THE OPEN UNIVERSITY OF SRI LANKA DIPLOMA IN INFORMATION AND
TECHNOLOGY – LEVEL 03
DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING
ECX 3265 – FUNDAMENTALS OF PROGRAMMING
FINAL EXAMINATION – 2015 / 2016

Date: 16 July 2016	Time: 09.30 – 12.30

<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

Q1) Write a complete C program to enter *marks* (limited to 0 to 100) of 10 subjects of a student and find the *average* marks for all the 10 subjects and *grade* the student according to the average marks.

a) Write a function to input a mark and validate it between 0 and 100 for a subject.   [10 marks]

b) Write a function to calculate the *total* of each *marks* validated marks using given formula.

    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]

c) Write a function to calculate average marks of 10 subjects

$$average= \frac{total}{total\ no\ of\ subjects}$$

    [10 marks]

d) write the main program to enter and validate, calculate total, calculate average marks and to print the average marks. Write functions with correct function calls and parameter passing.   [10 marks]

Part B

Q2) Write a complete C program for the following description.
Create an array called *"fft1"* with the size of *16* length as given in the figure. Type of the array is *integer*. Fill the array from 0 to 15 as the following figure.

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
fft1	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

Fig. 2.1.

Then create 2 arrays called *"ffta"* and *"fftb"* with the size of *8* length. Types of arrays are *integer*. Fill content of zeroth position and all even numbered positions in the *"fft1"* to the *"ffta"* array. Fill the content of all odd position of the *"fft1"* to the *"fftb"* as following figure (2.2.a) and (2.2.b).

```
        0  1  2  3  4   5   6   7              0   1   2   3   4   5   6   7
ffta  | 0| 2| 4| 6| 8| 10| 12| 14|     fftb | 1|  3|  5|  7|  9| 11| 13| 15|
```

fig. 2.2.a   fig.2.2.b

(Note: You can use Modular %2 to find even and odd values. Use *for* or *while* loop for entering and transferring data). [20 marks]

Q3)
a) Write a C program to print integer values 0 – 5 using pointers. Variable inside the *printf* statement should be a pointer value. [12 marks]

b) Write the declaration for struct type to contain following information.

billno	(type integer)
telno	(type char array of 10 length)
firstname	(type char array of 15 length)
lastname	(type char array of 30 length)
payment	(type double)

[8 marks]

Q4) Use "character arrays, strcpy, strcat, strlen, for loop" to answer the following question.

(a) Write a program to concatenate "William" stored in the "name1" character array variable and "Gates" stored in "name2" character array variable, and copy to "namecat" character array variable. [10 marks]

(b) 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]

Q5)
a) Write the outputs of the following programs [10 marks]

Program (a)	Program (b)

<pre>#include <stdio.h>
int main(void)
{
    int c;
    c = 5;
    printf("%d\n", c);
    printf("%d\n", c++);
    printf("%d\n\n", c);
    c = 5;
    printf("%d\n", c);
    printf("%d\n", ++c);
    printf("%d\n", c);
    return 0;
}</pre>
	<pre>#include <stdio.h>
	int main(void)
	{
	    int sum, x;
	    x = 1;
	    sum = 0;
	    while (x <= 10)
	    {
	        sum += x;
	        ++x;
	    }
	    printf("The sum is: %d\n", sum);
	    return 0;
	}</pre>

b)

i) Write four possible outputs with four different operators.

ii) If the line no 17 is removed and input "+" and 2 3 as fno and sno. What is the output?

[10 marks]

```
1   #include <stdio.h>
2   int main() {
3
4       char operator[1];
5       float fno,sno;
6
7       printf("Enter an operator ");
8       scanf("%s", operator);
9
10      printf("Enter two operands: ");
11      scanf("%f %f",&fno, &sno);
12
13      switch(*operator)
14      {
15        case '+':
16          printf("%.1f + %.1f = %.1f",fno, sno, fno+sno);
17          break;
18
19        case '-':
20          printf("%.1f - %.1f = %.1f",fno, sno, fno-sno);
21          break;
22
23        case '*':
24          printf("%.1f * %.1f = %.1f",fno, sno, fno*sno);
25          break;
26
27        case '/':
28          printf("%.1f / %.1f = %.1f",fno, sno, fno/fno);
29          break;
30        default:
31          printf("Error! operator is not correct");
32      }
33      return 0;
34  }
```