B.Sc. Engg. / HD CSE 1st Semester (63) 152 10 March 2016 (Afternoon)

ISLAMIC UNIVERSITY OF TECHNOLOGY (IUT)
ORGANISATION OF ISLAMIC COOPERATION (OIC)
Department of Computer Science and Engineering (CSE)

MID SEMESTER EXAMINATION WINTER SEMESTER, 2015-2016

DURATION: 1 Hour 30 Minutes FULL MARKS: 75

CSE 4107: Structured Programming I

Programmable calculators are not allowed. Do not write anything on the question paper.

There are **4 (four)** questions. Answer any **3 (three)** of them.

Figures in the right margin indicate marks.

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a) Define Programming as a process. Write down the properties of structured programming. 7

b) Determine the exact output of the following C program given in Figure 1. 8

```
#include <stdio.h>
void f1(int x, int y);
int main(){
    int i=-3, j=2 ,n;
    for (  ; i<0 ; ++i)
    {
        j++;
        if(i<-1)
            printf("@\n");
        f1( i++ , j );
    }
    return 0;
}
void f1(int x, int y){
    printf("x=%d y=%d\n", x, y);
}
```

Figure 1: Code for question 1(b)

c) Write a C program to produce the output given in Figure 2. This output is for line number n=4. So if you increase the line number n, it should follow similar pattern. 10

```
          1
        2   3
      4   5   6
    7   8   9   10
```

Figure 2: Figure for question 1(c)

a) Write a C program to find if a square matrix of size $n \times n$ is symmetric or not. A symmetric matrix is a square matrix that is equal to its transpose. Figure 3 shows an example of symmetric matrix. 8

$$\begin{bmatrix} 1 & 7 & 3 \\ 7 & 4 & -5 \\ 3 & -5 & 6 \end{bmatrix}$$

Figure 3: Figure for question 2(a)

b) The user will give one integer number **n** as input that indicates total mark out of 100. Print the grade by writing a C program according to grading rules given in Table 1. You have to use switch statement to solve this problem. Do not use any if condition.

Table 1: Table for question 2(b)

Grade	Marks Range
A	80-100
B	60-79
C	40-59
F	0-39

c) There are some disadvantages of switch over if statement in C. You cannot accomplish some tasks with a switch statement. Mention those limitations.

d) What happens when an array index with a specified size is assigned
   i. With values fewer than the specified size
   ii. With values more than the specified size

3. a) Write down the rules of Precedence and Associativity. Show the relative precedence of the relational and logical operators.

b) Point out the errors from the C program given in Figure 4. (if any)

```
#include <stdio.h>
int main( ){
  message( message ( ) ) ;
  return 0;
}
void message( ){
  printf ( "\n I Like C Programming" ) ;
}
```

Figure 4: Code for question 3(b)

c) Write a program in C which performs the following tasks:
   i. initialize an integer array of 10 elements in **main( )**
   ii. pass the entire array to a function **modify( )**
   iii. in **modify( )** multiply each odd number index elements of array by 3
   iv. return the control to **main( )** and print the new array elements in **main( )**

d) If the three sides of a triangle are entered through the keyboard, write a C program to check whether the triangle is valid or not. The triangle is valid if the sum of two sides is greater than the largest of the three sides.

4. a) Write logical expressions that tests whether a given character variable **ch** is:
   i. lower case letter
   ii. upper case letter
   iii. digit
   iv. white space (includes space, tab, new line)

b) Write a C program that takes an integer **n** as an input from the user and displays each digit of that integer in English. So, if the user types 932, the program should display "nine three two". Remember to display "zero" if the user types just a 0. You have to print the output in a user defined function. You are not allowed to write any **printf** statement in main function.

c) With appropriate examples mention the advantages of shorthand assignment operator and **goto** statement.