National University of Computer and Emerging Sciences



Lab Exercise 03

For

Object Oriented Programming Lab

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| Lab Instructor(s) | Mr. Usman Ghous |
| Semester | Spring 2021 |

**FAST School of Computing**

# Instructions:

1. Make a word document with the naming convention “SECTION\_ LAB#\_ROLLNO” and put all your source code and snapshots of its output in it. Make sure your word file is formatted properly.
2. Plagiarism is strictly prohibited.
3. Do not discuss solutions with one another.

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| **Question#1** |

Create a student database of Students using a structs. Your program will have two structures One for sections and One for Students. A student will have the following attributes:

1. Name
2. CNIC
3. Gender
4. CGPA

And the struct section will the following attributes:

1. An array of students less than 40.
2. Section name
3. Class teacher.

You have to write an efficient program to create sections of the amount user wants to, with less than 40 students. If the array of students is full, offer the student another section. Student can update their attributes.

Display the students of the whole section on request.

Sort the students wrt their CGPA. Write a menu driven program to complete all the required functionalities.

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| **Question#2** |

Write a program having 3 structures, circle, triangle and rectangle. Identify their attributes and find their areas. Provide functions for performing all the tasks.

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| **Question#3** |

Create a struct item, there can be three items:

1. Drinks for 60 rs.
2. Burgers for 200 rs.
3. Sweet for 120 rs.

A user can come and buy the required item, he can make his own combos. Either a burger with a drink or a burger with a sweet. User can buy as many items as he wants.

Calculate their bills and display the receipts at the end.

**Question#4**

Write a structure to store the roll no., name, age (between 11 to 14) and address of students (more than 10). Store the information of the students.  
1 - Write a function to print the names of all the students having age 14.  
2 - Write another function to print the names of all the students having even roll no.  
3 - Write another function to display the details of the student whose roll no is given (i.e. roll no. entered by the user).

**Question#5**

Let us work on the menu of a library. Create a structure containing book information like accession number, name of author, book title and flag to know whether book is issued or not.

Create a menu in which the following can be done.

1 - Display book information

2 - Add a new book.

3 - Display all the books in the library of a particular author.

4 - Display the number of books of a particular title.

5 - Display the total number of books in the library.

6 - Issue a book.

(If we issue a book, then its number gets decreased by 1 and if we add a book, its number gets increased by 1)

**Question#6**

Write a structure to store the names, salary and hours of work per day of 10 employees in a company. Write a program to increase the salary depending on the number of hours of work per day as follows and then print the name of all the employees along with their final salaries. Also ask employees if they have worked after hours, if yes, then add 10$ per hour in the salary of the employee

Hours of work per day 8 10 >=12

Increase in salary $50 $100 $150

**Question#7**

Create a structure named Date having elements day, month and year.

The program must ask user to enter current values in all three elements, then ask user desired value to add or subtract from the current date.

Your program must display complete date after desired addition or subtraction

Example:

Current date entered by user:

23/2/2021

Desired operation: add 500 days

Final date: 08/07/2022

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| **Question#8 Structure array** |

Write a program that create a structure array for N number of students. N will be an integer  
number input by program user.  
Struct of stundent contains following attributes:  
• Name  
• Age  
• CNIC  
• RollNumber  
• City  
• BirthStar (i.e scorpion, leo)

Input N number of students from user and display it one by one. Assume user will always input  
N=5. Note: Don’t use dynamic array of structure.

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| **Question#9 Structure Arrays, Passing and returning a structure variable with value/Ref** |

Write a C++ program for the following problem:  
Write a program that declares a struct to store the data of a baseball player (player’s name, number of home runs, and number of hits). Declare an array of 10 components to store the data of 10 baseball players. Your program must contain a function to input data and a function to output data.  
Add functions to search the array to find the index of a specific player, and update the data of a  
player. (You may assume that input data is stored in a file.) Before the program terminates, give  
the user the option to save data in a file. Your program should be menu driven, giving the user  
various choices.

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| **Question#10 (Pointer to structure, Structure variable array, dynamic memory allocation)** |

Write a program that simulates a soft drink machine. The program should use a structure that  
stores the following data:  
Drink Name  
Drink Cost  
Number of Drinks in Machine  
The program should create a dynamic array of four structures. The elements should be initialized  
with the following data:

**Drink Name Cost Number in Machine**Cola. 75 20  
Root Beer .75 20  
Grape Soda .80 20  
Cream Soda .80 20  
Each time the program runs, it should enter a loop that performs the following steps:  
• A list of drinks is displayed on the screen.

• The user should be allowed to either quit the program or pick a drink.  
• If the user selects a drink, he or she will next enter the amount of money that is to be  
inserted into the drink machine.  
• The program should display the amount of change that would be returned and subtract  
one from the number of that drink left in the machine.  
• If the user selects a drink that has sold out, a message should be displayed. *The loop then  
repeats.*• When the user chooses to quit the program it should display the total amount of money  
the machine earned.  
*Input Validation: When the user enters an amount of money, do not accept negative values, or  
values greater than $1.00.*

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| **Question#11 (Nested Structures, Dynamic array of Nested Structures)** |

In FAST-NU Faisalabad our Director want to make a Data Base system for student of Computer  
Science Department. The data base must contain  
1) Name of Student  
2) Address (House #, Street #, City Name, Province Name).  
3) Age  
4) GPA  
Create a structure of ***Student*** which must has nested structure of ***Address***.  
Take input for as many students as user wants. Then out put the final data in proper order.