National University of Computer and Emerging Sciences

Lab Manual

for

Object Oriented Programming

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Lab Manual 3

Objectives:

After performing this lab, students shall be able to:

- ✓ Memory leak concept.
- ✓ Dangling pointer
- ✓ Double pointer 2-D array.

Problem 1

Write a C++ program "**Queen Problem**". In this game we have three cards (Jack, King, Queen). Cards each time shuffle. Player has to guess where the queen has been placed. If the player guess is correct he will be given a reward three times of his penalty. Otherwise deduct a penalty to its account. Initially player has $100.
Before each guess queen ask user how much penalty charge if you guess wrong.

Hint: used rand function for shuffling.
Make players function to do this functionality.

a) Make static array of cards.
b) Make dynamic array of cards. Don't delete pointer. // why memory size increase at this step.
c) Make dynamic array of cards. Delete pointer.

Open the window task manager and see how much memory consumed at each step.

Problem 2

Write a function "**fibonacci series**" that takes a number from user and find the Fibonacci series of that number and return its address.
Hint: can't use pointer in Fibonacci_series function.
Int *Fibonacci_series();

Problem 3

When sending or receiving messages the security of the message is very important. There are several methods to secure the messages transmitted, one of them is encryption. Your program should take a string sentence as input. Your task is to code two functions to keep the messages secure. First you need to encrypt, making a function **encrypt (string mystr)**. The string should be encrypted by adding the length of string to each character. Then you need to decrypt the string by making a function **decrypt (string mystr)**, to reveal the original sentence.

Sample Run:

```
Welcome to Programming

Enrypted String:
m{éyàâ{6èà6fêà}êwââ□ä}

Decrypted String:
Welcome to Programming
```

Problem 4

i) Write a function **char** AllocateMemory(int& rows, int& cols)** that takes size of matrix (rows and columns) from user, allocates memory for the matrix and return its pointer.

ii) Write a function **void InputMatrix(char** matrix, const int rows, const int cols)** which takes input the values in matrix from user(console).

iii) Write a function **void DisplayMatrix(char** matrix, const int& rows, const int& cols)** that displays the matrix in proper format.

iv) Write a function that does the following:

- Creates three dynamic char arrays namely **alphabets, numbers, and specialchar.** (Define the sizes yourself).
- Iterate the 2D array and separate alphabet elements and save them in the alphabets array, separate number elements and save them in numbers array and separate special character elements and save them in the specialchar array.
- The function returns the three arrays **alphabets, numbers, and specialchar.**
- **Note:** The three arrays should not consume any extra space. **Resize the arrays accordingly.**

For example, if the **Sample Matrix** is

A	1	v	@
+	9	s	6
P	#	^	4

Your function will return the following arrays:

alphabets = A v s P
numbers = 1 9 6 4
specialchar = @ + # ^