after deletion: %s",m); getch();
return(0);
}
void deleteStr(char m[100],intn,intpos)
{
inti,Len=strlen(m); for(i=pos;i<=(Len+1-n );i++) m[i]=m[i+n];
}
```

OUTPUT:
Enter main string for deletion: abcdef Enter no of characters to be deleted:2 Enter position:3

12. Write a C program to determine if the given string is a palindrome or notProgram

```
#include <stdio.h>
#include <string.h>
void main()
{
 char string1[20];
inti, length;

int flag = 0;
clrscr();
printf("Enter a string:");
scanf("%s", string1); length
= strlen(string1);
for(i=0;i<length;i++)
 {
if(string1[i]!=string1[length-i-1])
{
 flag = 1;
 break;
}
 }
 if (flag)
```

```
 {
printf("%s is not a palindrome", string1);
 }
 else
{
printf("%s is a palindrome", string1);
 }
getch();
}
```

Output 1

Enter a string: madam
Madam is a palindrome

Output 2

Enter a string: sri
Sri is not a palindrome

13.Write a C program that displays the position or index in the string S where the stringT begins, or – 1 if S doesn't contain T.

Program

```
#include<stdio.h>
#include<string.h>
#include<conio.h>
void main()
{
char s[30], t[20]; char *found; clrscr();
puts("Enter the first string: ");
gets(s);
puts("Enter the string to be searched: ");
gets(t);
found = strstr(s, t);
 if(found)

{
printf("Second String is found in the First String at %d position.\n", found - s);
}
else
{
printf("-1");
}
getch();
}
```

Input & Output:

1.Enter the first string:
kali
Enter the string to be searched:li
second string is found in the first string at 2 position 2.Enter the first string:nagaraju

Enter the string to be searched:
raju
second string is found in the first string at 4 position 3.Enter the first string:nagarjuna

14. Write a C program to count the lines, words and characters in a given text.

Program

```
#include <stdio.h>
#include <conio.h>
#include <string.h>
void main()
{
 FILE *fs,*ft;
char ch;
int w=0,c=0,l=0;
clrscr();
fs=fopen("a.txt","r");
if(fs==NULL)
{
printf("source file can't be opened");
exit(0);
}
while((ch=fgetc(fs))!=EOF)
{
if(ch=='\n')
{ l++;
w++;

}
else if(ch=='\0'|| ch==' ')
{
w++:
c++;
}
else
c++;
}
printf("\n number of characters are %d",c);
printf("\n number of words are %d",w); printf("\n
number of lines are %d",l); getch();
}
```

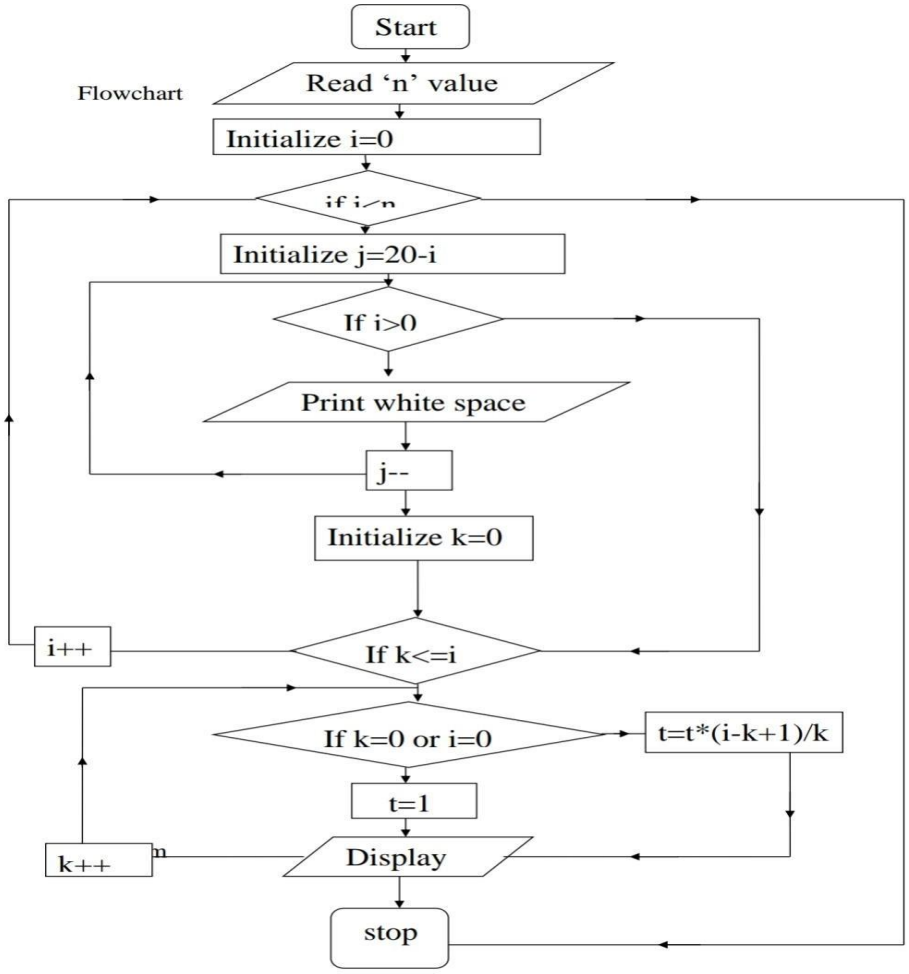
Output:

F2(save) ->alt+f9 ->file->DOS shell ->c:\tcc>copy con
file.txt
sriindu
^z(save)
1 file(s) copied
number of characters are 8

number of words are 2 number
of lines are 1

15. Write a C program to generate Pascal's triangle.
Algorithm
Step 1 : start Step
2 : read n
Step 3 : initialize i=0
Step 4 : if i<n
Step 5 : initialize j=20-i
Step 6: if j>0 is true Print
white space Decrement by
1
Goto step 5 again
Step 7 : initialize k=0
Step 8 : if k<=i then k<=i is false then i++ goto step 4
Step 9 : if k=0 to i=0 then t=1Step
10 : else t=t*(i-k+1)/k
Step 11 : print 't' then k++ goto step 8Step
12 : stop

Flowchart



Program

```
#include<stdio.h>
#include<conio.h>void
main()
  {
  intn,i,j,k,t=1;
  clrscr();
  printf("enter number of lines : \n ");
  scanf("%d",&n);
   for(i=0;i<n;i++)
  {
   for(j=20-i;j>0;j--)
  {
  printf(" ");
   }
   for(k=0;k<=i;k++)
   {
   if(k==0||i==0) t=1;
   else
  t=t*(i-k+1)/k;
  printf("%3d",t);
   }
  printf("\n\n");
   }
  getch();
  }
```

Output:

```
Enter number of lines : 31
1 1
 1 2 1
```

16. Write a C program to construct a pyramid of numbers

Program:

```
#include <stdio.h>
int main()
{
inti, j, rows;
printf("Enter number of rows: "); scanf("%d",&rows);for(i=1;
i<=rows; ++i)
{
for(j=1; j<=i; ++j)
{
printf("* ");
}
printf("\n");
}
return 0;
```

```
}
```

OUTPUT:

```
Enter number of rows: 5
*
* *
* * *
* * * *
* * * * *
```

PROGRAM 2:

```
#include <stdio.h>int main()
{
inti, j, rows;
printf("Enter number of rows: "); scanf("%d",&rows);for(i=1;
i<=rows; ++i)
{
for(j=1; j<=i; ++j)
{
printf("%d ",j);
}
printf("\n");
}
return 0;
}
```

OUTPUT:

```
Enter number of rows: 5 1
1 2
1 2 3
1 2 3 4
1 2 3 4 5
```

17. Write a C program to read in two numbers, x and n, and then compute the sum ofthis geometric progression: 1+x+x2+x3+… ..... +xn.

For example: if n is 3 and x is 5, then the program computes 1+5+25+125.Print x, n, the sum

Perform error checking.

For example, the formula does not make sense for negative exponents – if n is less than 0.Have your program print an error message if n<0, then go back and read in the next pair of numbers of without computing the sum. Are any values of x also illegal ? If so, test for them too.

Program

```
#include <stdio.h>
  #include <conio.h>
  #include <math.h>
```

```
  void main()
  {
int n, x, i, sum = 0;
clrscr();
printf("Enter the limit\n");
scanf("%d", &n);
printf("Enter the value of x\n");
scanf("%d", &x);
   if(x < 0 || n < 0)
   {
printf("illegal  value");
   }
   else
   {
      for(i = 0; i<= n; i++)
      sum=sum + pow(x, i);
   }
printf("sum=%d", sum);
getch();
   }
```

Input & Output:

```
   Enter the limit 4
  Enter the value of x
  sum=31
```

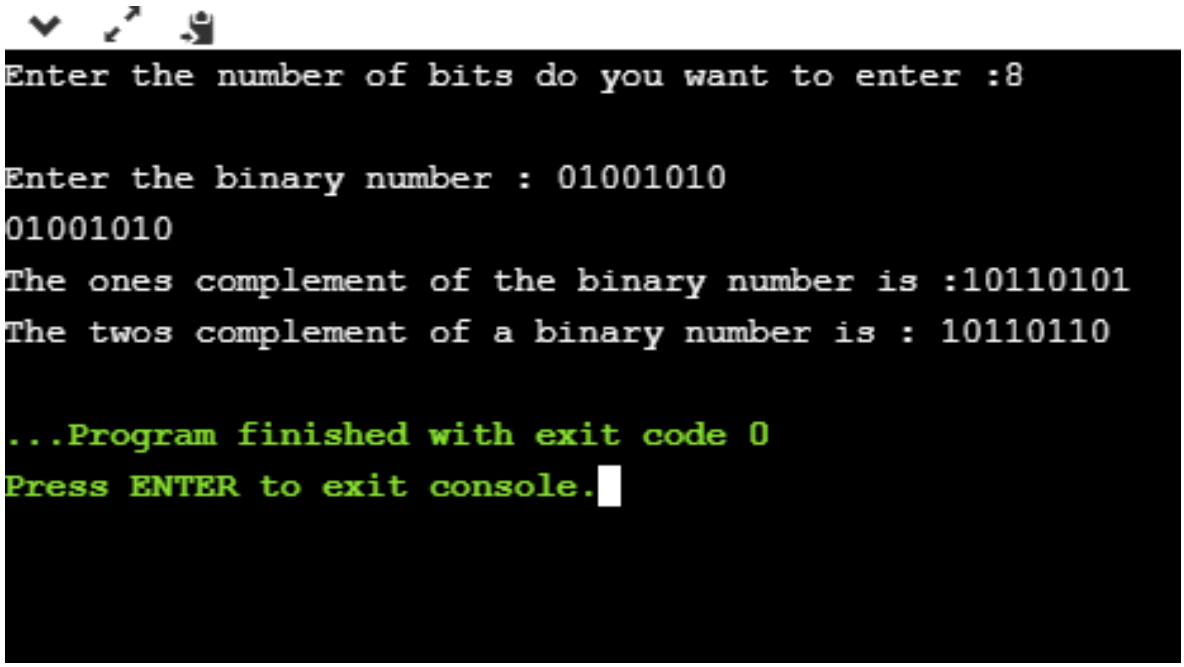
18. 2's complement of a number is obtained by scanning it from right to left and complementing all the bits after the first appearance of a 1. Thus 2's complement of11100 is 00100. Write a C program to find the 2's complement of a binary number.

Program

```
 #include <stdio.h>

int main()
{
   int n;  // variable declaration

   printf("Enter the number of bits do you want to enter :");

   scanf("%d",&n);

   char binary[n+1];  // binary array declaration;

   char onescomplement[n+1]; // onescomplement array declaration

   char twoscomplement[n+1]; // twoscomplement array declaration

 int carry=1; // variable initialization
```

```
  printf("\nEnter the binary number : ");
 scanf("%s", binary);
  printf("%s", binary);
   printf("\nThe ones complement of the binary number is :");
        // Finding onescomplement in C
for(int i=0;i<n;i++)
   {
 if(binary[i]=='0')
  onescomplement[i]='1';
  else if(binary[i]=='1')
onescomplement[i]='0';
   }
   onescomplement[n]='\0';
   printf("%s",onescomplement);
printf("\nThe twos complement of a binary number is : ");
  // Finding twoscomplement in C
for(int i=n-1; i>=0; i--)
    {
     if(onescomplement[i] == '1' && carry == 1)
        {
            twoscomplement[i] = '0';
        }
      else if(onescomplement[i] == '0' && carry == 1)
       {
          twoscomplement[i] = '1';
         carry = 0;
        }
        else
       {
         twoscomplement[i] = onescomplement[i];
```

```
        }
    }
twoscomplement[n]='\0';
printf("%s",twoscomplement);
return 0;
}
```



19. Write a C program to convert a Roman numeral to its decimal equivalent..

Program

Following is the C program to convert roman numbers to decimal numbers −

```
#include<stdio.h>
#include<conio.h>
main(){
  char roman[30];
  intdeci=0;
  intlength,i,d[30];
  printf("The Roman equivalent to decimal
 ");
  printf("Decimal: .....Roman
 ");
  printf("%5d..... %3c
 ",1,'I');
```

```
 printf("%5d.....%3c
",5,'V');
 printf("%5d.....%3c
",10,'X');
 printf("%5d.....%3c
",50,'L');
 printf("%5d.....%3c
",100,'C');
 printf("%5d.....%3c
",500,'D');
 printf("%5d.....%3c
",1000,'M');
 printf("Enter a Roman numeral:");
 scanf("%s",roman);
 length=strlen(roman);
 for(i=0;i<length;i++){
   switch(roman[i]){
      case'm':
      case'M': d[i]=1000;break;
      case'd':
      case'D': d[i]=500;break;
      case'c':
      case'C': d[i]=100;break;
      case'l':
      case'L': d[i]=50;break;
      case'x':
      case'X': d[i]=10;break;;
      case'v':
      case'V': d[i]=5;break;
      case'i':
      case'I': d[i]=1;
   }
 }
 for(i=0;i<length;i++){
   if(i==length-1|| d[i]>=d[i+1])
      deci+= d[i];
   else
      deci-= d[i];
```

```
  }
  printf("The Decimal equivalent of Roman numeral %s is %d", roman,deci);
}
```

Output

```
The Roman equivalent to decimal
Decimal:.....Roman
1 .....I
5 .....V
10 .....X
50 ..... L
100..... C
500..... D
1000 .....M
Enter a Roman numeral: M
The Decimal equivalent of Roman Numeral M is 1000
```

20. Write a C program that uses functions to perform the following operations:

i) Reading a complex number

ii) Writing a complex number

iii) Addition of two complex numbers

iv) Multiplication of two complex numbers

(Note: represent complex number using a structure.)

Program

```
struct complex add(struct complex a,struct complex b); struct complex
multiply(struct complex a,struct complex b);struct complex
 {
 float rl,img;
 }
 #include<stdio.h>
void main()
{
struct complex c1,c2,c3,c4;
clrscr();
printf("\n enter first complex number :");
scanf("%f%f",&c1.rl,&c1.img);
printf("\n enter second complex number :");
scanf("%f%f",&c2.rl,&c2.img); c3=add(c1,c2);
printf("\n addition=%0.2f+(%0.2f)i",c3.rl,c3.img);
```

```
 c4=multiply(c1,c2);
printf("\n multiplication=%0.2f+(%0.2f)i",c4.rl,c4.img); getch();
 }
struct complex add(struct complex a, struct complex b)
 {
struct complex x;
x.rl=a.rl+b.rl;
x.img=a.img+b.img;
return x;
 }
struct complex multiply(struct complex a, struct complex b)
 {
struct complex z; z.rl=(a.rl*b.rl)-
(a.img*b.img);
z.img=(a.rl*b.img)+(a.img*b.rl);return z;
 }
```

Output

```
Enter first complex number: 2 3
Enter second complex number: 3 3
Addition= 5.00+(6.00)i Multiplication=-
3.00+(15.00)i
```

21. i. Write a C program which copies one file to another.

ii. Write a C program to reverse the first n characters in a file.(Note: The file name and n are specified on the command line.)

. i. Write a C program which copies one file to anotherProgram

```
#include<iostream>
#include<stdlib.h>
usingnamespacestd;
int main(){
  charch;// source_file[20], target_file[20];
  FILE *source,*target;
  charsource_file[]="x1.txt";
  chartarget_file[]="x2.txt";
  source =fopen(source_file,"r");
  if(source == NULL){
    printf("Press any key to exit...
 ");
    exit(EXIT_FAILURE);
```

```
  }
  target =fopen(target_file,"w");
  if(target == NULL){
    fclose(source);
    printf("Press any key to exit...
 ");
    exit(EXIT_FAILURE);
  }
  while((ch=fgetc(source))!= EOF)
    fputc(ch, target);
  printf("File copied successfully.
 ");
  fclose(source);
  fclose(target);
  return0;
}
```

.

ii. Write a C program to reverse the first n characters in a file.(Note: The file name and n are specified on the command line.)

Program

```
#include<stdio.h>

#include<conio.h>

#include<string.h>

#include<process.h>

#include<stdlib.h>

void main(intargc, char *argv[])

{

  FILE *fs, *fd; char

  s[20], d[20];

  int c = 0, count = 0, n;clrscr();
```

```
 strcpy(s, argv[1]);

 n = atoi(argv[2]);
 fs = fopen(s, "r");if(s ==

 NULL)

 printf("\n FILE ERROR");

 fclose(fs);

 fs = fopen(s, "r+");count

 = 0; while(count < n)

 {

  d[count] = fgetc(fs);

  count++;

 }

 d[count] = '\0';

 fseek(fs, 0L, 0);

 fputs(strrev(d), fs);

 fclose(fs);

 fs = fopen(s,"r");

 while(!feof(fs))

 {

  printf("%c", fgetc(fs));c++;

 }

 fclose(fs);

 getch();

}
```

22.i. Write a C program to display the contents of a file.

ii. Write a C program to merge two files into a third file (i.e., the contents of the firstfile followed by those of the second are put in the third file)

i. Write a C program to display the contents of a file.

Program

```
#include<stdio.h>


#include<conio.h>
#include<stdlib.h>
void main()
{
FILE *fs;
char ch, *fname;
clrscr();
printf("Enter file name to read and display its content (like file.txt)
: ");
scanf("%s",fname);
fs=fopen(fname, "r");
if(fs==NULL)
{
printf("Error in opening file..!!");
getch();
exit(0);
}
While(1)
 {
Ch=fgetc(fs);
 If(ch==EOF)
 Break ;
 Else
Fputch(ch,stdout);
 }
printf("\n");
fclose(fs);
getch();
}
```

Output:

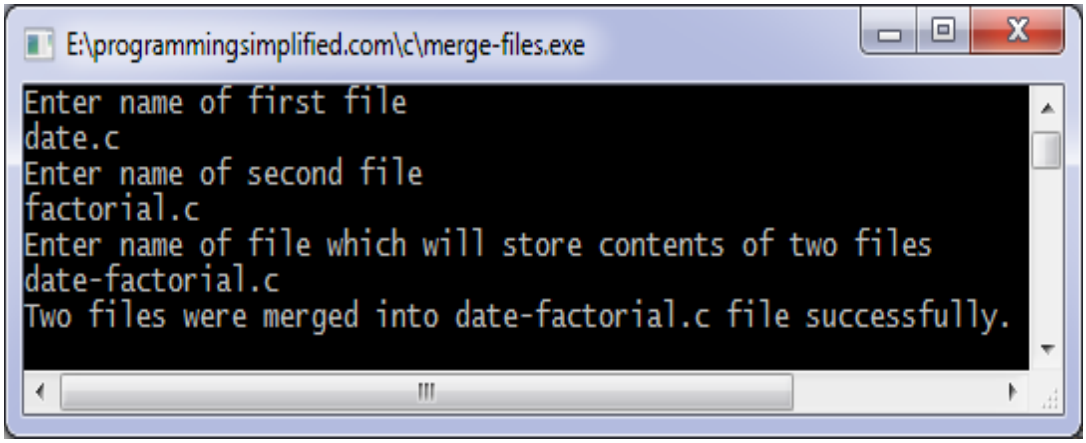
F2(save) ->alt+f9 ->file->DOS shell ->c:\tcc>copy con
file.txt
sriindu
^z(save)
1 file(s) copied
Ctrl+f9
Enter file name to read and display its content (like file.txt): file.txtSri indu

ii. Write a C program to merge two files into a third file (i.e., the contents of the firstfile followed by those of the second are put in the third file)

Program

```
#include <stdio.h>
 #include <stdlib.h>
```

```
int main()
 {
    FILE *fs1, *fs2, *ft;

   char ch, file1[20], file2[20], file3[20];

   printf("Enter name of first file\n");
    gets(file1);

   printf("Enter name of second file\n");
    gets(file2);

   printf("Enter name of file which will store contents of the two files\n");gets(file3);

   fs1 = fopen(file1, "r");fs2 =
    fopen(file2, "r");

   if (fs1 == NULL || fs2 == NULL)
    {
       perror("Error ");
       printf("Press any key to exit...\n");
       exit(EXIT_FAILURE);
    }

   ft = fopen(file3, "w"); // Opening in write mode

   if (ft == NULL)
    {
       perror("Error ");
       printf("Press any key to exit...\n");
       exit(EXIT_FAILURE);
    }

   while ((ch = fgetc(fs1)) != EOF)
       fputc(ch,ft);

   while ((ch = fgetc(fs2)) != EOF)
       fputc(ch,ft);

   printf("The two files were merged into %s file successfully.\n", file3);

   fclose(fs1);
    fclose(fs2);
    fclose(ft);

   return 0;
```



23. Write a C program that implements the following sorting methods to sort a given listof integers in ascending order i) Bubble sort ii) Selection sort iii)Insertion sort

i) Bubble sort:

Program

```
#include<stdio.h>
#include<conio.h>
#include<alloc.h>
void bubblesort(int *,int);void
 main()
{
int *a,n,i;
clrscr();
printf("\n enter the size of the array \n");scanf("%d",&n);
a=(int *)calloc(n,sizeof(int));
printf("\n enter the elements \n");
for(i=0;i<n;i++) scanf("%d",&a[i]);
printf("\n elements before sorting\n"); a
 for(i=0;i<n;i++)
printf("\t %d",a[i]);
bubblesort(a,n);
printf("\n sorted array elements \n");
 for(i=0;i<n;i++)
printf("\t %d",a[i]);
getch();
}
 void bubblesort(int *a,int n)
 {
inti,j,t;
 for(i=0;i<n;i++)
 {
 for(j=0;j<n-i-1;j++)
{
 if(a[j]>a[j+1])
 {
 t=a[j];
 a[j]=a[j+1];
 a[j+1]=t;
```

```
 }
 }
```

Output

```
Enter the size of the array5
Enter the elements3
2
1
4
5
Elements before sorting3 2
1 4 5
Sorted array elements1 2
3 4 5
```

ii) Selection sort:

Program

```
#include<stdio.h>
#include<conio.h> void
main()
{
int a[20],i,j,temp,n;
clrscr();
printf("\n enter the size of an array: \n");
scanf("%d",&n);
printf("enter array elementas \n");
for(i=0;i<n;i++) scanf("%d",&a[i]);
printf("\n selection sort: \n\n"); printf("array
elements before sorting: \n");for(i=0;i<n;i++)
printf("%d \t",a[i]);
 for(i=0;i<=n-2;i++)
 {
 for(j=i+1;j<n;j++)
 {
 if(a[i]>a[j])
 {
 temp=a[i];
 a[i]=a[j];
 a[j]=temp;
 }
 }
```

```
 }
printf("\n array after sorting: \n");
 for(i=0;i<n;i++)
printf("%d \t",a[i]);
getch();
}
```

Output

```
Enter the size of an array5
Enter the elements3
2
1
4
5
Selection sort
Array Elements before sorting3 2 1
4 5
array after sorting1 2
3 4 5
```

iii) Insertion sort:

Program

```
#include<stdio.h>
#include<conio.h>
void main()
 {
int a[20],i,j,k,temp,n;
clrscr();
printf("enter the size of an array: \n");
scanf("%d",&n);
printf("enter the elements in to an array: \n");
 for(i=0;i<n;i++)
scanf("%d",&a[i]);
printf("\n array before sorting \n");
 for(i=0;i<n;i++)
printf("%d \t",a[i]); printf("\n\n
insertion sort \n");for(i=1;i<n;i++)
 {
for(j=0;j<i;j++)
 {
 if(a[j]>a[i])
 {
```

```
temp=a[j];a[j]=a[i];
for(k=i;k>j;k--)
a[k]=a[k-1]; a[k+1]=temp;
 }
 }
 }
printf("\n array after sorting: \n");
for(i=0;i<n;i++)
printf("%d \t",a[i]);
getch();
}
```

Output

```
Enter the size of an array5
Enter the elements3
2
1
4
5
Array Elements before sorting3 2 1
4 5
Insertion sort array
after sorting1 2 3 4 5
```

24. Write C programs that use both recursive and non recursive functions to performthe following searching operations for a Key value in a given list of integers:

i) Linear search ii) Binary search

I)Linear search

Program

```
#include<stdio.h>
#include<conio.h>
void linear(int[],int,int);
void main()
 {
inti,n,key;int
a[50];
clrscr();
printf("\n how many elements you want to insert into an array= \n");
```

```
scanf("%d",&n);
printf("\n\n enter the array elements= \n");
for(i=0;i<n;i++)
 {
scanf("%d",&a[i]);
 }
printf("the elements in the array=\n");
for(i=0;i<n;i++)
 {
printf("%5d",a[i]);
 }
printf("\n which elements you want to search=");
scanf("%d",&key);
 linear(a,n,key);
getch();
 }
 void linear(int a[],intn,int key)
 {
int flag=1,i;
for(i=0;i<n;i++)
 {
 if(a[i]==key)
 {
printf("\n search is successfull \n");
printf("elements %d found at location %d \n",key,i+1);flag=0;
break;
 }
 }
if(flag)
 {
printf("\n unsuccessful search %d not found ",key);
}
getch();
 }
```

Output

```
How many elements you want to insert into an array=5Enter the
array elements:
3
2
5
1
4
```

The elements in the array=4 2
5 1 4
Which element you want to search=5
Search successful
Element 5 found at location 3
Output 2
How many elements you want to insert into an array=5Enter the
array elements:
3
2
5
1
4
The elements in the array=3 2
5 1 4
Which element you want to search=6
Unsuccessfull search 6 not found

ii)Binary search

Program

```
#include<stdio.h>
#include<conio.h>
void binary(int [],int,int);
void main()
 {
int a[50];
inti,n,key;
clrscr();
printf("\n enter how many elements you want to insert=\n");scanf("%d",&n);
printf("\n enter the elements in the ascending order= \n");for(i=0;i<n;i++)
scanf("%d",&a[i]);
printf("the array elements are = \n");
 for(i=0;i<n;i++)
printf("%5d",a[i]);
printf("\n which elements you want to search=");
scanf("%d",&key);
 binary(a,n,key);
getch();
 }
 void binary(int a[],intn,int key)
 {
intlow,high,mid;
```

```
int flag=1;
 low=0;
 high=n-1;
 while(low<=high)
{
 mid=(low+high)/2;
 if(key<a[mid])
 high=mid-1;
 else
if(key>a[mid])
low=mid+1; else
 if(key==a[mid])
{
printf("\n search successful \n");
printf("\n elements %d found at location %d \n",key,mid+1);flag=0;
 break;
 }
}
 if(flag)
printf("\n unsuccessful search %d not found",key);
 }
```

Output:

How many elements you want to insert into an array=5Enter the
elements in the ascending order:
1
2
3
4
5
The elements in the array=1 2
3 4 5
Which element you want to search=5
Search successful
Element 5 found at location 5
Output 2
How many elements you want to insert into an array=5Enter the
elements in the ascending order:
1
2
3
4

5
The elements in the array=1 2 3 4 5 Which element you want to search=6
Unsuccessfull search 6 not found.