Jatiya Kabi Kazi Nazrul Islam University
Department of Computer Science and Engineering
3rd year 1st semester Final Examination 2023
Course code: CSE-301, Microprocessors

Marks: 60 Time: 3 hrs.

Answer any five from the following

1. a) Define Microprocessor. What is the function of microprocessor in a system? 3
   b) What is a bus? Why data bus is bi-directional and address bus is unidirectional? 4
   c) How do you differentiate workstations from microcomputers? 2
   d) Explain the differences between a microprocessor and a microcomputer. 3

2. a) Define instruction. Discuss about categories of 8085 instructions that can manipulate data. 5
   b) Write down the five internal data operations of 8085 microprocessor. How does 8085 registers perform these operations? 5
   c) Define memory read and memory write operation. 2

3. a) What do you mean by multiplexed address/data bus? Discuss about control and status signals of 8085 microprocessors. 5
   b) Define Interrupts. Discuss about 8085 Interrupts. 5
   c) Write down the primary function of memory interfacing. 2

4. a) What are the advantages of 8086 microprocessor over 8085 microprocessor? 2
   b) Discuss about 8086 microprocessor organization. 4
   c) Write down the important advances of 80286 microprocessor over its predecessors. 3
   d) Define memory segment and segment:offset address. 3

5. a) Determine the addressing modes of the followings: 4
      i) MOV CX, 2[BX]
      ii) SUB AC, BX
      iii) MOV AX, [SI + 002h]
      iv) MOV BL, 05h
   b) Write down the differences between 8086 and 8088 microprocessors. 3
   c) Explain the 8288-clock generator with appropriate figure. 5

6. a) What do you mean by signed overflow and unsigned overflow? 3
   b) NEG AX, where AX contains 8000h. How does NEG AX affect the 8086 flags? 3
   c) Define the following instructions 2
      i. JG/JNLE ii. JA/JNBE iii. JNE/JNZ iv. JBE/JNA
   d) Discuss about IF-THEN structure. 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) Write an assembly program to find the sum of the following series: 4
   $1^2 + 2^2 + 3^2 + \cdots \ldots \ldots \ldots \ldots + n^2$

b) Identify the errors and write the correct answers: 3

i) MOV AH, BX

ii) MOV ES, DS

iii) MOV [BX], [SI]

c) Explain Interrupt Vector table with example. 5

8. a) What is co-processor? Give example. 3

b) Write program in assembly language to find the largest elements in an integer array. 4

c) In an 8086-microprocessor system, the stack segment and the stack pointer are initialized to 4000h and 6FF0h respectively. What will be the physical address after each execution of the following instructions consecutively? 5

i PUSH AX

ii PUSH BX

iii POP AX

iv PUSH DX

Jatiya Kabi Kazi Nazrul Islam University
Dept. Of computer Science and Engineering
3rd year 1st Semester Final Examination-2023
Course Title: Operating System
Course Code: CSE-303

Total Marks: 60 **Time: 3 hours**

Answer any five from the following

1. a) Define OS. Explain dual mode operation of OS with necessary figure. 4
   b) Draw and explain the state diagram of a process. 3
   c) Explain **Process Control Block (PCB)** with suitable figure. 5

2. a) Briefly describe the process states with appropriate diagram of process state. 5
   b) What do you understand by Process Control Block (PCB)? PCB serves as the repository for any information associated with a process. List some information that PCB can store for a process. 5
   c) What do you understand by context switch? 2

3. a) What are the four necessary conditions for deadlock to occur? 4
   b) Consider the following snapshot of a system: 8

	Allocation				Max				Available			
	A	B	C	D	A	B	C	D	A	B	C	D
P0	0	0	1	2	0	0	1	2	1	5	2	0
P1	1	0	0	0	1	7	5	0				
P2	1	3	5	4	2	3	5	6				
P3	0	6	3	2	0	6	5	2				
P4	0	0	1	4	0	6	5	6				

Answer the following question using Bankers algorithm.

i. Find the need matrix for every process.
ii. Illustrate that the system is in a safe state by demonstrating an order I which the processes may complete.
iii. If a request from the process P1 arrives for (0,4,2,0), can the request be granted immediately?
iv. If a request from process P2 arrives for (1,0,0,2), can the request be granted immediately?

4. a) State some reasons when a parent (parent process) may terminate the execution of one of its children (child process). 4
   b) A process is called cooperating if it can affect or affected by the other processes executing in the system. List and describe some reasons for providing an environment that allows process cooperation. 4
   c) What is buffering? What are the ways of implementing the buffer queues? 4

5. a) What is the advantage of multilevel scheduling? Explain with the help of an example. 3

b) Which of the following scheduling algorithms could result in starvation and why? 4
i. FCFS
ii. SJF
iii. RR
iv. Priority

c) What is Round Robin (RR) scheduling? Find grant chart, average waiting time, average turnaround time and throughput of the following process using RR algorithm. 5

Process	Burst time(ms)
A	10
B	6
C	2
D	8
E	4

Time Quantum = 4

6. a) What do you understand by critical section problem in OS? What are the necessary conditions that must be satisfied by a solution to the critical-section problem? 6

b) Describe a classic software-based solution to the critical-section problem which is known as Peterson's solution and its limitation as well. 6

7. a) What are the differences between paging and segmentation? 2

b) How OS handle a page fault? Explain with necessary figure. 5

c) Consider the following reference string: 5

1, 2, 3, 4, 5, 3, 4, 1, 6, 7, 8, 7, 8, 9, 7, 8, 9, 5, 4, 5, 4, 2

How many page faults occur for the following page replacement algorithms, for four frames? All frames are initially empty; as a result, unique pages will cost one fault each.
i) LRU
ii) FIFO
iii) Optimal

8. a) Briefly describe the Paging memory management scheme that permits the physical space of a process to be noncontiguous with appropriate figure. 6

b) What happens if the process tries to access a page that was not brought into memory? 3

c) Write some difference between internal and external fragmentation. 3

Jatiya Kabi Kazi Nazrul Islam University

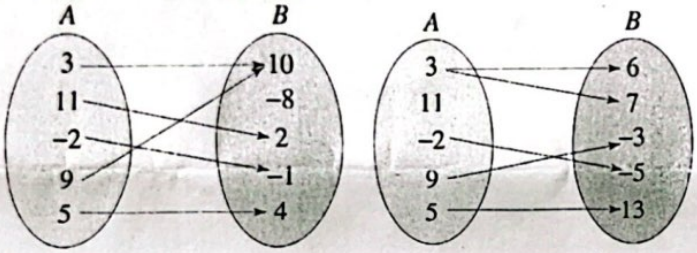
Department of Computer Science and Engineering
3rd Year 1st Semester Final Examination – 2023
Course: CSE305 (Theory of Computation)

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

[Answer any 5 (Five) questions of the following. You have to answer the all sub-section of a question in proper sequence.]

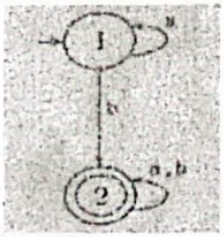
1. a) Why do you study theory of computation? Give an example that shows how it works. 3
   b) Explain formal language theory. Give the types of formal languages. 3
   c) How do you describe models of computation? Classify models of computation. 3
   d) A survey asks: "Which online services have you used in the last month?"; (i) Twitter, (ii) Facebook, and (iii) Have used both. The results show 40% of those surveyed have used Twitter, 70% have used Facebook, and 20% have used both. How many people have used neither Twitter or Facebook? 3

2. a) Explain the terms alphabets, strings, and languages with examples. 3
   b) Let R = {(1,2), (1,3), (2,2), (2,4), (4,3)} be a binary relation on the set A={1,2,3,4}. Apply the different closure properties of relation. 3
   c) Define predicate logic. Explain different types of logical quantifiers with examples. 4
   d) How do you define a function? Explain why the following Example-1 is function and Example-2 is not a function. 2



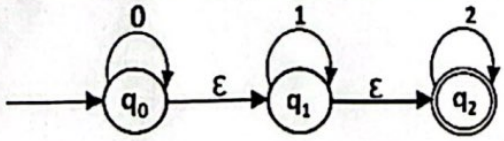
Example-1 Example-2

3. a) Convert the following DFA to the regular expression. 6



   b) Define Regular Expression. For the following regular expression, find an equivalent NFA. 6
   (ab ∪ a)*

4. a) How do you define the equivalence of DFA's and NFA's? 2
   b) Design an NFA with ∑ = {0, 1} in which double '1' is followed by double '0'. 2
   c) Define a two-way deterministic finite automaton (2DFA). How to accept a string by 2DFA? 3
   d) Convert the following NFA with e-move into its equivalence DFA. 5



5. a) Write the regular expressions for the following languages: 3
   (i) The language L accepting all the string which are starting with 1 and ending with 0, over

$\sum = \{0, 1\}$.

(ii) The language L accepting all the string in which any number of a's is followed by any number of b's is followed by any number of c's.

(iii) The language L over $\sum = \{0, 1\}$ such that all the string do not contain the substring 01.

b) Construct a FA from the given regular expression $10 + (0 + 11)0^* 1$. 4

c) State the pumping lemma for regular languages. How to prove that a given languages is not regular? 5

6. a) Give the formal definition of context-free grammar (CFG). Consider the following language 4
$L = \{wcw^R \mid w \in (a, b)^*\}$
and production rules:
$S \rightarrow aSa$
$S \rightarrow bSb$
$S \rightarrow c$
Now you have to check the string **babbcbbab** will be derived from the given CFG.

b) What about ambiguity of a grammar? Remove the ambiguity from the following grammar: 4

$$E \longrightarrow E * E \mid E + E \mid (E) \mid id$$

c) How do you simplify context-free grammar (CFG)? Remove unit productions from the grammar given below: 4

$$E \longrightarrow E * T \mid T$$

$$T \longrightarrow E + E \mid (E) \mid id$$

$$T \longrightarrow T + F \mid F$$

$$F \longrightarrow (T) \mid id$$

7. a) What is a Pushdown Automaton (PDA), and how does it differ from a finite automaton? 3

b) How does a DFA or a NFA consume each and every input symbol of given string? 4

c) What is DFA minimization? Briefly discuss the steps to Minimization of DFA? 5

8. a) Define language, string, singleton set and alphabet. 4

b) Briefly describe Ambiguity and Turing Machine 4

c) What do you mean by Undecidability and Reducibility in theory of computing? 4

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Jatiya Kabi Kazi Nazrul Islam University

Dept. of Computer Science and Engineering

3rd Year 1st Semester Final Examination-2023, Session: 2020-21

Course: CSE-307 (Internet and Web Programming)

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

[Answer Any 5 of the following questions]

1. (a) What type of pages require what type of servers? Explain the servers briefly with figure when rendering the pages. 6
   (b) Why HTTP/1.0 is faster than HTTP/1.1? Explain briefly with figures. 6

2. (a) What is DHTML? How can you write HTML comments? Give an example. 2
   (b) What is hypertext? Why does HTML call mark-up language? 3
   (c) What do know about events in DHTML? Discuss onclick, onmouseover, and onmouseout events with example. 4
   (d) What is <img> tag HTML? Write the HTML code so that you can show six images in two rows in a web page. 3

3. (a) What is HTML form? Can you design an HTML form for taking input the following data? Also, design an HTML table to show the data. 5

Roll	Gender	Session	Department
100	Male	2020-2021	CSE
200	Female	2020-2021	EEE
300	Male	2020-2021	STAT

   (b) What do you know about checkbox? How does it work in HTML form? Explain with proper example. 3
   (c) What do you mean by block-level and inline-level elements in HTML? Give two examples of each of them. 4

4. (a) What do you know about PHP? What are the different ways to add PHP code in HTML? 3
   (b) Write the use of $_SESSION variable during sign-in of a website using HTML/PHP code. 3
   (c) Write the functions of the following array functions with example. 3
      a) preg_replace()
      b) array_key_exists()
      c) htmlspecialchars()
   (d) What is an associate array? How can you put and print the values from the following table? 3

Emp-ID	Name	Designation	Salary
11	Shaon Rahman	AA	30,000
12	Rahima Khatun	BB	40,000

5. (a) What is MySQL database? How can you connect PHP code with MySQL 3

database?

(b) How can we get the ID of the last inserted data in a MySQL database? Give an example. 3

(c) Write a PHP program to upload an image file with proper validation. 4

(d) From the following code in PHP, find out the errors (if any) and write the reason. Write the corrected code. 2

```
<?php
$conn = mysqli_connect($server, $user, $password);
$sql = "select * from MyGuests;
$result= mysqli_query($conn, $sql);
if ($result) {
  echo "Query runs successfully<br>";
} else {
  echo "Error: ". $sql."<br>". mysqli_error($conn);
}
?>
```

6. (a) What do you know about JavaScript? How do 'for in' and 'for of' loop work in JavaScript - Explain with proper examples. 1+3

(b) What is client-side validation? Give an example program in DHTML to validate a form with the following fields using JavaScript? 1+2

Roll	Name	Dept
11	Shaon Rahman	AA
12	Rahima Khatun	BB

(c) Write several ways of adding JavaScript code to a DHTML webpage with example. 3

(d) Write down the output of the following code and its reason. 1+1

```
console.log(100=="100")
console.log(100==="100")
```

7. (a) What do you know about CSS? Can you write the basic syntax of CSS? Explain the syntax with proper example. 3

(b) How can you show blue colored text "I am a student of 3rd year" in HTML inside a box placed in the middle of a page with a university logo as background? 3

(c) Describe CSS box model with its required diagram and proper example program? 4

(d) What do you know about ASP and ASP.NET? 2

8. (a) Compare between Web 2 .0 and Web 3.0. 4

(b) Suppose you want to develop a web application. You want to give user specific view according to the user's choice. What type of page you will use? Describe that page with figure. 1+5+2

*** End ***

Jatiya Kabi Kazi Nazrul Islam University

Department of Computer Science & Engineering

CSE 309: Data Communication

3rd Year 1st Semester Final Examination 2024

Session: 2020-2021

Marks: 60 **Time: 3 Hours**

*** Answer any **Five** of the following questions. ***

1. a) To develop a data transmission system which components are required? How they work? 2+2
   b) "A protocol defines what is communicated, how it is communicated, and when it is communicated". Explain with your own words. 3
   c) When two parties make telephone call, is this a point-to-point or multipoint connection? Explain your logic. 2
   d) What are the differences between physical, logical, and port addresses? 3

2. a) List the name of the layers in TCP/IP protocol. Define physical address, logical address, and port address. Also map these addresses to the TCP/IP layers. 5
   b) What are the responsibilities of the presentation layer and session layer in OSI model? 2
   c) Match the followings to one or more layers of the OSI model: 5
   (i) Dialog control.
   (ii) Mechanical, electrical, and functional interface
   (iii) Encryption and Compression
   (iv) Route selection.
   (v) Error control
   (vi) Flow control

3. a) Use two examples to differentiate between the signal and data elements. 3
   b) What is the necessity of line coding? Write down the names of different line coding. 2+1
   c) You need to send 200 kbps over a noiseless channel with a bandwidth of 30 kHz. How many signal levels do you need? 3
   d) A telephone line normally has a bandwidth of 3000 Hz (300 to 3300 Hz) assigned for data communication. The capacity of a channel is 34860 bps. Calculate the SNR for this channel. 3

4. a) Explain the difference between the AMI and Pseudoternary bipolar line coding schemes with figure. 4
   b) Convert a digital signal into analog one using amplitude shift keying and frequency shift keying. The bit rate of the digital signal is 5. 4
   c) Discuss the use of constellation diagram. Draw the constellation diagrams for binary and quadrature PSK. 2+2

5. a) Explain the amplitude modulation technique. What purpose does this serve? 3+1
   b) Discuss the significance of multiplexing in data communication. 2
   c) Make a list of fundamental multiplexing methods for analog signals. Explain wavelength-division multiplexing technique with figure. 1+3
   d) Four channels, two with 300-kHz bandwidth and two with 200-kHz, are to be multiplexed together. Find the minimum bandwidth of the link. To avoid interaction, the channels are separated by an 8-kHz guard band. 2

6. a) State and explain the Nyquist Theorem. Write the equation for calculating the capacity of a noise less channel. Assume that a voice channel occupies a bandwidth of 4KHz. We need to combine four voice channels into a link starting from channel bandwidth 20KHz. Show the configuration with use of guard band of 1 KHz. 2+2

b) Define Bandwidth and throughput. A network with bandwidth of 10 Mbps can pass only an average of 12,000 frames per minute with each frame carrying an average of 10,000 bits. What is the throughput of this network? Deduce the relation between the bandwidth and throughput. 4

c) What is latency? Briefly describe each component of latency in data communication. 4

7. a) Describe the advantages of Frame relay over X.25. 2+2

b) What do you know about routing table? Explain RIP with example. 4

c) Explain the technologies of circuit switching. 4

8. a) Draw the digital signal of the following schemes using the digital data 10011011, assuming the first signal level is negative: 4
i) Polar: Differential Manchester
ii) Bipolar: Pseudo ternary
iii) Bipolar: Alternate Mark Inversion
iv) Multitransitional: MLT-3

b) Why is Delta modulation used? Explain the working of delta modulation technique. 3

c) ASK, FSK, PSK and QAM are popular techniques for digital-to-analog conversion. Among them which one is most susceptible to noise? Justify your answer. 2

d) Find the bandwidth for the following situations if we need to modulate a 5-KHz voice. 3
i) Amplitude Modulation
ii) Frequency Modulation ($\beta = 5$)
iii) Phase Modulation ($\beta = 5$)

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