Jatiya Kabi Kazi Nazrul Islam University
Dept. Of Computer Science and Engineering
3rd year 1st semester Examination : 2021-22
Course code: CSE-301, Microprocessors

Time: 3 hrs. Marks: 60

Answer any five from the following

1	a	Define Microprocessor. Discuss about the components of microprocessor.	4
	b	Define bit, byte, word, and instruction. What is the difference between a microprocessor and a CPU?	4
	c	Discuss about the 8085 microprocessor programming model.	4
2	a	Define opcode and operand. Discuss about commonly used codes and data formats are used in an 8-bit processor system.	5
	b	What are the externally initiated operations in 8085 microprocessor? Discuss about them.	3
	c	Define memory interfacing. Illustrate the memory address range of the chip with 256 bytes of memory and explain how the range can be changed by modifying the hardware of the Chip Select line.	4
3	a	What do you mean by low-order and high-order address bus?	2
	b	Illustrate the steps and the timing of data flow when the instruction code 0100 1111 (4FH-MOV C, A) stored in location 2005H, is being fetched.	5
	c	What are the differences between 8086 microprocessors and 80286 microprocessors	3
	d	How does the CPU execute a machine instruction?	2
4	a	Construct the internal architecture of an 8086 microprocessor.	4
	b	What do you mean by memory segment? A memory location has physical address 80FD2h. In what segment does it have offset BFD2h?	3
	c	What is the function of Stack Pointer and Instruction Pointer register?	2
	d	Define logical address. What are the differences between a register and a memory location?	3
5	a	Define variables. Discuss about different types of variables.	5
	b	Why do data segment and code segment are important in an assembly language program?	3
	c	Define LEA instruction. Write an assembly language program that can print a string.	3
	d	Why INT 21h instruction used in assembly language?	1
6	a	Discuss about the different types of 8086 flag registers.	3
	b	Define JMP instruction. How do you differentiate conditional jump from unconditional jump with proper example?	3
	c	Define AND condition and OR condition.	2
	d	Discuss about IF-THEN –Else structure with flowchart. Suppose AL and BL contain extended ASCII characters. Write down assembly language code that displays the one that comes first in the character sequence.	4
7	a	Define Repeat Loop. Write some code to read characters until a bland is read.	3
	b	Why shift instruction used in assembly language? Discuss about different types of shift instructions.	4
	c	What do you mean by logic instruction? Define XOR instruction. How do you change the sign bit of DX?	4
	d	What is DUP operator?	1
8	a	Explain the following instructions: i) STOSB ii) MOVSB iii) SHL	4.5
	b	Differentiate between 80286 and 80386 microprocessors.	3.5
	c	Explain the features of a Pentium processor.	4

Jatiya Kabi Kazi Nazrul Islam University
Dept. of Computer Science and Engineering
3rd Year 1st Semester Final Examination-2025
Course: CSE-303 (Operating Systems)

Time: 3 (Three) Hours **Full Marks: 5 x 12 = 60**

Answer any five of the following questions

1 a) "Operating System is an application software". Is the statement true? Define your answer. What are the goals of an Operating System? 3

b) How can you distinguish between a program and a process? Why multitasking is necessary? 3

c) Write down the relative advantages and disadvantages of single-level and multi-level directory system. 3

d) What is the purpose of interrupts? What are the difference between a trap and an interrupt? Can traps be generated intentionally by a user program? If so, for what purpose? 3

2 a) What do you know about parallel systems and distributed systems? When should an operating system create and terminate processes? 4

b) Why do we need multiple threads instead of multiple processes? Explain User-level threads, kernel-level threads and Hybrid implementation (scheduler activation). 4

c) What is a **Virtual Machine**? Explain how a **Virtual Machine** functions as a **Versatile Operating System.** 4

3 a) Explain the difference between preemptive and non-preemptive scheduling. 4

b) Suppose that the following processes arrive for execution at the times indicated. Each process will run for the amount of time listed. In answering the questions, use preemptive scheduling, and base all decisions on the information you have at the time the decision must be made. 6

Process	Arrival Time	Burst Time
P1	5	8
P2	1	4
P3	3	1
P4	2	9
P5	0	3

i. What is the average turnaround time and average waiting time for these processes with the FCFS scheduling algorithm?

ii. What is the average turnaround time and average waiting time for these processes with the SJF scheduling algorithm?

iii. What is the average turnaround time and average waiting time for these processes with the RR scheduling algorithm when quantum time is 2?

c) Define dispatcher. 2

4 a) What advantage is there in having different time-quantum sizes at different levels of a multilevel queuing system? 3

b) Which of the following scheduling algorithms could result in starvation? Justify your answer : 4

i. FCFS

ii. SJF

iii. RR

iv. Priority

How could you recover from starvation?

c) What is critical section problem? Describe the requirement for solving critical section problem. 5

5 a) What is semaphore? Is deadlock occurs when using semaphore? Explain your answer. 4

b) What is readers-writers problem? Describe the solution of readers-writers problems using semaphore. 5

c) What is the meaning of the term busy waiting? What other kinds of waiting are there in an operating system? Can busy waiting be avoided altogether? Explain your answer. 3

6 a) A system has 2 processes and 3 identical resources. Each process needs a maximum of two resources. Is deadlock possible? Explain your answer. 4

b) If a system does not employ either a deadlock-prevention or a deadlock avoidance algorithm, then a deadlock situation may occur. In this environment describe different way to detect deadlock. 6

c) What is false cycle. 2

7 a) Using the Banker's algorithm, determine if the following system is in deadlock. If it is, which process(es) are deadlocked? If not in deadlock, what is the safe sequence? You need to show all intermediate steps to get full marks. $P_1 - P_5$ are processes, and A, B, C, D are resource types. 12

(a) Determine if a request from process P_2 of (1, 0, 2, 1) instances of resource A, B, C and D respectively will be granted immediately or not. Explain your answer.

(b) After fulfilling the request of question (*a*), will the system grant request of P_1 (0, 2, 0, 3)?

Process	Allocation				Max				Available			
	A	B	C	D	A	B	C	D	A	B	C	D
P_1	0	1	0	2	7	5	3	6	3	3	2	4
P_2	2	0	0	1	3	2	2	3				
P_3	3	0	2	1	9	0	2	1				
P_4	2	1	1	2	2	2	2	3				
P_5	0	0	2	1	4	3	3	4				

8 a) Discuss the advantages and disadvantages of multiprogramming with fixed partitions and variable partitions. 4

b) Consider a logical address space of 64 pages of 1024 words each, mapped onto a physical memory of 32 frames. 4

c) Write the basic steps in replacing a page when page faults occur. 4

Jatiya Kabi Kazi Nazrul Islam University
Department of Computer Science and Engineering
Third Year First Semester Final Examination- 2025
Session: 2021-2022
Course: CSE-305 (Theory of Computation)

Full Marks: 60 **Time: 3 hours**

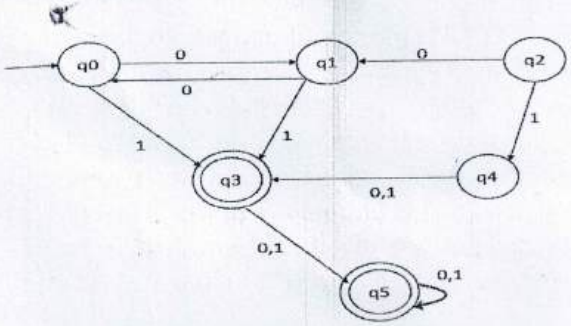
Answer any five of the following questions:

1. a) What is Theory of Computation (TOC)? Define symbol, alphabets, string and language. 3
   b) Give the mathematical definition of formal grammar. Explain Chomsky classification of grammar in detail. 3
   c) Write applications of Finite Automata. What are the differences between Deterministic Finite Automata (DFA) and Non- Deterministic Finite Automata (NDFA). 3
   d) Explain Moore's law on the evolution of computation. 3

2. a) What do you mean by Regular Expression (RE)? 2
   b) Which are the following languages over the alphabet {0,1} is described by the regular expression (0+1)*0(0+1)*0(0+1)*? 5
      A. The set of all strings containing the substring 00.
      B. The set of all strings containing at most two 0's.
      C. The set of all strings containing at least two 0's.
      D. The set of all strings that begin and end with either 0 or 1.
   c) The regular expression 0*(10*)* denotes the same set as: 3
      A. (1*0)*1*
      B. 0+(0+10)*
      C. (0+1)*10(0+1)*
      D. None of these.
   d) What is the difference between a* and a+. 2

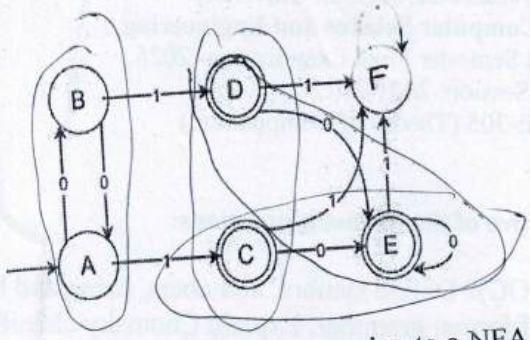
3. a) Make a comparison between Context-free grammar and Context-sensitive grammar with example? 2
   b) Construct a CFG to generate even and odd set of palindromes over alphabet {a, b}. 5
   c) Convert the CFG to Chomsky normal form $S \rightarrow aX|bS|ab|X, X \rightarrow aX|a| \in$ 5

4. a) What do you mean by Finite Automata and classify it? 3



   b) Remove the unreachable states from the q0 state of the following DFA. 4
   c) Define a DFA for the following language and draw the transition diagram of it. 5
      L={w | w has both an even number of 0's and an even number o 1's}

5. a) Why is the MyhillNerode Theorem important for DFA? 2
   b) Redraw a DFA from the following diagram applying the MyhillNerode Theorem. 10



6. a) Show the inductive step in the regular-expression to ε-NFA construction. 3
   b) Draw an NFA that accept all strings that end with 01 and redraw a DFA also of that NFA 4
   c) Construct an ε-NFA for the regular expression (0+1)*1(0+1) with step by step pictorial representation. 5

7. a) What is the application of Pumping Lemma in TOC? 3
   b) Write the different steps to prove that a a language L is not regular. 4
   c) Prove that the following language is not regular- 5
   $L_{01} = \{0^n1^n \mid n \geq 0\}$ is irregular

8. a) Define a Pushdown Automation (PDA) with its basic structure. 4
   b) Write the properties of Deterministic Pushdown Automata 3
   c) Construct PDA for the languages $\{a^n\, b^m\, c^n \mid m, n \geq 1\}$ *and* $\{a^n\, b^m\, c^n\, d^m \mid m, n \geq 1\}$ 5

Jatiya Kabi Kazi Nazrul Islam University

Dept. of Computer Science and Engineering

3rd Year 1st Semester Final Examination-2024, Session: 2021-22

Course: CSE-307 (Internet and Web Programming)

Time: 3 (three) Hours **Full Marks: 5 × 12 = 60**

[Answer Any five of the following questions]

1. (a) What is web engineering? Write the need of web engineering. 3
   (b) What is the scope of a web designer, web developer, and application developer? 6
   (c) What is URL? Describe it with an example. 3

2. (a) What is DHTML? Describe HTML Page Structure with an example. 4
   (b) Differentiate between text and hypertext? 1
   (c) What do you know about events in DHTML? Discuss onkeypress, onkeyup, and onkeydown events with examples. 4
   (d) What is <a> tag HTML? Write a code to link your department website "cse.jkkniu.edu.bd" to open it in a blank page. 3

3. (a) Write at least three input types that you can use in an HTML form. Can you use those elements to design a form so that the following data can be stored in a database? 4

ID	Gender	Name	Department
110	Male	Rahim	Marketing
120	Female	Nasima	Management
130	Male	Dolon	Accounting

   (b) Write HTML code to upload a file with the title of the file. 3
   (c) Define Block elements in HTML with examples. 2
   (d) Write the differences between POST and GET methods with examples. 3

4 (a) What is CSS? Explain a few advantages of CSS. 3
   (b) How can CSS be integrated into an HTML page? 3
   (c) Describe the type of selectors in CSS. 6

5. (a) How can you create an associative array from the following table? Print the values. 4

Emp-ID	Name	Designation	Salary
11	Shahin	AA	30,000
12	Rahim	BB	40,000
13	Jesmin	CC	20,000

   (b) Find the output of the following codes. 4

```
i.   $a = "5"; $b = 5; echo ($a === $b) ? "Equal" : "Not Equal";
ii.  echo "5".5;
iii. $x = "We are the \"Vikings\" from the east.";
```

iv. $x = 100; $y = "100"; echo ($x !== $y);

(c) Write the differences between the following functions with examples. 4

i. include() and require()

ii. mysqli_fetch_assoc() and mysqli_fetch_array()

6. (a) Find out the errors from the following code in PHP (if exist): 2

```
<?php
$country = $_GET['country];
$sql = 'select * from user_table where country=$country order by
username";
$result = mysql_query(sql);
?>
```

Write the corrected code.

(b) Write the uses of $_SESSION and $_COOKIE variables on a website using HTML/PHP code. 4

(c) Write the appropriate code to fetch data from the 'student' table in the database with the attributes Roll, Name, and District. Also, show those data in a table with the following format. 3

Roll	Name	District
11	Shaon Rahman	Dhaka
12	Rahima Khatun	Mymensingh

(d) How can you print all the values in tabular format from the following array in PHP using a foreach loop? 3

```
$cars = array (
  array("CSE",22,18),
  array("EEE",15,13),
  array("ESE",5,2),
  array("Stat",17,15)
);
```

7. (a) What is JavaScript? List some of the advantages and disadvantages of JavaScript. 4

(b) What are the key differences between Java and JavaScript? 4

(c) How do you write a "Hello World" example of JavaScript? 3

(d) Is JavaScript case sensitive language? 1

8. (a) What do you know about a firewall and a proxy server? Why are they necessary in network communication? 4

(b) Briefly describe the screened host architecture along with its diagram. 4

(c) Write the differences between a Bastion host and a Dual-homed host computer. 2

(d) What do you know about CGI Script? Why do we use it in web development? 2

*** End ***

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Jatiya Kabi Kazi Nazrul Islam University

Dept. of Computer Science and Engineering

3rd Year 1st Semester Final Examination-2024, Session: 2021-22

Course: CSE-309 (Data Communication)

Time: 3 (three) Hours **Full Marks: 5 × 12 = 60**

[Answer any five of the following questions]

1. a) What are the five criteria for an effective and efficient communication network? 2
   b) Draw the block diagram of a simplified data communication model and shortly explain the component of data communication. 3
   c) What is network topology? How many cables and ports are needed to connect 15 devices in a mesh topology? 1+2
   d) What are the important characteristics of data communication? Explain the following Computer networking devices in detail: i) Repeater and ii) Gateway 1+3

2. a) Suppose, your friend Bob is living in USA. You chat with him daily via messenger. Draw the scenario in the way of data communication. You have to follow the TCP/IP protocol suite. 3
   b) Discuss about TCP/IP protocol suite compared to OSI model. 4
   c) Write down the appropriate layer/layers name which has the following responsibilities: 5
      i. Create virtual circuit before transmission between two stations.
      ii. Flow control, error control.
      iii. Responsibility for carrying frames between adjacent nodes.
      iv. Ensure Reliable transmission of data.
      v. Establishes, manages, and terminates sessions.

3. a) Identify the types of the following addresses. 2
      i. 07: 0A:02:3C:5B
      ii. 192.168.123.132
      iii. 753
      iv. www.mhhe.com
   b) Suppose a noiseless channel with a bandwidth of 3000Hz transmitting a signal with four signal levels. Calculate the maximum rate. 2
   c) Explain two formulas to calculate the data rate. 3
   d) Describe throughput and latency. A network with bandwidth of 10Mbps can pass only an average of 12000 frames per minute with each frame carrying an average of 10000 bits. What is the throughput of this network? 3+2=5

4. a) A non-periodic composite signal has a bandwidth of 300kHz, with a middle frequency of 160 kHz and peak amplitude of 30v. The two extreme frequencies have amplitude of 10v. Draw the frequency domain of the signal. 3
   b) Draw the signal using 2+3=5
      i. Unipolar NRZ scheme for 010011.
      ii. Polar NRZ-L and NRZ-I schemes for 01001110
   c) Explain BASK and Multilevel ASK with example. 4

5. a) Discuss the necessity of modulation? Explain amplitude and frequency modulation with appropriate figure. 1+6=7

b) Explain different types of modems based on the transmission mode. 2
c) What are the differences between asynchronous and synchronous transmission? 3

6. a) What are some of the factors that determine whether a communication system is a LAN or MAN? 2
b) Describe difference types of transmission impairments that can affect wired transmission. 2
c) What is multiplexing? Shortly explain different types of multiplexing TDM technique. 1+3
d) Define the terms modulation and demodulation. Differentiate between digital and analog modulation. 2+2

7. a) What do you know about two dimensional switching? Write out the distinctions among hybrid, packet, and circuit switching. 2+2=4
b) Describe the routing and traffic control system of a network. 4
c) Describe the SONET layers compared with OSI or the Internet layers. 4

8. a) State and explain the Nyquist Theorem 2
b) What is latency? Briefly describe each component of latency in data communication. 3
c) Describe the advantages of frame relay over X.25 3
d) Write short notes on the following (any two): i) ATM ii) SONET and iii) Satellite communication 4