

| Exam. | Back | | |
|-------------|----------------------|------------|--------|
| Level | BE | Full Marks | 80 |
| Programme | All (Except B. Arch) | Pass Marks | 32 |
| Year / Part | I / I | Time | 3 hrs. |

Subject: - Computer Programming (CT401)

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ Attempt **All** questions.
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- ✓ Assume suitable data if necessary.

1. a) What is computer program? Discuss in brief about different generation of programming languages. [1+4]
- b) Why is algorithm and flow chart development important in problem solving? Write an algorithm and draw flow chart to test a number entered by user whether it is even or not. [2+3]
2. a) What is the identifier? What are the ways to give value to variable? Explain with example? [1+2+1]
- b) Explain about input and output function available in C with syntax and example of each part. [2+2+2]
3. a) Write algorithm, draw flow chart and program to input a number check it is Armstrong or not. [2+2+2]
- b) What do you mean by selective and repetitive statement? Why do we need break and continue statement? [2+2]
4. a) What do you mean by "call by value and call by reference"? Explain it with suitable example. [4]
- b) Can we pass whole array element from the function? Write the program to pass an array to function and sort them. [6]
5. a) Write a program that finds the largest word in a given sentence. [4]
- b) Differentiate between the methods of passing argument to function with example. What are their advantages and disadvantages? [6]
6. What is structure? Why is it necessary? Write a program to add two distances given in feet and inch format using structure. [1+1+6]
7. a) What is null pointer? What will be the output of following program, explain. [1+3]

```
#include<stdio.h>
int main() {
    if( ! NULL )
        printf("C programming is easy");
    else
        printf("C programming is not easy");
    return 0 ;
}
```

- b) Write a program to calculate the length of string without using string handling function. [4]
8. A file name employee.txt stores employee name, employee id and employee salary. Write a program to display the detail of all employees in the order of their salary. [8]
9. Write a program in FORTRAN to read 10 integers from user and sort them in ascending

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1. What are computer programs and computer programming? Explain the steps that are required to build a computer program for solving a certain problem. [2+6]

2. Explain with an example the role that precedence and associativity play in the execution of an expression. Rewrite the following program by correcting any errors, if present and also write down the output of the corrected code. [4+4]

```

Define MAX '5'
int main ( )
{
    int case[MAX]={2,3,5,4,10},i,sum=0;
    for(i=0,i<MAX,i+=1)
    {
        printf("Case %d = %3.2d\n",i,case[i]);
        sum +=* case+i;
    };
    average = sum/MAX;
    printf("%06.2f",average);
    return 1;
}
    
```

3. a) Compare if-else-if ladder and switch construct with example and flowchart. [5]

b) Write a program in C to generate following pattern using unformatted input/output functions only. [5]

```

      N
    e e e
  P P P P P
a a a a a a a
L L L L L L L L L
    
```

4. Write a program in C to find out whether the n^{th} term of the Fibonacci series is a prime number or not. Read the value of n from the user and display the result in the main function. Use separate user-defined functions to generate the n^{th} Fibonacci term and to check whether a number is prime or not. [8]

5. a) How two dimensional arrays are created in C programming? Write a program to read square matrix of size $N \times N$ and find sum of both diagonals. [2+4]
b) Write a program in C to check whether a given string is palindrome or not using user defined function. [4]
6. What are the advantages of using pointer in C programming? Write a program in C to find second largest elements from an array containing N elements using concept of pointer. [2+4]
7. Explain structures and nested structures? Create a structure to hold any complex number $x+iy$. Write a program that uses the structure to read two complex numbers and display a third complex number which is the multiplication of the entered complex numbers. [3+5]
8. a) What are different input/output functions used with data files in C? Explain with syntax and examples. [4]
b) Write a program in C to read integers from user until user says "no". After reading the data write all the odd numbers to a file name odd.txt and all the even number to file named even.txt. [4]
9. When can we use recursive functions? Why do we need control statements in computer programs? Differentiate between do...while and for statements. [2+2+2]
10. What are the characteristics of FORTRAN Programming? Write a program in FORTRAN to calculate the value of π by evaluating the following formula for the first 25 terms. [8]

$$\pi = 4 \left(1 - \frac{1}{3} + \frac{1}{5} - \frac{1}{7} + \frac{1}{9} - \dots \right)$$

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1. a) What do you mean by Programming Language? Explain about the evolution of programming languages. [1+3]
- b) What are the advantages of a Flowchart design? Write down the guidelines to be followed to draw a flowchart. [2+2]
2. a) What is the purpose of the semicolon that appears at the end of most assignment statement in C? Explain the program compilation, linking and loading process with example. [2+4]
- b) Discuss the types of errors in programming. How do you debug a C-program? [2+4]
3. a) Explain relational and logical operators. [4]
- b) Write a C program to display following pattern without using formatted input/output statements. [4]


```

                Programming
                rogrammin
                ogrammi
                gramm
                ram
                a
            
```
4. a) Why do we need control statements? Compare switch and if-else-if ladder with example. [4]
- b) Write a C program to display all characters between a given ranges. [6]
5. a) What are the advantages of using functions? Differentiate between Library functions and User-defined functions with suitable example. [5]
- b) Write a program to check whether a given number is Armstrong number or not using recursive function. [5]
6. a) Write a C program to read two strings in main and compare them using userdefined function. Display appropriate message from main. [4]
- b) What are overflow and underflow errors in context of array? Write a program to add corresponding elements of two arrays. The results should form a new array. [2+4]
7. a) Why should we prefer structure over array? Explain nested structure with example. [2+4]
- b) Write a program to read name and roll number of 48 students from user and store them in file. If the file already contains data, your program should add new data at the end of the file. [6]
8. a) What is the structure of FORTRAN program? [5]
- b) Write a FORTRAN program to read n numbers and display largest number among them. [5]

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1. a) What is a flow chart? Use the various commonly used flow chart symbols. How does a flow chart help computer programming? [2+2+2]
- b) What is a program? Briefly describe types of computer software. [2+2]
2. a) What is an operator, datatype, constant and variable? Define. [6]
- b) Define and write syntax of the following: [4]
 - i) gets()
 - ii) putchar()
 - iii) scanf()
 - iv) strlen()
3. a) How is the switch statement used in decision making? Explain with a suitable example. [4]
- b) Write a program to check whether a given integer is a triangular number or not. [6]

(Any number is a triangular number if the sum of natural number from 1 to any number i is exactly equal to that number. For e.g 1,3,6,10,15 etc are triangular number as, $1+2=3$, $1+2+3=6$, $1+2+3+4=10$, $1+2+3+4+5=15$)
4. a) Briefly explain the passing by value and passing by reference in function with example. [6]
- b) Write a program to calculate sum of digits of a given 5-digits number entered by the user using recursive function. [4]
5. What is a string? Write a program to read a 3*3 square matrix, find minimum integer value of a matrix, replace the diagonal elements by the minimum element and display it using pointer. [2+8]
6. a) What is the principal difference between a structure and an array? [2]
- b) Write a program to read structure "college" having name, estDate and location where estDate is an another structure having day, month and year as members. Display the records of 10 colleges. [8]
7. a) What is a data file in C? What are the modes in file handling? Explain briefly. [1+3]
- b) Write a program to read the information of a file named "data.txt" and write its contents to another file "record.txt". [6]
8. a) Compare DO and implied DO statement in FORTRAN. [3]
- b) Write a FORTRAN program to add and subtract two matrices and display the results in matrix form. [7]

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1. a) Explain different generation of programming languages. [4]
b) Why do we need analysis and design before coding a program? [4]
2. a) What do you mean by precedence and associativity of an operator? Explain with suitable example. [3]
b) What are the differences between formatted and unformatted Input / Output. Give suitable example with sample output for the following: %10i, %3c, %-10.3f and %x. [1+4]
3. a) What are the purpose of the continue statement? Within which control statements can continue statement be included? Compare with the break statement. [1+2+2]
b) Write a program to find the sum of series $S_n = \sum 1/n^2$ up to N term. [5]
4. What is the meaning of function prototyping? Write a program to calculate the sum of the series 1+11+111+.....+up to N terms using recursive function. If N is read as 5, the series is: 1+11+111+1111+11111. [2+6]
5. a) Explain with an example for compile time initialization of 2D array. Describe how compiler manages according to the number of initializers and size of an array given by a user in case of 1D array. [2+3]
b) Write a program to read a word from a main function, pass it into a function that will convert all of its characters into upper case if the first character is in lower case and into lower case if the first character is in upper case. Display the converted string from main function. [5]
6. a) Explain need of structures. How can we create and use a structure within another. [2+3]
b) Explain dot and arrow operators for accessing the members of a structure. [3]
7. a) If Ptr is a pointer to user defined type or basic type, by how many bytes is Ptr incremented when the statement Ptr++ is executed? [2]
b) Write a C program that calls reverse array () to reverse the array and return the array and display the element of reversed array using pointer. [6]
8. List different types of standard I/O used in C. Write a program to write name, roll no and age of five students into a disk file name "STUDENT.DAT". [2+6]
9. a) Explain different types of goto statements in FORTRAN programming with suitable example. Write a program to read n from user and display the sum of following series till n^{th} terms: $1+(1+2)+(1+2+3)+(1+2+3+4)+\dots+n$ [4+4]
b) Explain with suitable example to show how an Impiled Do loop works in FORTRAN. [4]

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1. a) What is mean by compilation? What is mean by interpretation? How do these two processes differ? [4]
- b) Define programming language? What are the features of good computer program? [1+3]
2. a) What are preprocessor directives? Explain constants and variables. [2+2]
- b) Write syntax and example of following statements/functions: [1×4]
 - i) printf
 - ii) getch
 - iii) scanf
 - iv) long
3. What are control statements? Illustrate nested IF statement with its flowchart. Write a program to calculate the series: $1 \times 10 + 3 \times 20 + 6 \times 30 + \dots + \frac{N(N+1)}{2} \times 10N$, where N is an integer term read from the keyboard. [2+2+6]
4. a) Write a program to display Armstrong numbers between the range entered by a user and also display their counts. You must use a function to check for Armstrong numbers and display them from main. [4]
- b) What do you mean by nested function and recursive function? Give an example of recursive function. [2+2]
5. a) Write a C program to read a string and display its reverse. Use user defined function to count number of characters in it and to reverse it. [4]
- b) Write an algorithm to insert a value in an array at a position given by user. [4]
6. a) What is a tag? Must a tag be included in a structure type definition? Must a tag be included in a structure variable declaration? Explain. [1+1+2]
- b) Write a C program that reads several different names and address using structure computer, rearrange the names into alphabetical order and write out alphabetical list. [4]
7. Illustrate with example that "Array is indirectly a pointer". Write program to calculate sum and average of integer numbers between M and N (where value of M and N are read from keyboard) using pointer. [4+4]
8. Write a program to continuously read name, age and salary of a worker and write it into a file until user confirms to end. Then read n from user and display the nth record in the file. Details of worker must be represented by a structure. [7]
9. a) Compare arithmetic and logical if statements in FORTRAN. [7]
- b) Write a FORTRAN program to display nature of roots of a quadratic equation. Calculate and display the roots, if they are real and equal. [8]

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1. a) Categorise programming languages on the basic of their uses and applications. Among them which programming language is C programming? [4]
 b) List and define different steps to solve the problem in computer system. [4]
2. a) Differentiate between declaration and definition. Explain structure of C program with an appropriate example. [4]
 b) Write syntax, example and use of following: [1×4]
 - i) printf()
 - ii) scanf()
 - iii) getch()
 - iv) getche()
3. Write the difference between do and do..... while loop and write the program "to find whether a year is leap or not". [3+7]
4. What is recursive function? How does it work? Find out sum of digit of number until the number becomes one digit number. [891>18>9]. [2+2+4]
5. a) Write a program to read a string and rewrite its characters in alphabetical order. [4]
 b) A multinational company has hired 3 sales persons for marketing/selling its 3 different products in Kathmandu. Each sales person sells each of these products. Write a program to read number of each product sold by all sales-persons. Calculate total sells of each item and the total sells of each sales-person. Use arrays. [6]
6. a) Explain about "Arrays within structures" along with programming example. [4]
 b) Write the program "to understand how structure members are sent to a function". [4]
7. Write down advantages of pointer. Write a program using pointer to swap the value of two variables where the swapping operation is performed in separate function. [2+6]
8. Write a C program to store employee details in a text file. Read data from the text file, sort them in ascending order of salary and store the sorted record to a binary file. Display the details and rank of employee given by the user. [8]
9. a) What do you mean by formatted and unformatted input/output statements in Fortran and also give suitable example which explain the concept of Formatted I/O. [8]
 b) Write the program to convert a binary number to a decimal number using Fortran programming language. [4]

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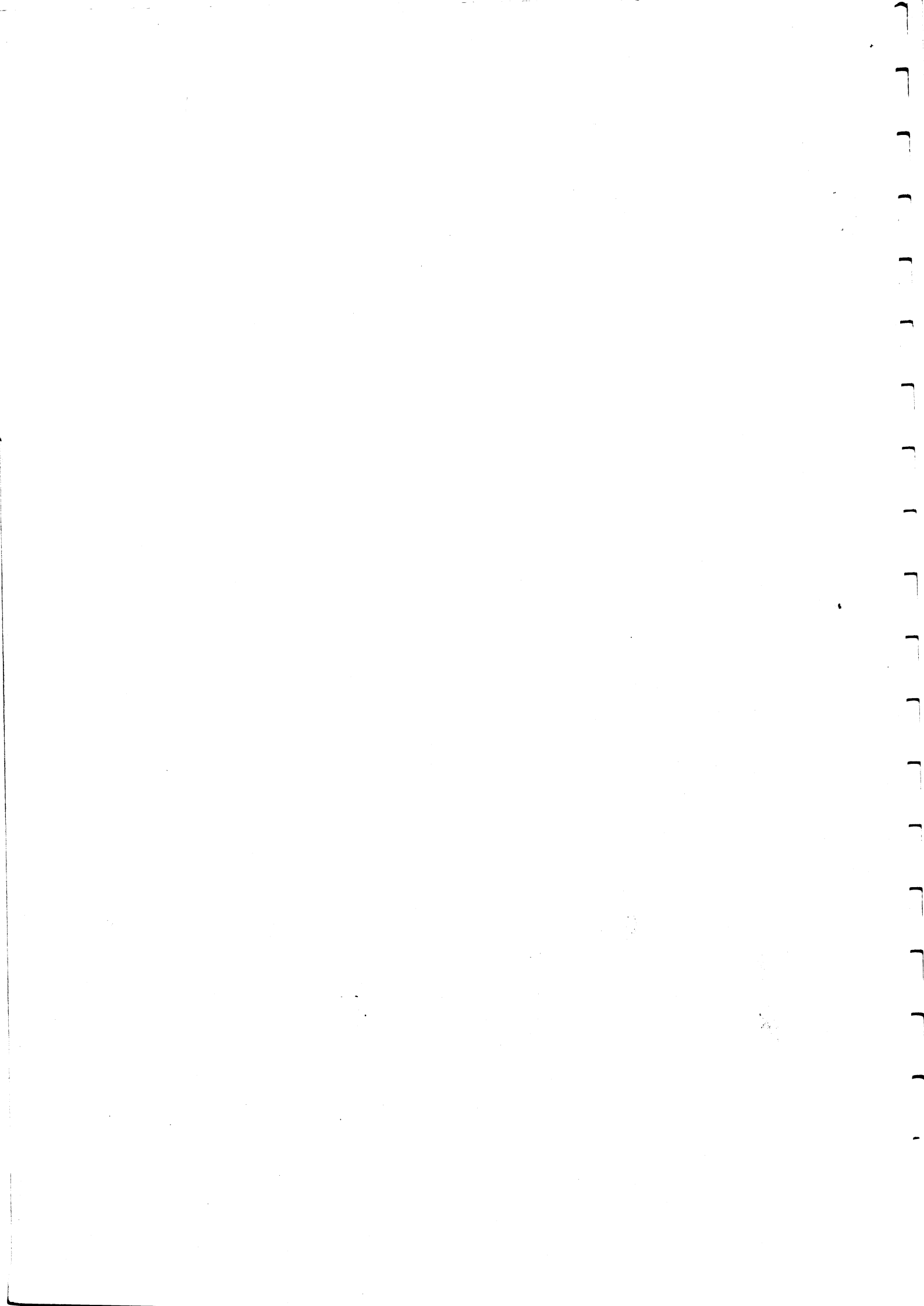
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1. a) ✓ Define software. Explain its types. [3]
b) ✓ What are the steps required to develop a computer program? Explain. [5]
2. a) ✓ What are relational operators and assignment operators? Explain with examples. [3]
b) Rewrite the following program by correcting any syntactical errors, if present. Also show the output of the corrected code. [3+2]

```
#Include <stdio.h>
int main ( )
{
    float root, int i = 1;
    do { sum = 2i - 1;
        print ("t%d\n", sum);
        i *= 5/3;
    } while (sum <= 15)
    root = pow (i, 1/2);
    print ("\n%.3f", root);
    return void;
}
```

3. a) ✓ Write a program to read the number until - 1 is encountered. Also count the number of even number and odd numbers entered by the user. [6]
b) Distinguish between break and continue statement with example. [4]
4. a) Explain how function is defined in C? Differentiate call by value and call by reference. [1+2]
b) Write a program using a function that returns the largest number from an array of numbers that is passed to the function. [5]
5. a) How are one dimensional and two dimensional arrays created in C? Explain with examples. [2+2]
b) Write a C program to read two matrices from user, add them and display the result in matrix form. [6]
6. What do you mean by nested structures? Give suitable example. Write a program to read the heights of two students and display the difference between their heights. Use feet and inches as members of a structure to define height. [2+6]
7. a) Compare array and pointer with example. [3]
b) Write a program to read a string from user and use a user defined function to copy the content of the read string into another character array changing lower case letter to upper if any. Use pointer to process the string. [5]
8. Write a program to read the details of book authors and write it to a file, until the user confirms to end. Then read and display the nth record in the file, where n is read from the user. The data for authors must be represented by structures that contain name, nationality and number of books published. [8]
9. a) Explain the FORTRAN structure. What are data types in FORTRAN. [2+2]
b) Write a program in FORTRAN to solve quadratic equation and display roots in proper format. [8]



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Subject: - Computer Programming I (EG442CT)

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1. Why do we need programming language? Write down the advantages and disadvantages of high level and low level programming languages. Write an algorithm and flow chart to check whether the given year is a leap year or not. [Hint a year is a leap year if it is divisible by 4 not by 100 and by 400.] [2+3+5]
2. What do you mean by operators? Explain different operators along with their precedence and associativity. Write a program to count the number of vowels in a string you are not allowed to use library functions. [2+2+6]
3. What is a nested if-else statement? Explain it with an example. Write a program to find the largest of the three numbers using a nested if-else statement. [1+2+7]
4. Compare while loop, for loop and do-while loop. Write a program to evaluate the following series until the difference between the two terms is less than 0.001. [3+7]

$$S_n = x + \frac{x^3}{3!} + \frac{x^5}{5!} + \dots$$
5. Explain why we need function in programming. Write a function to check whether a number is prime or not and use the output of that function to print prime numbers from 1 to n entered by the user. [3+7]
6. What is a pointer? Write down the relationship of array and pointer. Write a function that takes string as an argument and return the number of characters in the string. Also return by converting the string to upper case. Don't use library function. [1+2+7]
7. How is nested structure formed? Explain with example. Write a program to perform addition, subtraction, multiplication and division of complex numbers. Make separate functions for each operation. [1+2+7]
8. What are binary and text files? Write a program to write any structure information in a binary file and to read and display it later. Make a menu driven program to read and display information from file. [3+7]



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1. a) What do you mean by software and explain about generation of programming languages. [4]
 b) Define the term "Flowchart". Discuss about different symbols used in Flowchart. [4]
2. a) Find out final value of a, b and c where following expressions are executed sequentially. [4]


```
int a = 2, b = 3, c;
a = (b++) + (++b) + a; 10
c = a > b ? a; b; 3
b = (a++) + (b--) + a; 7
c = c++ * b--; 9
```

 b) What are the difference between formatted and unformatted I/O statements? Describe with proper example. [4]
3. a) Explain importance of break and default statements in switch statements. [3]
 b) Write a C program to display following pattern using unformatted output statements: [7]


```
P
Pu
PuL
PULC
PuLcH
PULCHO
puLcHoW
PULCHOWK
```
4. a) Define "function definition" and write the program to find the sum of two numbers using user-defined functions. [4]
 b) What do you mean by "call by value and call by reference" along with suitable example? [4]
5. Can we pass whole array element from function? Write a program to display only those students information which are passed. Use separate function to check the result of student. The information of students like Name, Roll No, Address and Marks are passed from main functions and pass to functions using array type arguments. [2+8]

6. a) Explain the use of typedef of keyboard in structures. [2]
b) Explain the need of nested structure. Write a C program to convert data in BS to data in AD using structure. Use the data difference of current data. [1+5]
7. a) A pointer variable is used to store address of some other variables, however, we need to specify datatype while declaring a pointer variable. Why? [3]
b) Briefly explain array of pointers. How are array and pointer related? Give example. [5]
8. a) Define opening and closing a file along with suitable examples. [4]
b) Write the program to display the records in sorted order sorting is performed in ascending order with respect to name using data files concept. [4]
9. a) Compare arithmetic and logical if statements in FORTRAN with suitable example. [4]
b) Write a FORTRAN program to read $m \times n$ matrix, transpose it and display both the matrices. [8]

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- ✓ 1. Differentiate between high level and low level. Explain the steps of solving a problem using computer. [4+4]
- ✓ 2. Consider a statement
`scanf("%s", str);`
 Where str is a string variable
 In above statement, why '&' symbol is not used? Can we input string with space in this statement? If not, why? [4]
- ✓ 3. Write a program in C to find all possible roots of a quadratic equation $ax^2+bx+c=0$. [8]
- ✓ 4. Write down significance of `main()` function in C, Differentiate between pass by value and pass by reference arguments. Describe both with meaningful example. [2+6]
- ✓ 5. Explain how array can be passed to functions. Write a program that passes an array to a function and print the largest and smallest element. [2+6]
- ✓ 6. How are structures different from arrays? Create a structure in C to store the name of a batsman, runs scored and no of times the batsman in dismissed. In the program, read the data of five players and display the batting average of the player whose name is entered by the user. Batting average is given by `total_runs/total_dismissals`. [2+6]
- ✓ 7. Write down advantages of pointer. What type of arithmetic operations can be implemented in pointer? Also describe the relationship between array and pointer with appropriate syntax and examples. [2+3+3]
8. Write a program in C, to read the following information for 96 students.
 Student Name, Student roll number, Marks obtained(in 100)
 Record all data in "ioe.txt" file, and program should print roll number and name of student who have obtained greater than or equal to 40 marks. [8]
9. Rewrite the following source code correcting any error present in it. Also indicate the error corrected in comment. Then write the output of the program. [4+4]

```

//program to convert list of temperatures
//in Centigrade to Fahrenheit
#include stdio.h;
int main()
{
    int i, n=3;
    float celc[n], faren[n];
    for(i=0; i<n; i++)
    {
        print("Celc[%d]=")
        scanf("%d", celc[i]);
    }
    convert(celc, faren, n);
    for(i=0; i<n; i++) print(faren[i]);
    break;
};
void convert(float cel[], float far[], int n)
{
    for(i=0; i<n; i++) cel2far(far[i], cel[i]);
};
cel2far(float f, float c)
{
    f = 9/5*c+32; };

```

10. How are do-loops used in FORTRAN? Explain with example. Compare it with implied do-loop. Write a FORTRAN program to read ten integer numbers, store them in array, arrange them in ascending order and display the sorted list.

11. What is the syntax of two dimensional arrays in FORTRAN? Explain with example.

[4]

Examination Control Division

2068 Baishakh

| Exam. Level | Regular / Back | | |
|----------------|---------------------|------------|--------|
| | BE | Full Marks | 80 |
| Programme | All (except B.Arch) | Pass Marks | 32 |
| Year / Part | I / I | Time | 3 hrs. |

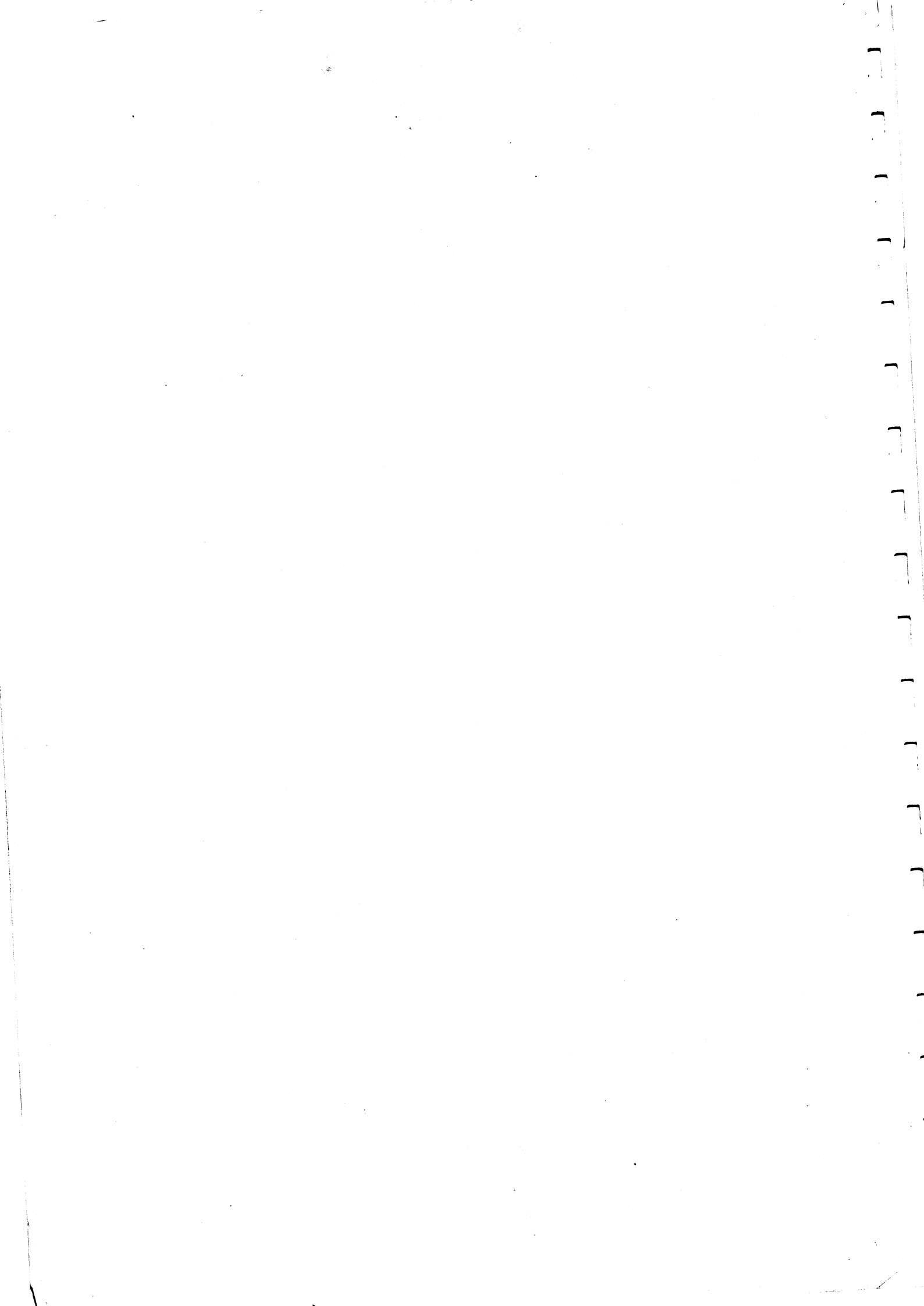
Subject: - Computer Programming

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ Attempt All questions.
- ✓ The figures in the margin indicate Full Marks.
- ✓ Assume suitable data if necessary.

1. What is high level language? Write different types of high level programming languages with their examples. How compiler is different than assembler programming language? [1+4+3]
2. What is a pseudo code? How is it different from an algorithm? Draw the flowchart to solve the multiplication of two matrices. [1+2+5]
3. Write a hierarchy of operations of the following expression in computer programming C: !EOF || B.Salary + Daily_Allowance > 8000 && eligible_code == 1 || net_pay > 10000. Write different formatted input output used in For Tran programming language. [4+4]
4. Write a program in C to calculate the frequency (F) for different values of capacitances(C), for a certain electrical circuit, with an inductance (L) and resistance (R), the damped natural frequency is given by $F = \sqrt{((1/LC) - (R^2/4C^2))}$. It is required to study the variation of this frequency with capacitance starting from 0.01 to 0.1 in steps of 0.01, and calculation should be done using user defined function. [8]
5. Write a syntax in C- programming with example of the following: "scanf", single statement "do....while", "strcpy", structures with arrays. [4x2]
6. What are the rules that govern the passing of arrays to user defined functions? Compare "user defined function" and "switch" in C- programming language. [3+5]
7. What are the importances of "Pointers" in C programming language? Write the output of the following program. [4+4]

```
# include<stdio.h>
# include<conio.h>
void main()
{   int k; int a[ ] = {1, 2, 3}; int*b[3]; int **c[3];
    int***d[3]; int****e[3]; int*****f[3];
    clrscr();
    for (k = 0;k<3; k++)
        {   b[k] = a + k; c[k] = b + k; d [k] = c + k;
            e [k] = d + k; f [k] = e + k;
        }
    for (k = 0;k<3; k++)
        {   printf ("%3d", *b[k];      printf ("%3d", **c[k];
            printf ("%3d", ***d[k];   printf ("%3d", ****e[k];
            printf ("%3d\n", *****f[k];
        }
}
```

8. Write a program to read name and age of 10 different students as the two members of a structure named "students". Display the name and corresponding age of the students sorted in an alphabetical order. [8]
9. What are the inputs and outputs functions used with data files? Explain, error handling process during reading and writing in a data files. [5+3]
10. Write a program in ForTran to test whether the accepted year is leap year, or not. (Hint: A year is leap year if: the year is divisible by 4, but not by 100 or the year is divisible by 400) [8]



Examination Control Division

2068 Shrawan

| Exam. | New Back (2066 Batch & Later) | | |
|-------------|-------------------------------|------------|--------|
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1. Define algorithm. Write an algorithm for finding largest and smallest values from a list. [2+6]
2. Draw a flowchart and algorithm to find roots of a quadratic equation ($ax^2 + bx + c = 0$). Include all three conditions of the determinant. [10]
3. Write a program to read values from user and find sum until user types 0, also display sum and average. [8]
4. Why programmers prefer using user defined functions? What is merits and demerits of using functions in program? Differentiate actual and formal parameters used in functions. [3+2+3]
5. Write a program to take a list of values from user into an array. Pass the list to a function which sorts the values in ascending order. Display the sorted list from main program. [3+5]
6. Write a program to represent complex number by a structure with real and imaginary as members. Take 2 complex numbers as input from user into structure variables. Pass the complex numbers to a function which calculates sum and returns it. Display the sum from another function display(). [10]
7. What is the role of pointers in passing parameters to functions by reference? Give example, how 2 dimensional array can be accessed by a pointer. [4+4]
8. What do you mean by opening a data file? How is this accomplished? Explain fscanf, fprintf, fread, fwrite functions. [1+3+4]
9. Explain the structure of a FORTAN program. Differentiate between arithmetic and logical if statement. [2+2]
10. Write a program in FORTAN to read two matrices from user, find their sum and display the sum. [8]



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1. What is high level language? What are the different types of high level languages? How computer programming language C is different from FORTRAN? [1+3+4]
2. Write an algorithm and flowchart of the distance between two points (x_1, y_1) and (x_2, y_2) , governed by formula $D^2 = (x_2 - x_1)^2 + (y_2 - y_1)^2$. Where, x_1, x_2, y_1, y_2 are given by user, but should not be zero. [5+5]
3. Write a syntax used in C programming language for the followings: [2x5]
 - a) scanf()
 - b) while
 - c) struct
 - d) if...else
 - e) static
4. What are the significant meanings of '&' and '*' established in C programming? How can you differentiate between 'called by value' and 'called by reference' with example in C programming? [4+6]
5. State with example, how switch () function differs from user defined function in computer programming language C. [4]
6. Write a pseudocode to find the standard deviation of an array of values in C programming. The array elements are read from the terminal. Use user defined functions to calculate standard deviation and mean. Standard deviation of n value is given by [8]

$$SD = \sqrt{\frac{\sum_{i=1}^n (x_m - x_i)^2}{n}}$$

Where x_m is the mean of the values.

7. Write a program in C programming language according to the output displayed below: (to open a file named RECORD.txt for the n number of data where Cost, Service Charge 5%, VAT 15%, and Total Cost must be calculated by program itself). [10]

Output is:

| Item Code | Description | Rate | Quantity | Cost |
|-------------------|-------------|-----------|----------|------------|
| 001CT | Computer | 22,000.00 | 5 | 110,000.00 |
| 007M | Cell Phone | 8,000.00 | 10 | 80,000.00 |
| VAT 15% | | | | |
| Service Charge 5% | | | | |
| Total Cost | | | | |

Thank You!!! Visit Again

8. Rewrite program correctly and write output of the given program written in C programming language below:

[8]

```
#include <stdio.h>
#include <conio.h>
#include <string.h>
void main()
{
    char ar1[11] = {'I','o','E',' ','P','U','L','C','H','O','W','K'};
    char ar2[15] = "IoE, Pulchowk";
    char ar3[11] = {{'I'},{'O'},{'E'},
    {' '},{ 'P'},{'U'},{'L'},{'C'},{'H'},{'O'},{'W'},{'K'};
    clrscr();
    printf("\nArray 1 = %c\n", ar1);
    printf("\nArray 2 = %c\n", ar2);
    printf("\nArray 1 = %c\n", ar3);
    return 0
}
```

9. Describe the formatted input and output statement in FORTRAN programming language with its syntax.

[4]

10. Write a program in FORTRAN to evaluate the following series:

[8]

$$\text{series} = 1/1^1 + 1/2^2 + 1/3^2 + \dots + 1/n^2$$

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Subject - Computer Programming I

- ✓ Candidates are required to give their answers in their own words as far as practicable.
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1. a) What are the demerits of C programming? Flowchart is representation of an algorithm. Justify the statement with suitable example. [2+2]
- b) Draw a flowchart and then write a program to read three sides of a triangle and print area for valid data and to print "Invalid data" if either one side of triangle is greater or equals to the sum of other two sides. [Area = $\sqrt{s(s-a)(s-b)(s-c)}$], where a, b, c are three sides and $s = (a + b + c) / 2$. [4]
2. a) Describe the meaning of precedence and associativity of operators with suitable example. How much memory is required for long integer and its range? [2+4]
- b) Write a program in C to calculate the sum of given series up to the term given by the user. [4]

$$Y = 1/2 - 2/x^2 + 3/x^3 - \dots$$
3. a) Distinguish between call by value and call by reference with example in C. [2]
- b) Write a program in C to find trace and norm of a matrix. Trace is defined as the sum of principal diagonal element; Norm is defined as square root of the sum of the square of all the elements in matrix. [6]
4. a) Classify the variable according to the scope and extent (storage class) with C. [2]
- b) Write a program in C which calculates F, where $F = (a * b^n) / c!$ and n is an integer. For designing above program, use two functions, one calculates factorial and other calculates power of a number. [6]
5. a) Why pointer operator is called indirection operator? Give example. [3]
- b) Write a C program to check whether the given string is palindrome or not. Palindrome should be checked by user defined function. [5]
6. a) What are the differences between malloc () and calloc (). When we use realloc (). [2+1]
- b) Write a C program to read n integer numbers in an array dynamically and create two functions to sort in ascending and descending order and display the result in the main function. [5]
7. a) Discuss how array of strings can be stored in array of pointer variable. [3]
- b) Write a C program to enter the strings until the user enters "end" and display the list of string in alphabetical order using two dimensional array of character using function. [5]

8. a) Explain nested structure in C, with example. [3]
b) Write a C program that illustrates the pointer pointing to the function. [5]
9. a) How can we pass structure variable as a parameter in function. Illustrate with an example. [2]
b) Create a structure Student(Roll, Name, Address, Age) to store 10 different records of students and another structure Marks_Sheet(SN, Subject_Name, Full_Marks, Pass_Marks, Marks_Obtained) within Student to store the records of 5 different subjects. Write a program to enter the records of students and display the records with the percentage each student have scored. [6]
10. a) In which condition unary operator is equivalent to assignment operator. Explain with examples. [2]
b) Write a program in-C to create a file named "subject.txt" that stores subject name, subject code and full marks where subject name and subject codes are strings and full marks is float. Also display all the records stored in the file. Write a program to keep the records of 10 subjects and display all records from the file. [6]

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1. a) Why is C programming most commonly used in simulation? Do you agree that the compiler can produce the executable file directly itself? Elaborate your answer. [2+2]
- b) Write an algorithm and a flowchart to read a five digit number and check whether the number is a palindrome or not. [2+2]
2. a) List different operators with their corresponding associativity in C. Mention the size and range of signed long int and float. [2+1]
- b) Write an interactive program that reads positive numbers until user enters "no" and then sum the numbers divisible by 4 that lie between the range of 10 and 50 and finally display the count and the average value. [5]
3. a) Illustrate the formatted I/O string data. Why don't good programmers prefer goto-statement? Compare switch over else if-ladder. [1+1+1]
- b) Write a program using recursion to compute the sum of the following series: [5]
 $1^2 - 2^2 + 3^2 - 4^2 \dots + (-1)^{n+1} n^2$ without using pow() function. You should read the value of n from the user.
4. a) How does a function optimize resources at the programmer and the machine side? How does a function return value? Illustrate with example. [1+2]
- b) Write a program to read number and call a function till 'yes' is entered by the user. You should count and sum the numbers using static variables in the function and return the average to the main function. [5]
5. a) Compare array with pointer syntactically and physically. [2]
- b) Write a program to compute the determinant of a square matrix of nth order and then check whether the given matrix is singular or not. You need to have two functions as read () and process (). [6]
6. a) Why do we need DMA? Explain the significance of calloc() with example. [1+1]
- b) Write a program that reads positive integer numbers into an array dynamically and pass them to a function where odd numbers are filtered into another array and display the array containing odd numbers in the main function. [6]
7. a) Mention the applications of pointer. Illustrate the invalid and valid pointer arithmetic on both data variable and pointer variable. [1+1]
- b) Write a program that dynamically allocates two different strings and pass them to a function where the second string is compared with the reverse of the first string on the character basis and display the message in the main function. You are not allowed to use the string functions. [6]
8. a) Illustrate the self referential structure and the position pointer. [1+1]
- b) Write a program that illustrates passing function address to other functions directly and using pointer. [6]
9. a) Sketch the bits assignment in a structure if you have 7 bit fields of 5 bits length each. Justify the bytes consumption by above structure with reasoning. [2]
- b) Write a program to compute any two instant memory spaces in a format (Kilobytes: Bytes: Bits) using structure. Build functions to add and subtract given memory spaces where 1KB = 1024 B and 1B=8 bits and display the results in the main function. [6]
10. a) Differentiate Text versus Binary mode of file. [2]
- b) Write a program that first appends the customer records in a binary file and display the number of customer records as well as the contents from the file. The file name should be given by user and display message if it does not exit. [6]

