Course Code: IT 3201

Course Title: Software Engineering

Time: 3 Hours

Full Marks: 60

Answer any **5 (five)** of the following questions. Figures in the right margin indicate marks.

1. a) Write the agile manifesto. How extreme programming values agile manifesto?   5
    b) How scrum development process works? Why XP@Scrum get popular among developers?   5
    c) Write the outcome of the different burn down charts.   2

2. a) How can we classify requirements? Give example of each type.   4
    b) Show the UML representation of the following relations: 4
       i.   In a shopping mall "*customer checkout*" use case is composed of "*Scan Item*", "*Calculate Total and Tax*" and "*Payment*" use cases.
       ii. "*Payment*" use case can use "*Customer authentication*" use case to complete its operation.
       iii. "*Customer authentication*", responsible for verifying the identity of the customer. The customer might require *[one of]* two realizations: "*CheckPassword*" or "*CheckFingerprint*".
    c) How many types of classes can be identified during analysis? Draw a class diagram from the   4
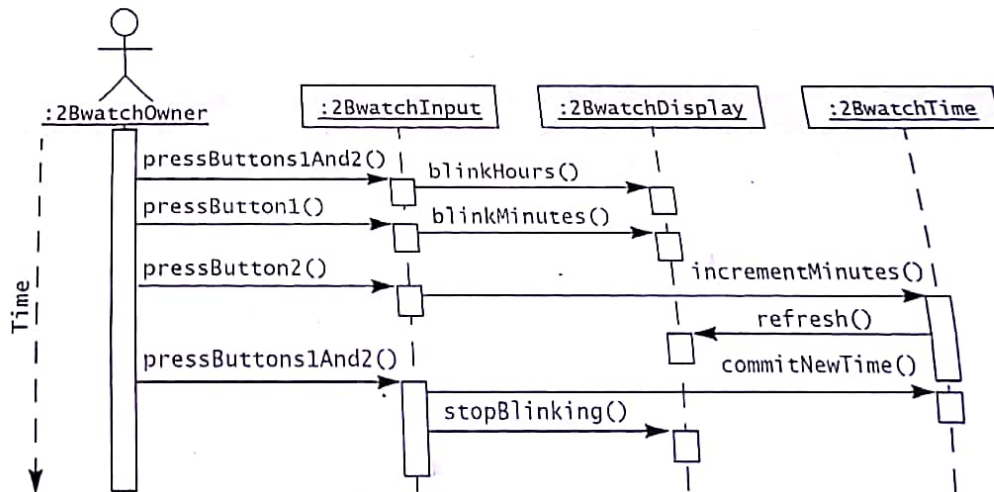   following sequence diagram in fig. 1:

Fig.1: Example of Sequence Diagram

3. A software company engaged in Object Oriented development has been collecting both software product metrics and software process metrics over a number of years.
    a) Explain what is meant by software product metrics and give three examples of product metrics   4
       relating to OO software.
    b) Explain what is meant by process metrics and give examples of three such metrics relevant to a   4
       software company's process improvement.
    c) Explain what is meant by the Goal Question Metric (GQM). Outline how GQM and both   4
       software product metrics and software process metrics can be used in a company's efforts to
       determine and to improve their software quality

4. a) Consider a system that includes a Web server and two database servers. Both database servers are identical: the first acts as a main server, and the second acts as a redundant back-up in case the first one fails. Users use Web browsers to access data through the Web server. They also have the option of using a proprietary client that accesses the databases directly. Draw a UML deployment diagram representing the hardware/software mapping of this system. 4

b) Why do we need structural partitioning? Which type of partitioning in useful for agile? 4

c) Write the names of different cohesions. Why should we increase cohesion for good design? 4

5. a) Show the software architecture of an ATM system. 2

b) Show the expression of calculating Error Index (EI). 2

c) Show the risk management process. 2

d) How many types of plan you need to do for software development? 2

e) For the given table below shows the tasks, durations and dependencies. Draw a task network and then find the critical path from the network. 4

Task	Effort (person-days)	Duration (days)	Dependencies
T1	15	10	
T2	8	15	
T3	20	15	T1 (M1)
T4	5	10	
T5	5	10	T2, T4 (M3)
T6	10	5	T1, T2 (M4)
T7	25	20	T1 (M1)

6. a) What are the stages of Testing? Identify the following types of testing: 4

    i. Testing the limits of system e.g. maximum number of users, peak demands, extended operation.

    ii. Test the various software and hardware configurations

    ii. Evaluate response times and time to perform a function

    v. Exercise all input and output parameters of each component, all components and all calls (each component is called at least once and every component is called by all possible callers.)

b) Why developer or programmer shouldn't test the system? What are the differences between system testing and inspections? 4

c) Explain the modified sandwich testing strategy and compare it with the other strategies. 4

7. Computer-Aided Software Engineering (CASE) tools are designed to help developers manage complexity.

a) What are the two main types of complexity such a tool must deal with? 3

b) What are the tools traditionally used to manage each type of complexity? 4

c) For each type, describe briefly one case history in which a serious failure was caused. 5

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Jahangirnagar University, Savar, Dhaka
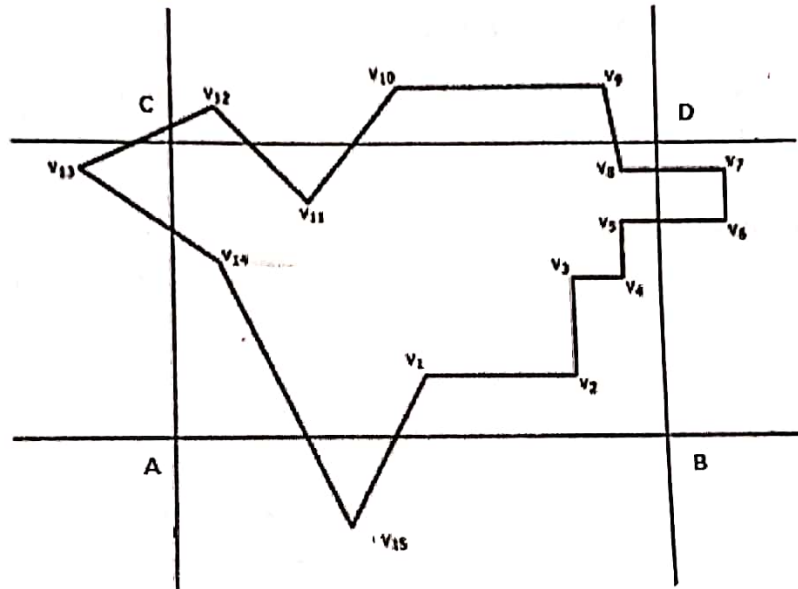3rd Year 2nd Semester B.Sc.(Hons.) Final Examination 2018

Course Code: IT-3203
Total Marks: 60

Course Title: Computer Graphics
Times: 3 Hours

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Answer any five (5) questions:

1. a) Explain scan conversion. What are the steps required to scan convert a point? Explain with an appropriate example.   4.0

   b) The endpoints of a given line are (4, 5) and (16, 12). Scan convert the line by direct use of line equation to compute each value of x and y in the meantime.   3.0

   c) Explain DDA algorithm with proper illustration. What are the advantages and disadvantages of using this algorithm for line conversion?   5.0

2. a) Write mid-point circle algorithm that generates the pixels coordinates in the 90^0 to 45^0 octant.   3.0

   b) Define aliasing effects of scan conversion. Explain briefly the three major adverse side effects of scan conversion.   3.0

   c) Explain Z buffer algorithm   3.0

   d) Explain color CRT using shadow mask   3.0

3. a) Write down the general open GL code to scan convert the following object on screen considering the co-ordinate points according to your preference: 6.0

   b) Rasterize the ellipse with pixel co-ordinates as $r_x=9$ and $r_y=7$ 6.0

4. a) Find the form of matrix for reflection about a line L with slope m and y intercept (0,b)   4.0

   b) Explain the Liang-Barsky algorithm for finding the visible portion of a line   4.0

   c) Describe Sutherland-Hodgman Algorithm   4.0

5. a) Magnify the triangle with vertices A(3,3), B(4,4) and C(8,5) to twice its size while keeping C(8,5) fixed.   4.0

   b) Show the effect of shearing transformation on the rectangle P(4,4), B(10,4), C(4,10) and D(10,10) with appropriate figure having shearing parameter of 3 units along x-axis and 5 units along y-axis.   4.0

   c) Perform scaling on a rectangle with vertices A(0,0), B(5.5,0), C(5.5,5.5) and D(0,5.5) to new vertices having scaling parameter of-   4.0
   - 5 units uniformly for both co-ordinates after translating it to 2 units in x-direction and 3 units in y-direction.

6. a) Consider a rectangular window which has a lower left hand corner at (-8,5) and upper right-hand corner at (7,11). Now find out the region codes for the following endpoints:{P(-9,7),Q(-6,12)};{R(--7,8),S(8,7)},{T(6,-7),U(6,7)};{V(-6.5,10),W(8,13)};{X(-9,12),Y(-6,11)};{A(-10,13),B(-7,16)};{C(-10,7),D(9,9)}; {E(-8,8),F(6,7)};   8.0

   b) Use Liang-Barsky algorithm to clip the lines {A(-6,12),B(16,11)}; {C(13,9),D(15,6)};{E(-7,15),F(8,12)};{G(11,11),H(13,14)};   with $x_{min}=6$, $x_{max}=14$, $y_{min}=7$, $y_{max}=13$ 4.0

7. a) Explain Sutherland-Hodgeman algorithm to perform the following polygon clipping: 8.0

b) In the light of 3-D transformation illustrate the following: 4.0
   i.   Translation
   ii. Rotation
   iii. Scaling
   iv. Rflection

Course Code: IT 3205   Time: 3 Hours

Course Title: Web Technology   Full Marks: 60

Answer any 5 (five) of the following questions. Figures in the right margin indicate marks.

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1. a) Why do we need validation? Write the steps of server side and client side validation.   5
   b) Explain client caching.   2
   c) Write the structure of HTTP request and response. Write their contents.   5

2. a) What is FQDN? Mention several popular domain and their hierarchy with example.   2
   b) Mention the service which convert the domain name to relevant IP address. Describe the function of this server service. Relative to this, What are the function of Primary and Secondary of this server service?   3
   c) In web technology perspective, what are the differences between TCP and UDP?   3
   d) Explain how the recursive query happens. Classify the URI.   2
   e) Consider a scenario, where you type direct IP address in your client browse. Then what will happen. Explain technically.   2

3. a) Define JSP and ASP.   2
   b) What is web storage in HTML 5? Write the two types of web storage used in HTML 5.   5
   c) Create the following graphics in fig. 1 using <SVG> tag (border line color: Black and fill color: yellow).   3
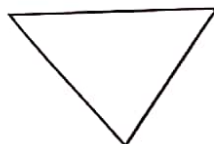

Fig. 1

   d) Explain URI & URN.   2

4. a) How can you insert JavaScript code in a HTML file?   5
   b) How JavaScript can display output? Give example of any one.   5
   c) Write the output of the following methods: 2
      i. splice()
      ii. slice(start, end)

5. a) Define SSI and CGI.   4
   b) Draw a diagram showing the interaction between scripts and browser.   4
   c) Explain in your own words about the Frame advantages.   2
   d) When and why you should use GET method? Why POST method is more secured?   2

6. a) What is box model in CSS? 4

b) How can you create imge gallery in CSS3? 4

c) Explain the following code: 4

```
<!DOCTYPE html>
<html>
<head>
<style>
    p.ex1 { font: 15px arial, sans-serif;  }
    p.ex2 { font:italic bold 12px/30px Georgia, serif; }
    </style>
</head>
<body>
    <p class="ex1">This is a paragraph with CSS styling. </p>
    <p class="ex2"> This is a paragraph with CSS styling.</p>
    </body>
</html>
```

7. a) What are differences between XML and HTML? 3

b) What is the htmlspecialchars() function in PHP form validation? 2

c) How can you avoid $_SERVER["PHP_SELF"] exploits in PHP? 2

d) Draw the output: 2

```
<frameset rows="25%, 50%, 25%">
<frame src="frame_a.htm">
<frame src="frame_b.htm">
<frame src="frame_c.htm"></frameset>
```

e) What is the $_SERVER ["PHP_SELF"] variable in PHP and what is the security threat in here? 3

Institute of Information Technology
JAHANGIRNAGAR UNIVERSITY
3rd Year 2nd Semester B.Sc (Hons.) Final Examination 2017

Course Title: Microprocessor & Interfacing   Course Code: IT 3207

Duration: 03 Hr   Full Marks: 60

There are **seven** questions, answer any **five** of them. Figures in the right margin indicates the marks

1. a. Write a simple assembly program to subtract two memory location, where each memory location is one byte wide.   4

    b. How to you differentiate between machine cycle and clock cycle? If a device slower than microprocessor requests additional clock cycles, how does 8086 accommodate the extra time cycles?   4

    c. Discuss the pipeline processing. How does it improve the performance of performance over the traditional processing? Distinguish between RISC and CISC architecture.   4

2. a. How does the 8086 microprocessor produce 20-bit physical address from 16-bit logical address?   4

    b. What are the differences between accumulators based microprocessor and general purpose microprocessor?   4

    c. If we use registers as storage, we can speed up operation but the cost will be increased. However, if we use secondary memory as storage, we lose the speed but cost will be reduced. What will be the optimum solution?   4

3. a. What do you understand by volatility? How the volatility problem can be resolved in practical applications?   4

    b. Design an 8-bit microprocessor interfaced to a 6K RAM system using the linear select decoding technique.   4

    c. What is the function of memory management unit (MMU)? What is the difference between physical memory and virtual memory?   4

4. a. An 8086 microprocessor can access up to one Megabytes of physical memory – justify the statement.   4

    b. Draw the 8086 microprocessor architecture, and specify the reasons why the 8086 microprocessor architecture is divided into two functional unit.   4

    c. What do you understand by memory segmentation? Why is memory segmentation used?   4

5. a. Explain the control and status register.   4

    b. Why do we need programmable interval controller? Draw the internal block diagram of a programmable interval controller.   5

c. An 8085 execute the following instruction

MVI A, 89

MVI B, 74

ADD B

DAA

Evaluate the content of accumulator and status flag

6. a. Describe the RESET signal (Pin 21) and which thing does the 8086 microprocessor initialize as a consequences if the RESET is low?   4

b. Discuss on the string addressing mode. Consider the string mode instruction "MOVS BYTE", where DF = 0, [DS] = 2000_{16}, [SI] = 0500_{16}, [ES] = 3000_{16} and [DI] = 0300_{16}; and the contents of memory locations at [20500] = 38_{16} and [30300_{16}] = 45_{16}. What will be the content of memory locations and the value of SI and DI after execution of the instruction? (Specify the reasons also)   4

c. Why indirect memory addressing mode is expensive than that of direct memory addressing mode? What are the advantages of using the register indirect addressing mode?   4

7. a. Write down the characteristics of Intel 80386 microprocessor. What are the differences between 80386 DX and 80386 SX?   4

b. Draw the block diagram of Intel 80386 microprocessor, and hence make a short discussion on central processing unit, memory management unit and bus interface unit.   4

c. Describe real address mode, protected address mode and virtual address mode used in Intel 80386 based microprocessor.   4

FULL MARKS: 60 TIME: 3 HOURS

Answer any **FIVE** of the following questions. Numerals at the right margin indicate marks.

1. a. Discuss advantages and disadvantages of using the following database structures for keeping biological data: 4
   i) File Database
   ii) Relational Database
   b. Define network with respect to biology. Give three examples of biological networks that can be constructed from large scale datasets.   4
   c. A bioinformatician wishes to construct an integrated functional network from the three networks that you described in (a). Outline a process that could be used to facilitate this integration.   4

2. a. What is Data Bank? What are the purpose of establishing a Data Bank?   4
   b. What do you mean by mutation and why researchers are helped by mutations?   4
   c. Why researchers need to use BLAST?   4

3. a. What is peptide bond? Explain the chemical structure of a protein.   4
   b. What is peptide bond for amino acid chain? What are the different categories of amino acids?   4
   c. What are the function of protein in the living species?   4

4. a. You are given two DNA sequences to align *ACGTCCTTCATT* and *GTCTCATG*. You have a scoring scheme where a   4
   - Match gives you +1
   - A mismatch gives you 0
   - Gap opening costs -10

   Write down the best alignment of the two sequences.
   b. Write the process of producing protein in the cell.   4
   c. What do you mean by promoter region? Why we need to observe the promoter region of a gene?   4

5. a. Let the scoring scheme of an alignment technique be "for any matching pair score is +1, mismatch pairs score = 2 and the gap penalty = -1". Answer the following questions: 4
   i) Construct the substitution matrix.
   ii) Write the recursive functions of Needleman-Wunsch Algorithm for global alignment.
   b. Construct the score table and discover the alignment for the sequence S=ACAGT and T=ACTGT using the information given above.   4
   c. Why do we use the concept penalty gap?   4

6. a. Write the cost-only Needleman-Wunsch Algorithm.   4
   b. Analyze the time and space complexity of cost-ony Needleman-Wunsch Algorithm. Also comment on it.   4
   c. When an alignment is called local alignment. What are the differences of it with global alignment?   4

7. a. Give the alignment matrix of the sequence *AATCGCGCGGT* and *ATGCGCCGT* assuming the following costs: $Cost(a, a) = 0$; $Cost(a, b) = 3$ when a ≠ b, $Cost(a, -) = Cost(-, a) = 2$. How would you set the function Cost in order to compute the longest subsequence common to x and y?   6

b. Define and distinguish between: phylum, taxon and species.   3
c. Aligning large genomic sequences cannot be done using pure dynamic   3
    programming approach because it would be too slow. Algorithms designed to
    handle such alignments – e.g., BLASTZ, AVID and LAGAN –- al take a general
    three-step "hierarchical" approach to large-scale alignment. Describe these
    three steps.