Charotar University of Science and Technology [CHARUSAT]

Chandubhai S. Patel Institute of Technology [CSPIT]

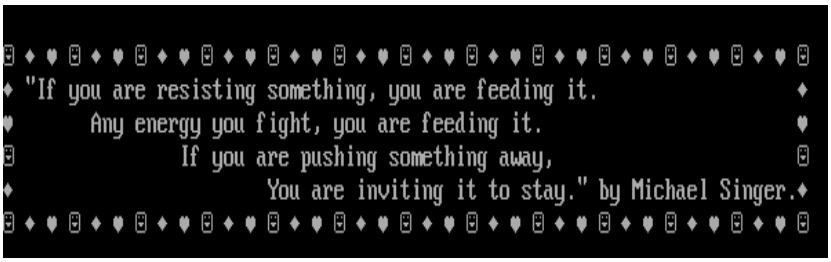
U & P U. Patel Department of Computer Engineering

Practical List

Subject code	:	CE143	Semester	:	1	Academic Year	:	2021-2022
Subject name	:	Computer Concepts and Programming						

CE:143 Computer Concepts and Programming Practical list

Practical No.	Unit	Aim of Practical
1.	Introduction to 'C' language	Draw FlowChart and Write Algorithms.
2.	Constants, Variables & Data Types in 'C'	Write a program using Constants, Variables, arithmetic expressions, data types, type modifiers and type conversions.
3.	Operators and Expression in 'C'	Write program providing understanding of Relational, logical, ternary and bitwise operators.
4.	Managing Input & Output Operations	Write a program for formatted and unformatted output in C.
5.	Conditional Statements & Branching	Write programs using If, If-else, If-else-if, Nested If, break, continue, goto and switch statements.
6.	Looping	Write programs using While loop, Do-while, simple for loop, nested for loop, break and continue.
7.	Arrays	Write programs on arrays (Sorting, Merging, finding particular value, etc.)
8.	Character Arrays and Strings	Write programs for string function (strlen, strcat, strcmp, strcpy, strrev, strstr, etc.) using array.
9.	User-Defined Function in 'C'	Write a program having user defined function having various scenarios of arguments and return values
10.	Structures and Union	Write a program to define struct and union and use their members.
11.	Pointers	Write a program explaining about how pointers are useful with Arrays and Functions.
12.	File Management in 'C'	Write a program for file management functions like: Create, Open, Read, Write and Close file operations.
13.	Dynamic Memory Allocation	Create programs for dynamically allocating memory in C programs using standard library functions: malloc (), calloc(), free() and realloc().

<table>
<tr><th>Set No.</th><th>Program No.</th><th>Program</th></tr>
<tr><td>1</td><td>1.1</td><td>
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.
Outcome:


Note:
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.
Also draw flowchart and write algorithm.
Try this example on Turbo C or Code blocks only.
Question:
1. Have you learnt about ASCII values for different symbols other than smile, diamond and heart? If yes, then mention any 5 ASCII symbols and their values in tabular format.
<table>
<tr><th>Sr. No.</th><th>Symbol</th><th>ASCII Value</th></tr>
<tr><td>1</td><td></td><td></td></tr>
<tr><td>2</td><td></td><td></td></tr>
<tr><td>3</td><td></td><td></td></tr>
<tr><td>4</td><td></td><td></td></tr>
<tr><td>5</td><td></td><td></td></tr>
</table>
</td></tr>
<tr><td></td><td>1.2</td><td>
Write your bio-data using Escape Sequences. And you have to take your Basic Information as user input. It should contain the following content. It should contain the following content.
Expected Outcome:
Draw flowchart, write algorithm and program for given scenario. Also attach screenshot of output
</td></tr>
</table>

#=======#=======#=======#=======#=======#=======#=======#=======#

BIO - DATA

#=======#=======#=======#=======#=======#=======#=======#=======#

Basic Information

Name : XYZ
Address : XYZ
Mobile Number : 123
Gender : M/F
Date of Birth : DD/MM/YYYY

Education Qualification

- SSC -> Name of school -> Passing Year
  "Percentage"
- HSC -> Name of school -> Passing Year
  "Percentage"

Other Information

Technical Skills : 'JAVA', 'C', 'C++'
Hobbies : ABC, XYZ

#=======#=======#=======#=======#=======#=======#=======#=======#

THANK YOU

#=======#=======#=======#=======#=======#=======#=======#=======#

Questions:

1. What is the purpose of using escape sequences? Answer in one or two statements. Mention any 5 escape sequences used regularly along with their purpose.

Sr. No.	Escape Sequence	Purpose
1		
2		
3		
4		
5		

<table>
<tr>
<td>2.</td>
<td>2.1</td>
<td>
In a town, the percentage of men is 52. The percentage of total literacy is 48. If total percentage of literate men is 35 of the total population, write a program to find the total number of illiterate men and women if the population of the town is 80,000.
Expected Outcome:
Draw flowchart, write algorithm and program for given scenario. Also attach screenshot of output.
Fill below mentioned table as per your output.
<table>
<tr><td>Sr. No.</td><td>Get Outcome</td><td>Value</td></tr>
<tr><td>1</td><td>Total Population</td><td></td></tr>
<tr><td>2</td><td>Number of Literate (Men + Women)</td><td></td></tr>
<tr><td>3</td><td>Number of Men</td><td></td></tr>
<tr><td>4</td><td>Number of Literate Men</td><td></td></tr>
<tr><td>5</td><td>Number of illiterate Men</td><td></td></tr>
<tr><td>6.</td><td>Number of Women</td><td></td></tr>
<tr><td>7.</td><td>Number of Literate Women</td><td></td></tr>
<tr><td>8.</td><td>Number of illiterate Women</td><td></td></tr>
</table>
Questions:
1. Has this scenario helped you learn about integer and float datatype? If yes, then mention the requirements of using integer and float data types.
</td>
</tr>
</table>

2.2

A Bigbazaar cashier has currency notes of denominations 10,50 and 100. If the amount to be withdrawn is input through the keyboard in hundreds, find the total number of currency notes of each denomination the cashier will have to give to the withdrawer.

Expected Outcome:

Draw flowchart, write algorithm and program for given scenario. Also attach screenshot of output

Fill up the required number of currency notes of denomination 10, 50 and 100 in below given table as per the output received.

Sr. No.	Note Requirements	Counts
1	Requirement of 100 Rs. note	
2	Requirement of 50 Rs. note	
3	Requirement of 10 Rs. note	

Questions:

1. Have you learned about how scanf function can be used to collect the user input? Give the correct answer for the following table:

Sr. No.	Data Type	Format Specifier	Example of data
1	Integer		
2	Float		
3	Char		

<table>
<tr>
<td></td>
<td>2.3</td>
<td>
Write a program to calculate Net Salary. User has to input Basic Salary and Output should be:
Enter Basic Salary: 5000 (e.g. 5000)
Allowances:
DA = 70% of Basic Salary
HRA = 7% of Basic Salary
MA = 2% of Basic Salary
TA = 4% of Basic Salary
Deduction:
PF = 12% of Basic Salary
IT = any value (e.g. 500)

Net Salary = Basic Salary + Allowances – Deduction
Expected Outcome:
Draw flowchart, write algorithm and program for given scenario. Also attach screenshot of output.
Fill up the data mentioned in below given table as per the output received.
<table>
<tr><th>Sr. No.</th><th>Input/Outputs</th><th>Amount</th></tr>
<tr><td>1</td><td>Enter your Basic Salary</td><td></td></tr>
<tr><td>2</td><td>DA of Basic Salary</td><td></td></tr>
<tr><td>3</td><td>HRA of Basic Salary</td><td></td></tr>
<tr><td>4.</td><td>MA of Basic Salary</td><td></td></tr>
<tr><td>5.</td><td>TA of Basic Salary</td><td></td></tr>
<tr><td>6.</td><td>PF of Basic Salary</td><td></td></tr>
<tr><td>7.</td><td>Gross Salary</td><td></td></tr>
<tr><td>8.</td><td>Net Salary</td><td></td></tr>
</table>
Questions:

Have you learned about various data types that can be suitably used for this problem? Do mention which data types can be used and why? Also mention the difference between the outputs.

</td>
</tr>
<tr>
<td>3</td>
<td>3.1</td>
<td>
Write a program that takes the length of the pendulum as input and then calculate the time period of the pendulum. Provided that, $T=2\pi\sqrt{L/G}$. Define the value of π as 3.14 and take L as the length of the pendulum and G as the acceleration of gravity either in m/s or as input from the keyboard. Display the time period rounded to 2 decimal places.
Hint:
Use Math.h header file, use #define for specifying the value of π
Expected Outcome:
Draw flowchart, write algorithm and program for given scenario. Also attach screenshot of output.
Fill up the output as per the inputs mentioned in below given table as per the output received in console.
</td>
</tr>
</table>

Sr. No.	Input		Output
	Length	Gravity	Time Calculated(seconds)
1.	50 m	9.8 m/s^2	
2.	50 m	0 m/s^2	
3.	50 m	0.9993 g	
4.	50 m	-1 g	

Questions:

1. Have you learned about, how math function is useful for calculating square root? Which datatype is supported by all math functions? Also mention any 5 math functions with their purpose.

Sr. No.	Math function	Description
1.		
2.		
3.		
4.		
5.		

3.2

Let us understand the working of Pre-increment, Post-increment, Pre-decrement and Post-decrement

a) Consider a scenario where, Boys are playing in the park and collecting and removing the yellow balls in/from the bucket based on teacher's instruction. Let's say there are already 10 Yellow balls present in a bucket. Following is the sequence of the instructions given by the teacher for adding/removing the balls.

i. Rajiv: ++ Yellow
ii. Preet: --Yellow
iii. Raj: Yellow++
iv. Ritul: Yellow--

Expected Outcome:

Fill up the data mentioned in below given table as per the output received.

Sr. No.	Instructions	Yellow
1.	Count before execution	
2.	Count after execution	

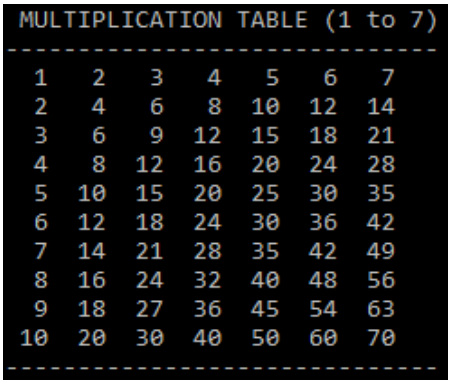
b) Consider another scenario where boys and girls both are asked to add/remove Yellow and Pink balls from the bucket respectively. Currently there are 10 Yellow balls in the bucket and 20 Pink balls.
Teacher has given the sequence of instructions as below for adding/removing the balls.
Calculate = ++Yellow + Yellow++ + --Yellow + ++Pink - --Pink - --Pink
Get the count of Yellow and Pink balls after evaluating above given scenario.

<table>
<tr>
<td></td>
<td></td>
<td>
Expected Outcome:
Fill up the data mentioned in below given table as per the output received.
<table>
<tr><th>Sr. No.</th><th>Instructions</th><th>Yellow</th><th>Pink</th></tr>
<tr><td>1.</td><td>Count before execution</td><td></td><td></td></tr>
<tr><td>2.</td><td>Count after execution</td><td></td><td></td></tr>
</table>
Also get the count of calculate and explain how it is calculated in stepwise manner. (hint: left to right, as per memory)

Questions:
Have you understood the working of Pre-increment, Post-increment, Pre-decrement and Post-decrement?
Rubrics: Output should be as mentioned in the expected outcome, if it is imperfect then submission marks are proportional.
</td>
</tr>
<tr>
<td></td>
<td>3.3</td>
<td>
Write a C program to swap two numbers (use two variables for collecting value from user) without using third variable. (Hint: Use arithmetic operators)
Expected Outcome:
Draw flowchart, write algorithm and program for given scenario. Also attach screenshot of output.
Fill up the output as per the output received in console.
<table>
<tr><td>Sr. No.</td><td>Instruction</td><td>Number1</td><td>Number2</td></tr>
<tr><td>1.</td><td>Before Swapping</td><td></td><td></td></tr>
<tr><td>2.</td><td>After Swapping</td><td></td><td></td></tr>
</table>
Questions:

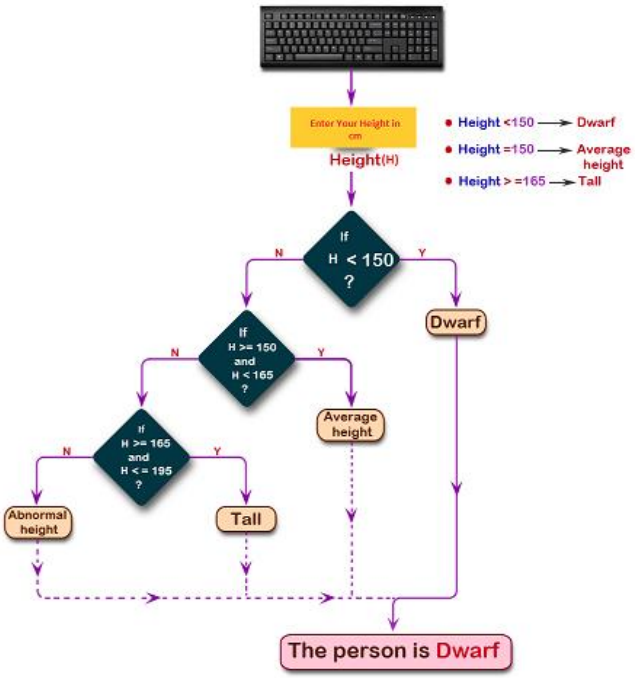
Have you learned about, how we can use arithmetic operators for swapping the numbers?

</td>
</tr>
</table>

<table>
<tr>
<td>4</td>
<td>4.1</td>
<td>
a. Write something about your characteristics not more than 50 words using gets function and print out the same using puts function.
Expected Outcome:
Draw flowchart, write algorithm and write program for given scenario. Also attach the screenshot of output.
Questions:
1. What is the significance of using gets and puts? Are they acting as replacement of any function? How?
b. Write a program to convert the decimal number into octal and hexadecimal format. Print hexadecimal and octal values for given inputs in expected outcomes.
Hint: Use %o and %x
Expected Outcome:
Draw flowchart, write algorithm and program for given scenario. Also attach screenshot of output.
Fill up the output as per the inputs mentioned in below given table as per the output received in console.
<table>
<tr><th>Sr. No.</th><th>Inputs</th><th>Octal</th><th>Hexadecimal</th></tr>
<tr><td>1.</td><td>Your Roll No</td><td></td><td></td></tr>
<tr><td>2.</td><td>143</td><td></td><td></td></tr>
<tr><td>3.</td><td>0</td><td></td><td></td></tr>
<tr><td>4.</td><td>1</td><td></td><td></td></tr>
<tr><td>5.</td><td>-1</td><td></td><td></td></tr>
</table>
</td>
</tr>
<tr>
<td></td>
<td>4.2</td>
<td>
Write a C Program to Print multiplication table from 1 to 7 to achieve the following output. (Use #define directives and do while loop)
Expected Outcome:
Draw flowchart, write algorithm and write program for given scenario.


</td>
</tr>
</table>

5	5.1	Write a C program for the given scenario from the flowchart. Note that you have to enter your own height in centimeters.



Expected Outcome:

Write algorithm and write program for given scenario. Also attach screenshot of output.

Tick marks your achieved result in the appropriate column:

Sr. No.	Inputs (cm)	Dwarf	Average	Tall	Abnormal
1.	Your Height				
2.	Your Mother's height				
3.	Your Father's height				
4.	Your Sibling's height				

5.2

Write a C program to find all roots of a Quadratic equation using nested switch case. Take three user inputs from keyboard for finding the discriminant (b2 – 4ac). Use the concept of nested switch case for finding the roots of equation. Get the outputs for roots till 2 decimal points only.

Hint:

Discriminant > 0

root1 = (-b + sqrt(discriminant)) / (2*a)

root2 = (-b - sqrt(discriminant)) / (2*a)

Discriminant < 0

root1 = root2 = -b / (2*a)

imaginary = sqrt (-discriminant) / (2*a) (eg. Print it as: i20.3, i.e. i followed by value)

Discriminant = 0

root1 = root2 = -b / (2*a)

Expected Output:

Draw flowchart, write algorithm and program for given scenario. Also attach screenshot of output.

Input values in the console as per the table given below and write the results in the table, based on received output.

Sr. No.	**Inputs**			**Root1**	**Root2**	**Imaginary**
	a	**b**	**c**			
1.	1	2	3			
2.	3	-7	-5			
3.	9	12	4			

Questions:

1. Have you learned about how to use normal switch case and nested switch case?
2. Is default case necessary for every switch case?
3. What if break statement is not mentioned between two consecutive cases?

5.3

If the ages of Ram, Shyam and Ajay are input through the keyboard, write a program to determine the youngest of the three. If all of them are of same age then print that "All are of same age". (Hint: Use Nested if else statement)

Expected Output:

Draw flowchart, write algorithm and program for given scenario. Also attach screenshot of output.

Take different input values as per your wish and given scenario get output.

Sr. No.	**Inputs**			**Expected Output**
	Ram	**Shyam**	**Ajay**	
1.	Same	Same	Same	All are of equal age
2.	Different	Different	Different	Ram/Shyam/Ajay is youngest
3.	Same	Same	Different	Ram and Shyam are equal

4.	Different	Same	Same	Shyam and Ajay are equal
5.	Same	Different	Same	Ram and Ajay are equal

Questions:

1. Have you tried merging the concepts of Nested if else and else if ladder in this scenario?
2. Differentiate the concept of Nested if else and else if ladder.

5.4

The policy followed by a company to process customer orders is given by the following rules: Suppose stock=100

a) If a customer order is less than or equal to that in stock and 'has credit' is OK, supply 'has requirements.

b) If 'has credit' is not OK do not supply. Send him intimation.

c) If 'has credit' is OK but the item in stock is less than 'has ordered', inform 'out of stock' and intimate him that the balance will be refunded.

Write a C program to implement the company policy.

Expected Outcome:

Draw flowchart, write algorithm and program for given scenario. Also attach screenshot of output.

Give the inputs in the console as per the below given table, and provide the output accordingly.

Sr. No.	**Inputs**			**Output**
	Credit	**Order**	**Stock**	
1.	Y or y	20	100	
2.	N or n	50	80	
3.	Y or y	50	80	
4.	Y or y	70	30	
5.	Y or y	30	30	

Questions:

1. Which kind of logic have you used for building this program? **If else if ladder** or **nested if else** statements?

<table>
<tr>
<td>6</td>
<td>6.1</td>
<td>
There is a person, who is asked to enter the alphanumeric password for registering into an ecommerce website for purchasing products from website. But he is not aware about, what does Alphanumeric mean. So, he tries entering various combinations 5 times, but he fails to create such password. So let us help him by writing a C program to validate his password. Constraints for writing password are it should have combination of lowercase, uppercase and digit.
Note: Use Do while loop, and give print appropriate outputs on incorrect validations.
Expected Outcome:
Draw flowchart and write algorithm and write program for given scenario.
Mention all the inputs that you have experimented and outputs received. Also mention the correct alphanumeric password created by you.
<table>
<tr><th>Sr. No.</th><th>Inputs</th><th>Output</th></tr>
<tr><td>1.</td><td>Mention here the passwords used for wrong experiments</td><td>Password does not satisfy constraints!!! Please try again</td></tr>
<tr><td>2.</td><td>Mention the passwords that gave you correct validation</td><td>Good Password, you may proceed</td></tr>
</table>
Questions:

Have you understood working of do…while loop? Do mention the syntax of this loop.
Have you used for loop in this program?
What is goto statement? How is it useful?

</td>
</tr>
<tr>
<td>6</td>
<td>6.2</td>
<td>
Two numbers are entered through the keyboard. Write a program to find the value of one number raised to the power of another. (Use While loop)
Expected Outcome:
Draw flowchart, write algorithm and program for given scenario. Also attach screenshot of output.
Mention at least 3 different inputs that you have experimented and outputs received.
<table>
<tr><th>Sr. No.</th><th>Base No.</th><th>Power</th><th>Output</th></tr>
<tr><td>1.</td><td></td><td></td><td></td></tr>
<tr><td>2.</td><td></td><td></td><td></td></tr>
<tr><td>3.</td><td></td><td></td><td></td></tr>
</table>
Questions:

Have you understood the concept of while loop? if yes write its syntax here.

</td>
</tr>
</table>

6.3

Write a C program for Big bazaar cashier to count the amount to be collected from the customer. Cashier will enter the numbers one after another for each item and to get the summation of entered numbers, he has to enter 0.
(Use for loop) (Hint: Break statement can be used)

Expected Outcome:

Draw flowchart, write algorithm and program for given scenario. Also attach screenshot of output.

Mention at least 3 different inputs that you have experimented and outputs received.

Sr. No.	Entered Number	Summation after entering 0
1.		
2.		
…		
…		
N.		

Questions:

1. Have you learned the concept of for loop using above given scenario? Explain what does 'i' stands for in the for() loop, consider the given example below.
   E.g. for(i=0;i<10;i++)

6.4

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

Expected Outcome:

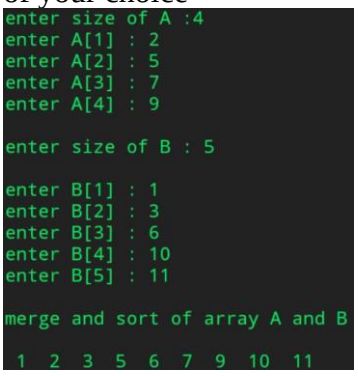
Draw flowchart, write algorithm and program for given scenario. Also attach screenshot of output.

Write the sequence of sticks inputted by you and computer one after another.

Sr. No.	Entered Number by User	Entered Number by Computer	Sticks left
1.			
2.			
…			
…			
N.			

Questions:

1. What is the significance of using break and continue statement?

<table>
<tr>
<td>7</td>
<td>7.1</td>
<td>Twenty-five numbers are entered from the keyboard into an array. Write a C program to find out how many numbers of them are positive, negative, and how many are even and odd?
Expected Outcome:
Draw flowchart, write algorithm and program for given scenario. Also attach screenshot of output.
Enter the counts of positive, negative, even and odd numbers in the below given table as per the output received.
<table>
<tr><th>Sr. No.</th><th>Parameter</th><th>Counts</th></tr>
<tr><td>1.</td><td>Positive Numbers:</td><td></td></tr>
<tr><td>2.</td><td>Negative Numbers:</td><td></td></tr>
<tr><td>3.</td><td>Even Numbers:</td><td></td></tr>
<tr><td>4.</td><td>Odd Numbers:</td><td></td></tr>
</table>
Questions:
1. Is it necessary to initialize a variable with zero everytime? If yes, then why? If No, then when is it necessary to initialize the number with zero and why?</td>
</tr>
<tr>
<td></td>
<td>7.2</td>
<td>Write a program for creating two arrays of different size and merge both arrays into one by sorting those arrays in ascending order. [Merge by sorting]
Expected Outcome:
Draw flowchart, write algorithm and program for given scenario. Also attach screenshot of output.
Following screenshot showcases the expected outcome, you can enter the input values of your choice
 
</td>
</tr>
<tr>
<td></td>
<td>7.3</td>
<td>Write a Program to multiply any two 3*3 Matrices.
Test Data:
Input the rows and columns of first matrix: 3 3
Input the rows and columns of second matrix: 3 3
Expected Input and Output:
Draw flowchart, write algorithm and program for given scenario. Also attach screenshot of output.
Input for first matrix:</td>
</tr>
</table>

	j[0]	j[1]	j[2]
i[0]	2	5	8
i[1]	3	6	9
i[2]	4	7	10

Input for Second Matrix:

	j[0]	j[1]	j[2]
i[0]	2	3	4
i[1]	9	7	6
i[2]	1	5	2

Fill up the matrix multiplication data in the below given table as per the output received:

	j[0]	j[1]	j[2]
i[0]			
i[1]			
i[2]			

Questions:

1. State the advantages of using Array Indexes. When is it suitable to take array index?

8 | 8.1

Help user to identify how strong is his password based on the number of lowercase alphabets, uppercase alphabets, digits and special characters given by the user from the keyboard. Length of entered password(string) should be of 8.

Constraints for identifying strength of password:

1. **Strong:** Mixture of lowercase alphabets, uppercase alphabets, digits and special characters
2. **Average:** Mixture of lowercase alphabets, digits and special characters
3. **Poor:** Either only has alphabets/digits/special characters

Expected Outcome:

Draw flowchart, write algorithm and program for given scenario. Also attach screenshot of output.

Look at the example given in table and try various test cases such a way to get the varied strength of password (Strong/Average/Poor).

Sr. No.	Input	Lowercase	Uppercase	Digits	Symbol	Output
Example	Abc@1234	✓	✓	✓	✓	Strong
1.						
2.						
3.						

Questions:

1. Explain the difference between string and character. Also write the syntax for printing character and string.

8.2

Let us assume, teacher is supposed to allot seats based on the student's names. You are requested to help teacher by creating a C program, for collecting the names of 5 students and sort them in alphabetical order.

Hint: Use string functions, use **fgets** function to collect the names of students.

Expected Outcome:

Draw flowchart, write algorithm and program for given scenario. Also attach screenshot of output.

Enter the inputs entered by you for 5 names, and give the output how they are sorted.

Sr. No.	Input of names	Sorted Output as per output
1.		
2.		
3.		
4.		
5.		

Questions:

1. Which string functions have you learned from this program? Explain any 5 string functions in below given table.

Sr. No.	String Functions Syntax	Purpose
1.		
2.		
3.		
4.		
5.		

8.3

Write a C program to check if the user inputted string is palindrome or not using recursion.

Expected Outcome:

Draw flowchart, write algorithm and program for given scenario. Also attach screenshot of output.

Enter the following test inputs and give the output as per the output gained.

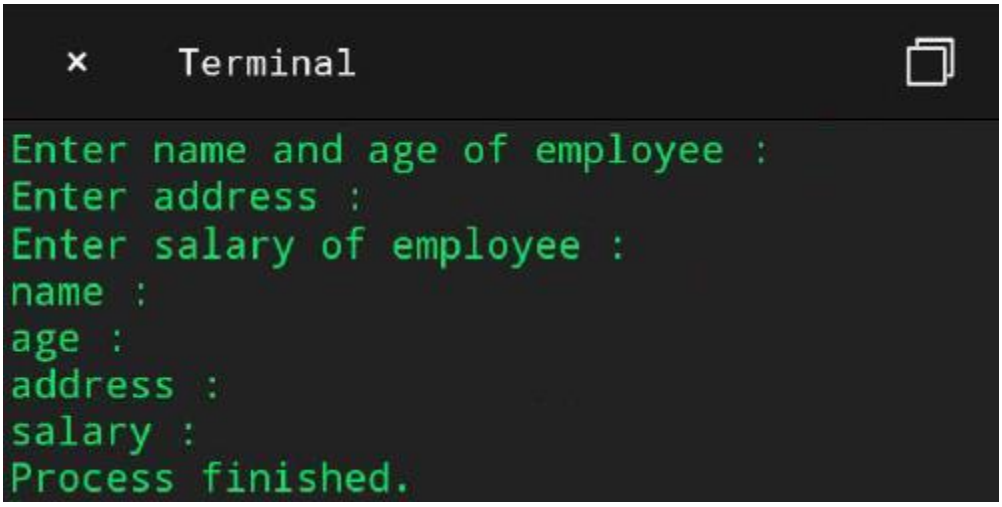
Sr. No.	Input	Sorted Output as per output
1.	Alpha	
2.	Madam	
3.	saippuakivikauppias	
4.	Hannah	

Questions:

1. Explain the concept of recursion. Explain the difference between recursion and iteration?

<table>
<tr>
<td>9</td>
<td>9.1</td>
<td>
Write a C program to check if the entered number is prime or not by using types of user defined functions
(i) No arguments passed and no return value
(ii) No arguments passed but a return value
(iii) Argument passed but no return value
(iv) Argument passed and a return value
Expected Outcome:
Draw flowchart, write algorithm and program for given scenario. Also attach screenshot of output.
Enter the details into the table based on the inputs entered by you and tick mark the column, whether the inputted value is prime or non-prime:
<table>
<tr><th>Sr. No.</th><th>User Defined Functions</th><th>Input</th><th>Prime</th><th>Non-Prime</th></tr>
<tr><td>1.</td><td>No arguments passed and no return value</td><td></td><td></td><td></td></tr>
<tr><td>2.</td><td>No arguments passed but a return value</td><td></td><td></td><td></td></tr>
<tr><td>3.</td><td>Argument passed but no return value</td><td></td><td></td><td></td></tr>
<tr><td>4.</td><td>Argument passed and a return value</td><td></td><td></td><td></td></tr>
</table>
Questions:
1. You might be clear now, how user defined functions are created in different ways. Explain them.
</td>
</tr>
<tr>
<td></td>
<td>9.2</td>
<td>
Verify the triangle, if the length of the sides of a triangle are denoted by a, b and c, then the area of triangle is given by:
$$s = \frac{a+b+c}{2}$$
$$A = \sqrt{s(s-a)\times(s-b)\times(s-c)}$$
Use nested function.
Collect the values for a, b and c from user for identifying whether it forms Triangle or not.
Expected Outcome:
Draw flowchart, write algorithm and program for given scenario. Also attach screenshot of output.
Enter the inputs for verifying triangle and mention the results in the below mentioned table format. Tick mark whether based on input, triangle is formed or not.
<table>
<tr><th>Sr. No.</th><th>Input</th><th>Forming Triangle</th><th>Not a Triangle</th></tr>
</table>
</td>
</tr>
</table>

<table>
<tr><td></td><td></td><td>
<table>
<tr><th></th><th>a</th><th>b</th><th>c</th><th></th><th></th></tr>
<tr><td>1.</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>2.</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>3.</td><td></td><td></td><td></td><td></td><td></td></tr>
</table>
Questions:
1. Explain the concept of nested functions in C.
</td></tr>
<tr><td></td><td>9.3</td><td>A positive integer is entered through the keyboard, write a function to find the binary equivalent of this number using recursion.
Expected Outcome:
Draw flowchart, write algorithm and program for given scenario. Also attach screenshot of output.
Enter the inputs for converting the number into binary form, try it for three different inputs and fill the below given table:
<table>
<tr><th>Sr. No.</th><th>Input</th><th>Binary</th></tr>
<tr><td>1.</td><td></td><td></td></tr>
<tr><td>2.</td><td></td><td></td></tr>
<tr><td>3.</td><td></td><td></td></tr>
</table>
Questions:
1. Mention the advantages of using recursion in a program.</td></tr>
<tr><td>10</td><td>10.1</td><td>Write a C program to create a structure of Book Detail and display the details of the book in appropriate format by passing structure as a function argument.
Book Detail must contain following information:
Book Title, Author name and Amount of book in float.
Expected Outcome:
Draw flowchart, write algorithm and program for given scenario. Also attach screenshot of output.
Enter the inputs for converting the number into binary form, try it for three different inputs and fill the below given table:
<table>
<tr><th>Sr. No.</th><th>Book Title</th><th>Author Name</th><th>Amount of book</th></tr>
<tr><td>1.</td><td></td><td></td><td></td></tr>
<tr><td>2.</td><td></td><td></td><td></td></tr>
<tr><td>3.</td><td></td><td></td><td></td></tr>
</table>
Questions:
1. Can we declare function inside structure of C Programming? Explain Why?</td></tr>
<tr><td></td><td>10.2</td><td>Create a Union 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.
Expected Outcome:</td></tr>
</table>

<table>
<tr>
<td></td>
<td></td>
<td>
Draw flowchart, write algorithm and program for given scenario. Also attach screenshot of output.
Enter the inputs for collecting the details for library books. Here, if user inputs flag=1, then book is issued else book is not issued.
<table>
<tr><th>Sr. No.</th><th>Accession Number</th><th>Title of Book</th><th>Author</th><th>Price</th><th>Flag</th><th>Output</th></tr>
<tr><td>1.</td><td></td><td></td><td></td><td></td><td></td><td>Book Issued</td></tr>
<tr><td>2.</td><td></td><td></td><td></td><td></td><td></td><td>Book Not Issued</td></tr>
</table>
Questions:
Explain the major difference between structure and union in detail.
</td>
</tr>
<tr>
<td></td>
<td>10.3</td>
<td>
Write a C program for collecting and displaying employee details such as, Age, Name, Address and Salary by using nested structure.
Expected Outcome:
Draw flowchart, write algorithm and program for given scenario. Also attach screenshot of output.
Get the output as mentioned below:


Questions:
Explain how nested structure works in C programming.
</td>
</tr>
<tr>
<td>11</td>
<td>11.1</td>
<td>
Write a program to read the marks of 10 students for the subject CE143 Computer concepts and Programming and computes the number of students in categories FAIL, PASS, FIRST
CLASS and DISTINCTION using Pointers and Arrays.
<table>
<tr><td>Marks</td><td>Categories</td></tr>
<tr><td>70 or above</td><td>DISTINCTION</td></tr>
</table>
</td>
</tr>
</table>

69 to 60	FIRST CLASS
59 to 40	PASS
Below 40	FAIL

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

Expected Outcome:

Draw flowchart, write algorithm and program for given scenario. Also attach screenshot of output.

You are requested to gain all categories of results, so input the values accordingly, also write the counts of all the categories.

Sr. No.	Input	Distinction	First Class	Pass	Fail
1.					
2.					
...					
10.					
	Counts				

Questions:

1. Explain the importance of using pointers?

11.2

Write output for the following programs:

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);
		}

12	12.1	Write a program to read a text file 'Demo.txt' and print each word of that file in reverse order. **Expected Output:** Draw flowchart, write algorithm and program for given scenario. Also attach screenshot of output. Example: Input: HELLO Output: OLLEH **Questions:** 1. Explain, why do we need to use files in C?
	12.2	Write a C program that illustrates how to write into a file using **putw()** function and how to read the same file using **getw()** function. Use **fopen(), fclose(), getw() and putw()** functions. **Expected Outcome:**

<table>
<tr><td></td><td></td><td>Draw flowchart, write algorithm and program for given scenario. Also attach screenshot of output.
Enter the data in a file from console and retrieve that data on the console.
Also attach the screenshot of file where the data is written.
Questions:
1. Explain any 3 functions of file other then mentioned in the problem.
<table>
<tr><th>Sr. No.</th><th>Function</th><th>Purpose</th></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td></td></tr>
</table>
</td></tr>
<tr><td></td><td>12.3</td><td>Two files Data1.txt and Data2.txt contains list of integers. Write a program to produce file Data3.txt which holds as merged list of these two lists. Use command line argument to specify the file name.
Expected Outcome:
Draw flowchart, write algorithm and program for given scenario. Also attach screenshot of output.
Enter the data in a file from console and attach the screenshots of Data1.txt, Data2.txt and Data3.txt files. Also add the screenshot of console.
Questions:
1. Explain the difference between argc and argv along with their significance.</td></tr>
<tr><td>13</td><td>13.1</td><td>Write a program to read and print the student details using structure and Dynamic Memory Allocation.
Following student details needs to be included:
Roll No., Name, Age, Class, Branch.
Expected Outcome:
Draw flowchart, write algorithm and program for given scenario. Also attach screenshot of output.
Enter this student details for N number of students, collect the no. of details to be entered from the user and ask for that many student’s details. Enter all details in below mentioned table and print the values collected from user.
<table>
<tr><th>Sr. No.</th><th>Roll No.</th><th>Name</th><th>Age</th><th>Class</th><th>Branch</th></tr>
<tr><td>1.</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>2.</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>...</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>N.</td><td></td><td></td><td></td><td></td><td></td></tr>
</table>
Questions:
1. Explain the benefits of using dynamic memory allocation. Give one scenario where it is most useful.</td></tr>
<tr><td></td><td>13.2</td><td>Write a program using a character string in a block of memory space created by calloc</td></tr>
</table>

<table>
<tr>
<td></td>
<td></td>
<td>
() and then modify the same to store a larger string using realloc () function. (Dynamic Array).
Expected Outcome:
Draw flowchart, write algorithm and program for given scenario. Also attach screenshot of output.
Enter the details in below given table as per the requirement:
<table>
<tr><th>Sr. No.</th><th>Instruction</th><th>Output</th></tr>
<tr><td>1.</td><td>String to be entered</td><td></td></tr>
<tr><td>2.</td><td>String received after reallocation of memory</td><td></td></tr>
</table>
Questions:
1. Mention advantage of using realloc() function.
</td>
</tr>
<tr>
<td></td>
<td>13.3</td>
<td>
Write a program to enter N numbers into array and find average. 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.
Expected Outcome:
Draw flowchart, write algorithm and program for given scenario. Also attach screenshot of output.
Enter the details in below given table as per the requirement:
<table>
<tr><th>Sr. No.</th><th>Instruction</th><th>Output</th></tr>
<tr><td colspan="2">Enter the size of Array</td><td>N (To be entered by user)</td></tr>
<tr><td>1.</td><td></td><td>To be entered by user</td></tr>
<tr><td>2.</td><td></td><td>To be entered by user</td></tr>
<tr><td>…</td><td></td><td>To be entered by user</td></tr>
<tr><td>N.</td><td></td><td>To be entered by user</td></tr>
<tr><td colspan="2">Average of entered values</td><td></td></tr>
</table>
</td>
</tr>
</table>

Prepared By:	Aayushi Chaudhari	**Date:**	15/09/2021