B.Sc. Engg. SWE 1st Semester 27 February 2020 (Afternoon)

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

MID SEMESTER EXAMINATION **WINTER SEMESTER, 2019-2020**

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. 1.**
Figures in the right margin indicate marks.

(Mandatory to Answer)

1. a) Every semester students sit for the examinations and obtain marks which are eventually converted to letter grades. Subject-wise credits and letter grades are then converted to a GPA (Grade Point Average) for the student in that particular semester using the rules: 10
   - First the subject wise letter grades will be converted to a point. For example, if a student gets A+ he/she will be awarded 4.0; subsequently he/she will get 3.75 for A, 3.5 for A-, 3.25 for B+, 3.00 for B, 2.75 for B-, 2.50 for C+, 2.25 for C and 2.0 for D. F grade is not assigned any point and if any student gets F grade, his/her GPA will not be calculated.
   - Then subject-wise points is calculated by multiplying the letter grade with the subject's credit. For example, if a student gets A+ in a 3 credit subject he/she will receive 4×3=12 points for the particular subject.
   - The total points received is calculated by summing up all the subject-wise points.
   - GPA is the points received per credit on an average.

   Write an algorithm in pseudo-code or flow chart format to calculate the GPA of a student. Assume data structures: *subjectWiseCredit* and *subjectWiseLetterGrade* and *numberOfSubjects* which will be provided as input. For example: *subjectWiseCredit*[1] will show the credit for subject 1 and *subjectWiseLetterGrade*[1] will provide the letter grade.

   Your algorithm should have a sub algorithm to find the point for each letter grade. For example: you may have a procedure *getPointForLetterGrade* (letterGrade) for this purpose.

   b) Convert $(55)_{10}$ to a 6
      i. Base-3 number.
      ii. Base-7 number.

   c) Perform the following 2's complement arithmetic assuming 4-bit computer system and comment on the validity of the result: 6
      i. 5 - 2
      ii. -4 -4

   d) Convert $(1234)_5$ to a base-25 number. 3

2. a) Suppose a programmable Fan has three speed levels including Off mode which can be activated by sending commands 00, 01, and 02. You want to program another speed level for 'stepping speed'. In stepping speed mode, the speed will gradually increase and then decrease and will repeat. Suppose the Fan has a ROM to store your commands and can be recalled by a command number assigned. 7
   Program the device 'Fan' for the 'Stepping speed' mode.

   b) How does the computer define/ generate the clock speed. Why is it so difficult to fabricate very high speed processor? 6

   c) Explain the steps of the scenario from when you type an URL on the browser to how you get a web page in response. 12

3. a) Internet Service Providers (ISPs) are normally the enablers who connect the users to the internet. Mention 3 (Three) different technologies with brief description that enable you to connect to the internet. 6

b) What is the need of the compiler when assembler is sufficient to do computer programming? Why is a linker needed? 3+3

c) Briefly describe the keyboard technologies. 6

d) Briefly describe the technologies inside an optical mouse. 7

4. a) Write the algorithm to convert a decimal number to a number of another base ***B***. 6

b) Write down the design differences of HTTP and FTP protocols. 6

c) What is BIOS? Write its importance for a computer system. 4

d) Write the difference(s) between computer virus and other malwares. Briefly describe the attacking model of *ransomware*. 6

e) What is a server from the perspective of hardware and software? 3