THE OPEN UNIVERSITY OF SRI LANKA
FACULTY OF ENGINEERING TECHNOLOGY
DIPLOMA IN TECHNOLOGY - LEVEL 3
FINAL EXAMINATION – 2011/2012
MEK3170 – C PROGRAMMING

DATE : 19th March 2012
TIME : 1400HRS. – 1700 HRS.
DURATION : THREE HOURS (3)

INSTRUCTIONS

1. *This paper consists of 6 questions.*
2. *Answer four(4) questions including **Question 1.***
3. ***Question 1 is compulsory** and carries 40 marks.*
4. *Answer 3 more questions which carry 20 marks each.*
5. *This is a **close book** examination.*
6. *All your programs should have validation codes where ever needed and comments as applicable.*

Question 1 **(40 Marks)**

a) [10 Marks]

Write a complete C/C++ program which asks the user to input a grade (A, B, C, D or F) and which displays the following messages given on Table1 depending on the input. **Note:** Use a **switch** statement to write your program.

Input	Output
A	Your average must be between 85-100
B	Your average must be between 70-84
C	Your average must be between 55 - 69
D	Your average must be between 40-54
F	Your average must be between 0-39
Any other grade	Please enter a valid grade

Table 1

b) [10 Marks]

Write a complete C/C++ program, which will display the following output.

```
* * * * *
* * * *
* * *
* *
*
```

Note: Use a nested loop to write your program

c) [20 Marks]

Define a class in C++ to represent a bank account. Use constructors and destructors as applicable. Include the following as data members

- Name of the depositor
- Account number
- Type of account
- Balance amount in the account

You are supposed to write member functions for the following tasks.

- To deposit an amount
- To withdraw an amount after checking the balance
- To display name and the balance

You may use the following data given on Table2 for the program.

Name of the depositor	Account number	Type of account	Balance(Rs.)
Nimal	1010890	Savings	150000.00
Kamal	2020980	Savings	60000.00
Sirimal	3030089	Savings	140000.00

Table 2

Bank Transactions that needs to program are

- Nimal withdraws an amount of Rs.190000.00 from his account
- Kamal Deposits(Save money) Rs. 3000.00 on his account
- Sirimal Checks his account balance

Write a main program which can be used to test your program.

Note: You should use object oriented concepts to develop the program.

Question 2

(20 Marks)

Write a complete C/C++ program that uses a **multi-dimensional array** to store the values of average temperature for each month of the year for four major cities in Sri Lanka; Colombo, Kandy, Jaffna and Galle.

The program should perform the following.

- Get the values of temperature for each month from the user and store them on an array
- Display the values you entered to the array
- Find answers for following using functions
    1. Month with the highest temperature and the relevant temperature value
    2. Temperature for the month of March
    3. Average value of temperature for the year

Question 3

(20 Marks)

Write a complete C/C++ program to carry out the given tasks.

- Accept user inputs which should be integer values between 1 and 10
- Calculate the factorial of the given integer
- Display the factorial of the integer value entered
- If the user enters a value out of the given range then an error message should be displayed

Consider the following when writing your program.

factorial(0)=1

factorial(n)=n*factorial(n-1)

Note:- Use **Pointers to functions technique** in order to write the program

Question 4

(20 Marks)

A **file** is required to maintain the salary of employees at ABC Company. The program should read the file which contains the Employee name, Employee number and the Basic salary. The program should allow the user to enter at least three (3) records of new employee data to the file. Write a complete C++ program for the above given tasks.

Question 5

(20 Marks)

Develop a C++ program using an **array of structures** to create a simple mailing list. The mailing list should contain Person's name, Street, City, Postal code and Country. The user should be provided with the facility to view the mailing list when necessary.

Question 6

(20 Marks)

'Golden High school' is a higher educational institute which has Regular and Scholarship students studying for different diplomas. All students should pay their class fee at the registration time. The class fee is calculated as follows.

- For Regular Students:-

  Class fee = (No of courses * Course fee) + Material Charge

- For Scholarship Students:-

  Class fee = (No of courses * Course fee)/2

The Course fee for all diploma subjects is Rs. 5000.00 and the Material Charge is Rs.1000.00

Write a complete C++ program using the Object oriented concepts to calculate the Class fee for the 4 students whose information is given in Table 6.

Please note the following: You should use base classes, derived classes, constructors, destructors, functions and other object oriented concepts to develop the program.

Index Nimber	Name of the Student	Student Type	No of courses
3040333	Nimali	Regular	10
3040601	Kamali	Scholarship	5
3040334	Samali	Regular	12
3040602	Amali	Scholarship	7

Table 6

END