THE OPEN UNIVERSITY OF SRI LANKA
BACHELOR OF TECHNOLOGY – LEVEL 03
DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING
ECX 3217 – SOFTWARE DEVELOPMENT FOR ENGINEERS

FINAL EXAMINATION – 2015 / 2016

Date: 4th December 2016 **Time: 0930-1230 hrs**

<INSTRUCTIONS>

1. Answer **Question 1** in **Part A**, which is compulsory.
2. Answer **3 questions out of 4** given in **Part B.**
3. This is a closed book exam and no reference books and materials are allowed.

PART A (Compulsory question)

1)

a) *Read the following description and answer to the question 1.a and 1.b.*
Create an array called "***A***" with the size of ***12*** length as figure 1.1. Type of the array is ***integer***. Fill the array from 0 to 11 as the figure 1.1.

	0	1	2	3	4	5	6	7	8	9	10	11
A	0	1	2	3	4	5	6	7	8	9	10	11

figure 1.1

Then create 2 arrays called "***B0***" and "***B1***" with the size of length 6. Types of arrays are ***integer***. Fill content of zeroth position and all even numbered positions in the "***A***" to the "***B0***" array. Fill the content of all odd position in the "***A***" to the "***B1***" as the figure 1.2.

	0	1	2	3	4	5
B0	0	2	4	6	8	10

	0	1	2	3	4	5
B1	1	3	5	7	9	11

figure 1.2

(Note: You can use Modular %2 to find even and odd values. Use for or while loop for entering and transferring data).

a.1) Draw a Flow chart for transferring data from A to B0 and B1. [5 marks]

a.2) Write a C program to implement program given in the flow chart including header files, main function, iteration and conditional structures. Include comments where necessary. [15 marks]

b) Use "character arrays, strcpy, strcat, strlen, for loop" to answer the following question.

b.1) Write a program to concatenate the word "***Open***" stored in the "name1" character array variable and "***University***" stored in "name2" character array variable, and copy to "namecat" character array variable. [10 marks]

b.2) Extend the program to store the inverse of "namecat" array variable to the array variable called "nameinv". This inverse process has to do within a loop. [10 marks]

PART B (Answer 3 questions only)

2) Write a complete C program to enter *marks* (limited to 0 to 100) of 10 subjects and find the *average* marks for all the 10 subjects and *grade* the student according to the average marks. Answering a), b) and c) to complete the above program.

a) Write a function to enter ***marks*** for 10 subjects and calculate the ***total*** of each ***marks***.

Use the $total = total + marks$ For counting total for 10 subjects.

(Note : use for loop or while loop for entering marks and calculating total.) [10 marks]

b) Write a function to calculate average of total for 10 subjects

$$average = \frac{total}{total\ no\ of\ subjects}$$ [5 marks]

c) write the main program to enter total marks, average marks and to print the average marks. Write functions with correct function calls and parameter passing. [5 marks]

3) A library wishes to create a database for its borrowers.

Business rules in this library are as follows.

* A book has a unique id called book no.
* Each book has a title, author, edition, year of published and unit price.
* Borrowing has borrowing id, borrower id, book id, date out and date in.
* Each borrower has a unique id called borrower id.
* Each borrower has a name, address, date of birth, gender, telephone no and registered date.
* Date out and date in are date borrowed by the borrower and returned date.
* A borrower can borrow one or more books at a time.

a) Draw the entity relationship diagram (ERD) for the above description with necessary relationships. [10 marks]
b) write entities for the above description. [2 marks]
c) Write primary keys and foreign keys each entity [3 marks]
d) write 3 rd normal form tables. [5 marks]

4.
a) Briefly explain following terms related to database management system?
DBMS, properties of a table, record, candidate key, composite key [10 marks]
b) What are the elements of an ERD and explain them? [4 marks]
c) What is the difference between primary and foreign key? [3 marks]
d) Explain difference between 2nd normal form and 3rd normal form [3 marks]

5.
a) Write phases of Software Development Life Cycle [5 marks]
b) Write activates of Software Testing Life Cycle [5 marks]
c) Explain white box testing and black box testing [10 marks]