B.Sc. Engg. SWE 1st Semester — 8 March 2019 (Afternoon)

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

MID SEMESTER EXAMINATION — **WINTER SEMESTER, 2018-2019**

DURATION: 1 Hour 30 Minutes — **FULL MARKS: 75**

SWE 4101: Introduction to Software Engineering

Programmable calculators are not allowed. Do not write anything on the question paper.
There are **4 (four)** questions. Answer any **3 (three)** of them **including Question No. 4.**
Figures in the right margin indicate marks.

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1. a) A software is written as a program or a set of programs, as a module or a set of modules. A team of software engineers work collaboratively to accomplish the task of developing a software. What does the term ***'Man-Month'*** indicate about a software? How does the '*understanding the customer*', '*technological know-how*' and '*team formation*' influence the estimated man-month for a software project? 9
   b) Mention the components of a computer system. 4
   c) Differentiate between Parallel and Distributed Computing. 4
   d) Write your perception about Open Source Community and Open Source Software. 4
   e) What do you understand by Von-Neumann and Harvard architecture? 4

2. a) What is a firmware? What is its relation and difference with software? Mention 3 computer devices that use firmware and also mention the purpose of using the firmware. 5
   b) Write the algorithm (in pseudo-code format) for calculating the summation of the all the odd numbers from ***Number1*** to ***Number2***. Consider *Number1* and *Number2* are two input variables. 5
   c) Mention the relations between data, information and knowledge. 5
   d) How does a ball mouse work using an optical-mechanical technology? Describe the technology to detect the forward and backward movement of the mouse. 5
   e) Modern computer systems has a view as shown in figure 1: 5

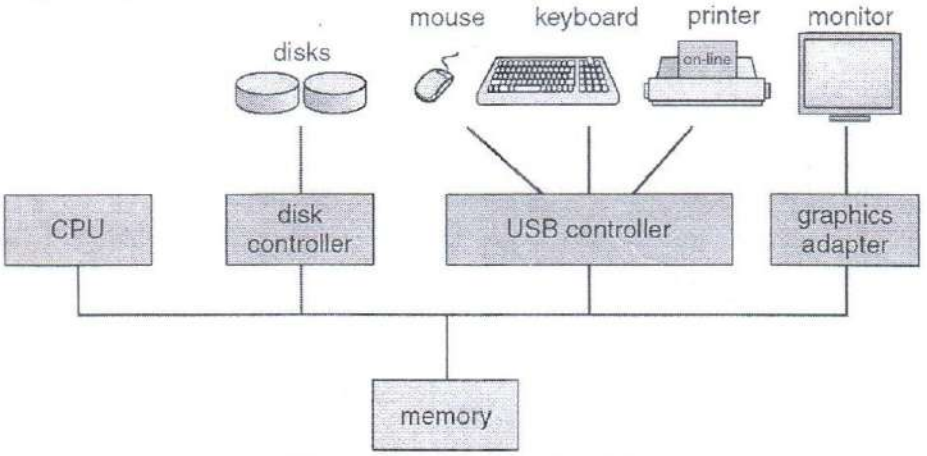

Figure 1: Figure for question 2(e)

Interpreting the above figure briefly answer to the following questions:
   i. How does the CPU control multiple peripheral or I/O devices in parallel?
   ii. How multiple devices use the ***bus*** (the horizonal line in the figure)?

3. a) Define a number system. Why do we convert any number into decimal number? 4
   b) Convert $(1234)_{10}$ to a 9
      i. Base-4 number.
      ii. Base-16 number.
      iii. Base-7 number.
   c) What are the decimal values for the numbers $(2114)_5$ and $(775)_8$? 6
   d) Suppose you have a 4-bit binary number system in your computer. You want to do the arithmetic (**-5-3**). How will your computer perform the math? How will your computer decide the correctness of the arithmetic performed? 6

4. **(Mandatory to Answer)**
   a) A novice user used the commands ***ls*** and ***cd*** as shown in the following figure and got a message: 'Error: not a directory'. 6

```
# ls
user          bin          etc          home          dev
var        myfileDirDev
# cd myfileDirDev
 Error: not a directory
```

Figure 2: Commands for question 4(a)

What mistake has s/he done? What actions does the user need to perform if s/he wants to investigate the contents of ***myfileDirDev***.

   b) Suppose a hypothetical micro-processor has the following instructions with their instruction codes: 7

Instruction	Instruction Code (in Hexadecimal)
COC	55
DIB	9F
BAB	43

The instructions use some registers **AX - FX** which have codes 00-05H. The instructions can also use one numeral.
What will be the machine code for the following micro-processor commands:

```
COC   AX,  FX
DIB   FX,  89H
BAB   BX,  DX
```

   c) What is virtualization? How does virtualization enable **Infrastructure as a Service (IaaS)**? 6
   d) Quote a simple example how Digital Logic Design (DLD) can be used as software of a Computer System. 6