CHANDUBHAI S. PATEL INSTITUTE OF TECHNOLOGY
DEVANG PATEL INSTITUTE OF ADVANCED TECHNOLOGY & RESEARCH

U & P U. Patel Department of Computer Engineering

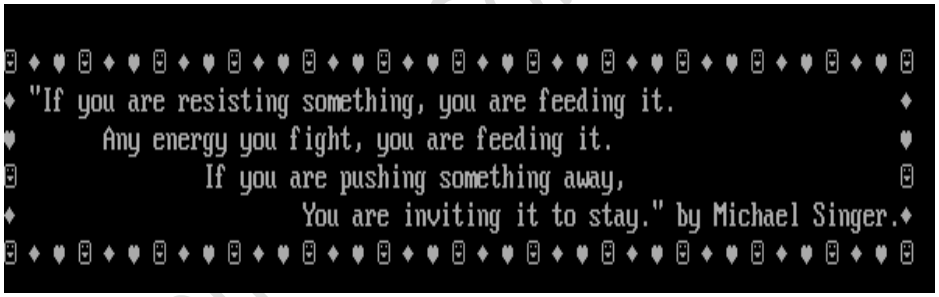
CSPIT **F.Y. B.Tech (CE/IT/EC)**

DEPSTAR **F.Y. B.Tech (CE/IT/CSE)**

Subject Name: Computer Concepts & Programming **Semester :** I

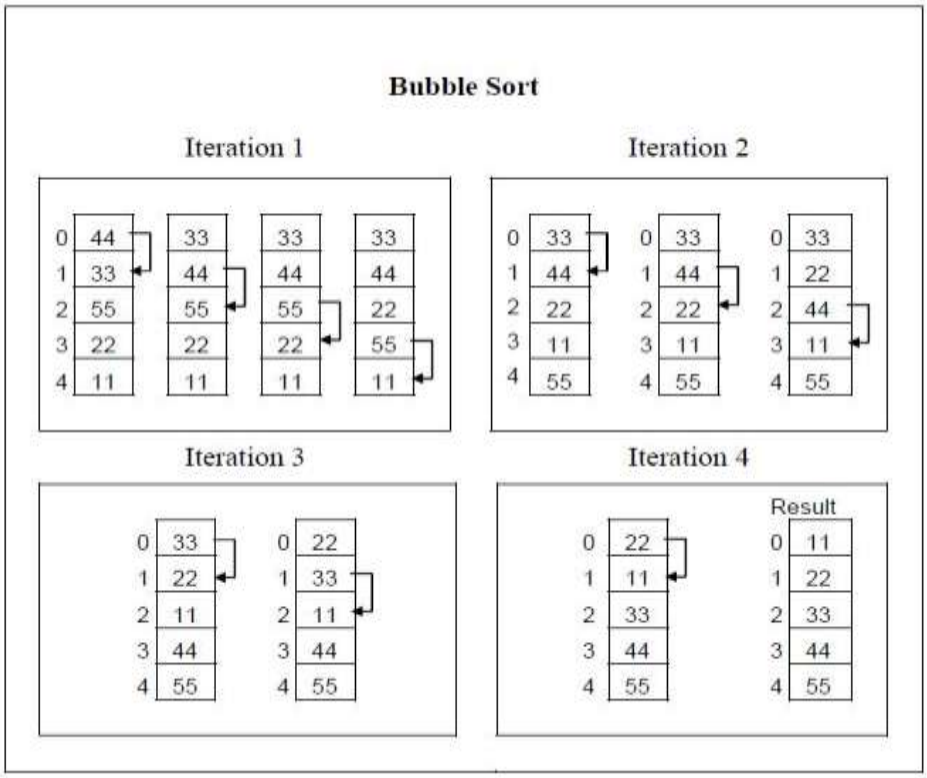
Subject Code: CE141 **Academic year:** 2018-19

Practical List

Sr. No.	Aim of the Practical	Hrs	LO	PO	PEO
	Knowledge Required: Constants, Variable & Data Types, Operators				
1.	Write a C program that will output this passage by Michael Singer. Make sure your output looks exactly as shown here (including spacing, line breaks, punctuation, and the title and author). Use Required **Escape Sequence** and **ASCII Value.**  There are three shapes in the output: Smiling Face, Diamond & Heart. The ASCII Value for Smiling face is 1. The ASCII Value for Diamond is is 4. The ASCII Value for Heart is is 3.	04			
2.	Ramesh's basic salary is input through the keyboard. His dearness allowance is 40% of basic salary, and house rent allowance is 20% of basic salary. Write a program to calculate his gross salary.				
3.	Write a program to calculate area of two circle. (πr^2). Use **Preprocessor directive** named **macro expansion** for the symbol π (**Symbolic Constant**) **without argument** and **with argument.** Use **typedef** to rename the float datatype.				

4.	Write a program to do following: **(a)** Input an amount and convert it into rupees and paisa. (For Ex. 25.67 Rs = 25 Rs and 67 Paisa).**(Implicit type Conversion)** **(b)** Input No of female and No of male and calculate the ratio of females to males in a town. No of female and No of male are in int and ratio is in float. (For Ex. No_of_Female = 10 & No_of_Male = 7 then ratio = 1.43).**(Explicit type Conversion)**				
	Knowledge Required: I/O Operations , Decision Making and Branching, Decision Making and Looping				
5.	While purchasing certain items, a discount of 10% is offered if the quantity purchased is more than 1000.If quantity and price per item are input through the keyboard, write a program to calculate the total expenses. Use **Simple If** statement.	04			
6.	Given three points (x1, y1), (x2, y2) and (x3, y3), write a program to check if all the three points fall on one straight line. Use **fabs()** function of < **maths.h**> header file. Use **if…else** statement.				
7.	If the three sides of a triangle are entered through the keyboard, write a program to check whether the triangle is valid or not. The triangle is valid if the sum of two sides is greater than the largest of the three sides. Use **nested if…else** statement**.**				
8.	An Insurance company follows following rules to calculate premium. (1) If a person's health is excellent and the person is between 25 and 35 years of age and lives in a city and is a male then the premium is Rs. 4 per thousand and his policy amount cannot exceed Rs. 2 lakhs. (2) If a person satisfies all the above conditions except that the gender is female then the premium is Rs. 3 per thousand and her policy amount cannot exceed Rs. 1 lakh. (3) If a person's health is poor and the person is between 25 and 35 years of age and lives in a village and is a male then the premium is Rs. 6 per thousand and his policy cannot exceed Rs. 10,000. (4) In all other cases the person is not insured. Write a program to output whether the person should be insured or not, his/her premium rate and maximum amount for which he/she can be insured. Use **Else…if Ladder.**				
9.	Write a program to input a character using **getchar()** and print the character using **putchar()** and check the character category. Also convert uppercase alphabet to lower case and vice versa. (Use **Character Test Functions** : isalnum(), isalpha(), isdigit(), islower(), isprint(), ispunct(), isspace(), isupper()) and (toupper() & tolower()) of <ctype.h> header file.				

10.	Write a program to find the grace marks for a student using **Switch Statement**. The user should enter the class obtained by the student and the number of subjects he has failed in. 1. If the student gets first class and the number of subjects he failed in is greater than 3, then he does not get any grace. If the number of subjects he failed in is less than or equal to 3 then the grace is of 5 marks per subject. 2. If the student gets second class and the number of subjects he failed in is greater than 2, then he does not get any grace. If the number of subjects he failed in is less than or equal to 2 then the grace is of 4 marks per subject. 3. If the student gets third class and the number of subjects he failed in is greater than 1, then he does not get any grace. If the number of subjects he failed in is equal to 1 then the grace is of 5 marks per subject.				
11.	Write a program to calculate following series using **if and goto** statement. Compare the results using **for loop**. $1^2+2^2+\ldots\ldots n^2$	04			
12.	An "Armstrong number" is an n-digit number that is equal to the sum of the nth powers of its individual digits. For example, 153 is an Armstrong number because it has 3 digits and 13+ 53+33 =153. Similarly 1634 is an Armstrong number because it has 4 digits and 14+ 64+34 + 44 = 1634. Write a program to find whether the entered number is Armstrong or not using **While Loop.**				
13.	Write a menu driven program which has following options: 1. Prime or not 2. Perfect number or not 3. Factorial of a number 4. Exit Use **do...while statement** so that the menu is displayed at least once. Also use **Switch statement.**				
14.	Write a program to print the following pattern using **Nested for loop.** **(Any one in homework)** **a)** * * * * * * * * * * * * * * * **b)** 1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 **c)** 1 1 2 3 5 8 13 21 34 55 **d)** A A A A B A A B C A A B C D A A B C D F	04			
H1	Write a program for a match-stick game between the computer and a user. Your Program should ensure that the computer always wins. Rules for the games are as follows: • There are 21 match-sticks. • The computer asks the player to pick 1, 2, 3, or 4 match-sticks.				

	• After the person picks, the computer does its picking. • Whoever is forced to pick up the last match-stick loses the game. **Use while loop, break and Continue Statements.** To understand the above game in a better way visit the following link: http://atozmath.com/Games/21MatchStick.aspx				
	Knowledge Required: Arrays & Strings				
15.	Write a program to that will scan an array from the user and print maximum and minimum number on the screen. Also find the index of given specific element from the user.	04			
16.	Write a program to sort elements of an array in **ascending order** using **Bubble Sort.**  				
17.	Write a program that reads an **M x N** matrix **A** and prints its elements in spiral order. You should start from the element in the 0th row and 0th column in the matrix and proceed in a spiral order as shown below. 1→ 2 → 3 → 4 ↓ 5 → 6 → 7 8 ↑ ↓ ↓ 9 10←11 12 ↑ ↓ 13←14←15← 16 Output for the above matrix:1 2 3 4 8 12 16 15 14 13 9 5 6 7 11 10				
18.	Write a program to find whether two given strings are permutations of each other. A string str1 is a permutation of str2 if all the characters in str1 appear the same number of times in str2 and str2 is of the same length as str1. For example if two strings are kindness and ksnisden the answer is Yes.	04			

H2 **Home Work:**

Write a program that would sort a list of names of fruits in alphabetical order. For example 5 names Orange, Pineapple, Grapes, Banana, Mango should sort the names as follows:

Banana
Grapes
Mango
Orange
Pineapple

<u>Knowledge Required: User-Defined Functions, Structures & Union</u>

19. Write a Program to print the table of Squares and Cubes of 1 to 10. (04)
The Program uses the following four **Function:**

Functions	Category
printline(): draws the line using ' - ' character.	**Function with No Arguments, No return type**
printnum() : prints number, square and cube.	**Function with Arguments ,No Return type**
square() : computes square of a number.	**Function with Arguments, with Return Type**
cube() : computes cube of a number.	**Function with Arguments, with Return Type**

The output should look like the below diagram:

```
-------------------------
| Number | Square | Cube |
-------------------------
|      0 |      0 |    0 |
|      1 |      1 |    1 |
|      2 |      4 |    8 |
|      3 |      9 |   27 |
|      4 |     16 |   64 |
|      5 |     25 |  125 |
|      6 |     36 |  216 |
|      7 |     49 |  343 |
|      8 |     64 |  512 |
|      9 |     81 |  729 |
|     10 |    100 | 1000 |
-------------------------
```

H3 Write a program to calculate nCr using Function with No arguments But with Return type.
(Hint: nCr = n! / ((r!) (n – r)!)).

20. Write a program to pass a number entered through keyboard as an argument to user-defined functions and find the factors of a number and check whether the factors are prime or not using **Nested Functions.**

21.	Write a program to generate Fibonacci series using **Recursive Function**. In a Fibonacci sequence the sum of two successive terms gives the third term. 1 1 2 3 5 8 13 ….	04			
22.	Write a Program to compute the standard Deviation of N Numbers using **Arrays & Function.** $\sigma = \sqrt{\frac{1}{N}\sum_{i=1}^{N}(x_i - \overline{x})^2}.$ For example suppose we have following numbers: 9, 2, 5, 4, 12, 7, 8, 11 To calculate the standard deviation $\boldsymbol{\sigma}$ of these numbers: 1. First find out the simple average of the numbers which is also known as mean and is denoted by $\bar{x}$. There are 8 numbers so the average would be $\bar{x}$ = (9+2+5+4+12+7+8+9)/8 = 7 2. Then for each number: subtract the Mean and square the result $(9 - 7)^2 = (2)^2 = 4$ $(2 - 7)^2 = (-5)^2 = 25$ $(5 - 7)^2 = (-2)^2 = 4$ $(4 - 7)^2 = (-3)^2 = 9$ $(12 - 7)^2 = (5)^2 = 25$ $(7 - 7)^2 = (0)^2 = 0$ $(8 - 7)^2 = (1)^2 = 1$ $(9 - 7)^2 = (2)^2 = 4$ 3. Then calculate average of those squared differences. Average of squared difference = (4+25+4+9+25+0+1+4)/8 = 9 4. Take the square root of that and we are done! $\boldsymbol{\sigma = \sqrt{9} = 3}$				
H4	Write a Program to reverse a string using Recursive Function and check whether it is palindrome or not.				
23.	Write a Program to find the upper triangle in the given matrix. Consider the following 4 x 4 Matrix. X X X X 0 X X X 0 0 X X	04			

	0 0 0 X If all the elements denoted by X are non-zero then the matrix has upper triangle. For the upper triangle, all the elements of principle diagonal and above must be non – zero. Pass **two dimensional arrays to the function**.				
H5	Write four small programs to illustrate the use of 4 storage class specifier's auto, static, register and extern.				
24.	Create a **Structure** called library to hold accession number, title of the book ,author name, price of the book and flag indicating whether the book is issued or not.(flag = 1 if the book is issued , flag = 0 otherwise). Write a program to enter data of one book and display the data. Write this same program with **Union** also.				
25.	Define a structure called Result for students. Structure will have members like Roll number, marks for three subjects and total of three subjects. Write a program to enter data for 5 students and display the merit list of students. **Use Array of Structures.** For example, if Roll No and marks of three subjects of each student are entered through the keyboard , the output should look like the following: Merit list --> Roll_No Sub1 Sub2 Sub3 Total 3 90 89 98 277 4 89 78 98 265 2 90 78 89 257 5 89 78 90 257 1 45 67 89 201				
26.	Write a program to read and display information of salary of an employee using **Structure within a Structure. Outer structure** contains members like name of employee, designation, department name, basic pay and **inner structure** contains dearness allowance, house_rent allowance and city_allowance. Calculate the total salary of one employee.	04			
27.	Define a **structure** named Date that contains three members day, month and Year. Write a program that compares two given dates. If the dates are equal then display message as "Equal" otherwise "Unequal". Write a **function** Check_Date to check whether the entered date is proper or not. The date is proper if day is between 1 and 31, month is between 1 and 12 and year is between 1000 and 9999. **(Structures & Functions)**				
	Knowledge Required: Pointers, File Management, Dynamic Memory Allocation				
28.	Write a program to perform following operations on two integer pointers. 1. Addition 2. Subtraction 3. Increment 4. Swaping of two numbers 5. Max and min of two numbers				

<table>
<tr><td>29.</td><td>Write a program to read the marks of 10 students for the subject CE141 Computer concepts and Programming and computes the number of students in categories FAIL, PASS, FIRST CLASS and DISTINCTION using Pointers and Arrays.
<table>
<tr><th>Marks</th><th>Categories</th></tr>
<tr><td>70 or Above</td><td>DISTINCTION</td></tr>
<tr><td>69 to 60</td><td>FIRST CLASS</td></tr>
<tr><td>59 to 40</td><td>PASS</td></tr>
<tr><td>Below 40</td><td>FAIL</td></tr>
</table>
For example if following marks of 10 students are entered:
34 56 78 98 12 31 67 75 91 23
Then the output should be
DISTINCTION 4 FIRST CLASS 1 PASS 1 FAIL 4</td><td>04</td><td></td><td></td><td></td></tr>
<tr><td>H6</td><td>Write a program that extracts part of the given string from the specified position. For example, if the string is “Workshop on Cloud Computing”, then if from position 5, 4 characters are to be extracted then the program should return the string as “shop”. Moreover, if the position from where the string is to be extracted is given and the number of characters to be extracted is 0 then the program should extract entire string from the specified position. (Pointers and Strings)</td><td></td><td></td><td></td><td></td></tr>
<tr><td>30.</td><td>Write a program that uses an array of pointers to strings str[ ]. Receive two strings str1 and str2 and check if str1 is embedded in any of the strings in str[ ]. If str1 is found, then replace it with str2.

char *str[ ] = {
"We will teach you how to...",
"Move a mountain",
"Level a building",
"Erase the past",
"Make a million",
"...all through C!"
} ;

For example if str1 contains "mountain" and str2 contains "car", then the second string in str should get changed to "Move a car".

(Array of Pointers)</td><td>04</td><td></td><td></td><td></td></tr>
<tr><td>31.</td><td>Write a program which performs the following tasks:
− initialize an integer array of 10 elements in main( )
− pass the entire array to a function modify( )
− in modify( ) multiply each element of array by 3
− return the control to main( ) and print the new array elements in main( )
Above program should be done in two ways: call by value and call by address and illustrate the difference between them. (Pointers as Function Arguments)</td><td></td><td></td><td></td><td></td></tr>
</table>

32. Write output for the following programs: 04

1. (Pointers to Functions)

```
#include<stdio.h>
void display();
int main()
{
        void (*func_ptr)();
        func_ptr=display;
        printf("Address of functions display is %u\n",func_ptr);
        (*func_ptr)();
        return 0;
}
void display()
{
  puts("By helping others, we help overselves!!");
}
```

2. (Functions Returning Pointers)

```
char *copy (char*,char *);
int main()
{
        char *str;
        char source[] = "Kindness";
        char target[10];
        str=copy(target,source);
        printf("%s\n",str);
        return 0;
}
char *copy(char *t,char *s)
{
        char * r;
        r = t;
        while(*s!='\0')
        {
                *t=*s;
                t++;
                s++;
        }
        *t='\0';
        return(r);
}
```

33. An automobile company has serial number engine parts starting from AA0 to FF9. The other characteristics of parts to be specified in structure are year of manufacturing, material and quantity manufactured.

(a) Specify a structure to store information corresponding to part.

(b) Write a program using pointer to retrieve information on parts

<table>
<tr><td></td><td>with serial numbers between BB1 and CC6. (Pointers and Structures)</td><td></td><td></td><td></td><td></td></tr>
<tr><td>34.</td><td>Write a program that takes contents of a file and copy them into another file and print it on the screen. Use feof () functions to detect the end of file and ferror() function to detect if there is an error in opening the file.</td><td></td><td></td><td></td><td></td></tr>
<tr><td>35.</td><td>Write a program to create a file named ALPHABETS which consists of all 26 letters ABC…XYZ and prints the contents of the file in reverse order ZYX….CBA on the screen. Use the function ftell(), fseek() and rewind().</td><td>04</td><td></td><td></td><td></td></tr>
<tr><td>H7</td><td>Write a program to open a file name INVENTORY and store in it the following data. Use fprintf() and fscanf() functions.
<table>
<tr><th>Item Name</th><th>Number</th><th>Price</th><th>Quantity</th></tr>
<tr><td>AAA1</td><td>111</td><td>17.5</td><td>100</td></tr>
<tr><td>BBB2</td><td>125</td><td>35</td><td>50</td></tr>
<tr><td>CCC3</td><td>150</td><td>50</td><td>200</td></tr>
</table></td><td></td><td></td><td></td><td></td></tr>
<tr><td>36.</td><td>Two files Data1 and Data2 contains sorted list of integers. Write a program to produce file Data3 which holds a single sorted, merge list of these two list. Use command line argument to specify the file name.</td><td></td><td></td><td></td><td></td></tr>
<tr><td>37.</td><td>Write a program to enter N numbers into array and sort the second half of the array using function sort(). Enter the size of the array through keyboard. (Dynamic Array). Use malloc () to allocate memory and use free() to free the memory after the use.
For example if input is
5 13 24 67 45 34
Output should be
5 13 24 34 45 67</td><td></td><td></td><td></td><td></td></tr>
<tr><td>38.</td><td>Write a program using to store a character string in a block of memory space created by calloc () and then modify the same to store a larger string using realloc () function. (Dynamic Array).</td><td></td><td></td><td></td><td></td></tr>
<tr><td></td><td>TOTAL LAB HOURS</td><td>60</td><td></td><td></td><td></td></tr>
</table>