JATIYA KABI KAZI NAZRUL ISLAM UNIVERSITY

Computer Science and Engineering

3rd Year 1st Semester Final Examination, Session 2019-20

Course code: CSE-301, Microprocessors

Time: 3 hrs. Marks: 60

Answer any five from the following

1.	a)	What do you mean by microprocessor? How does microprocessor acts as a programmable device?	3
	b)	What are the limitations of 8085 microprocessor?	3
	c)	Discuss about microprocessor –based system with Bus Architecture.	4
	d)	Which memory is known as user memory? What is the function of user memory?	2
2.	a)	Define opcode and operand.	2
	b)	How do you recognize the number of bytes in an instruction?	4
	c)	Discuss about the flag register of 8085 microprocessor.	4
	d)	What is the function of load operation?	2
3.	a)	Discuss about externally initiated operations of 8085 microprocessors.	4
	b)	What are the differences between static RAM and dynamic RAM?	3
	c)	If the memory chipsize is 2048×8 bits, how many chips are required to make up 16K- byte memory?	3
	d)	What is the memory word size required in an 8085 system?	2
4.	a)	Discuss the following pins of 8086 microprocessor: i) NMI ii) HLDA iii) ALE	4.5
	b)	Describe the basic operations of DMA with appropriate figure.	5
	c)	Explain the read cycle timing diagram for minimum mode.	2.5
5.	a)	What are the differences between MOV an XCHG instructions?	3
	b)	Discuss about different types of variables used in assembly language.	4
	c)	Define JMP instruction. Write an algorithm that display the one that comes first in the character sequence, where AL and BL contain extended ASCII characters.	5
6.	a)	Define signed overflow and unsigned overflow with example.	4
	b)	Discuss about for loop. Write a count-controlled loop to display a row of 80 stars.	4
	c)	Define right shift instruction. Use right shifts to divide the unsigned number 65143 by 4. Put the quotient in AX.	4
7.	a)	How can we use PTR to override a type?	3
	b)	What is the use of the DUP operator?	2
	c)	Write down the differences between based and index addressing modes.	3
	d)	How does an instruction affect the flags? NEG AX, where AX contains 8000h. How do results affect the flag registers?	4
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-2022
Course Title: Operating System
Course Code: CSE-303

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

Answer any Five from the following questions

1. a) What are the three main goals of an operating system? 3
   b) What are the different components of an operating system? 4
   c) What are some of the challenges facing operating systems today regarding system design and implementation? 5

2. a) What are the different types of operating-system structures? 4
   b) What are the advantages and disadvantages of a microkernel operating system? 4
   c) What are the different ways that an operating system can handle system calls? 4

3. a) What are the four necessary conditions for deadlock to occur? 4
   b) What is deadlock avoidance? 2
   c) Consider the following scenario of a system: 6

	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 Banker's 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 (04,2,0), can the request be granted immediately?

4. a) What are the three conditions that must be satisfied by a solution to the critical-section problem? Explain. 4
   b) Define: i) Race condition; ii) Semaphore; iii) Monitor; iv) Mutex lock; 4
   c) What are some different ways to solve the critical-section problem? 4

5. a) On all current computers, at least part of the interrupt handlers is written in assembly language. Why? 3
   b) Consider a system in which threads are implemented entirely in user space, with the run-time system getting a clock interrupt once a second. Suppose that a clock interrupt occurs while some threads is executing in run-time system. What problem might occur? Can you suggest a way to solve it? 4
   c) Consider the following piece of C code: 2

```
Void main() {
    fork();
    fork();
    exit();
}
```

How many child processes are created upon execution of this program?

d) A computer system has enough room to hold five programs in its main memory. These programs are idle waiting for I/O half the time. What fraction of the CPU time is wasted? 3

6. a) What is thread? Explain the benefits of multithreaded system. 3
   b) Mention the components of threads. Why do you need threads? 2
   c) Consider the following set of processes, with the length of the CPU burst given in milliseconds: 7

Process	Burst Time	Priority
P1	10	3
P2	1	1
P3	2	3
P4	1	4
P5	5	2

The processes are assumed to have arrived in the order p1, p2, p3, p4, p5, all at time 0.

i. Draw four Gantt charts that illustrate the execution of these processes using the following scheduling algorithms: FCFS, SJF, non-preemptive priority, and RR (quantum=1).

ii. What is the turnaround time of each process for each of the scheduling algorithms in part a.

iii. What is the waiting time of each process for each these scheduling algorithms?

7. a) What is the purpose of paging in the page tables? 2
   b) Consider the logical address space of 64 pages of 1024 words each, mapped onto a physical memory of 32 frames. 3
      i. How many bits are there in the logical address?
      ii. How many bits are there in the physical address?
   c) Compare contiguous and non-contiguous memory allocation methods. 3
   d) Consider the following page reference string: 1, 2, 3, 4, 2, 1, 5, 6, 2, 1, 2, 3, 7, 6, 3, 2, 1, 2, 3, 6. How many page faults would occur for the following replacement algorithms, assuming three frames? Remember that all frames are initially empty, so your first unique pages will cost one fault each. 4
      i. LRU replacement
      ii. FIFO replacement
      iii. Optimal replacement

8. a) List and describe the file's attributes those are common for all operating system. 4
   b) Briefly describe the different kinds of access method used by the operating system to access files. 4
   c) What are the different types of file-system operations? 4

Jatiya Kabi Kazi Nazrul Islam University

Department of Computer Science and Engineering

3rd year 1st semester Final Examination-2022

Course: CSE 305 (Theory of Computing)

Time: 3 hours

Full Marks: 60

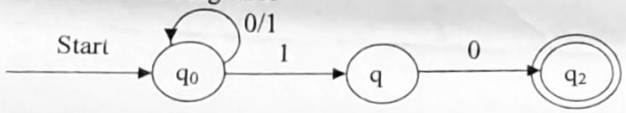
Answer any 5 (Five) questions of the following:

1. (a) Define automata. Write some application of automata. 3
   (b) Write about alphabet, string, powers of an alphabet. 3
   (c) Prove that every expression has an equal number of right and left parenthesis. 3
   (d) Write a finite automaton model for word "Trishal". 3

2. (a) What is the difference between deterministic finite automata and non-deterministic finite automata? 2
   (b) Consider to a DFA the following NFA: 4

	0	1
→ p	{q,s}	{q}
*q	{r}	{q,r}
R	{s}	{p}
*s	∅	{p}

   (c) Consider the following NFA 4



   Using the process of subset construction convert this NFA to DFA.
   (d) Give DFA's accepting the set of all strings with 011 as substring. 2

3. (a) Draw the diagram that are used for converting the following regular expression into automata. 3
   (i) R+S
   (ii)R.S
   (iii) R^*
   (b) Convert the regular expression of $a(a+b)c^*a$ into automata 5
   (c) Consider the following grammars:
   S=>AB
   A=>aAb|aA|ϵ
   B=>bBa|c
   Now (i) eliminate ϵ-productions (ii) eliminate useless productions from the given grammars. 4

4. (a) Consider a TM M=({ q_0, q_1, q_2, q_f},{0,1},{0,1,B}, δ, q_0,B{ q_f}). Where δ is given as follows:

Δ(q,a)	0	1	B
q_0	(q_0,1,R)	(q_1,1,R)	(q_f,B,R)
q_1	(q_2,0,L)	(q_2,1,L)	(q_2,B,L)
q_2	-	(q_0,0,R)	-
q_f	-	-	-

   Now show the ID's for input 01101. Finally say your opinion, what the TM is doing. 6
   (b) Draw the transition diagram of TM for the given transition table in (a). 3
   (c) What do you understand by Multitape Turing Machines? 3

5. (a) What is context-free language? Give a formal definition of a context-free grammar with appropriate example. 2
   (b) What do you mean by Chomsky normal form? Convert the following CFG to Chomsky normal form: 5
   S→ASA|Ab
   A→B|S
   B→b|ε
   (c) Formally define pushdown automation. Construct and explain a PDA, P_1 from the following CFG G: 5
   S→aTb|b
   T→Ta|ε

6. (a) Consider a pushdown automata (PDA), P=({ q_0, q_1, q_2},{0,1},{0,1, Z_0}, δ, q_0, Z_0,{q_2}) 4
   Now define the rules of δ to accept any string of w-w-Reverse language.
   (b) Draw the graphical notation for the PDA in (a). 3
   (c) Consider the following function: 5

1. $\delta(q,0,Z_0)=\{(q,XZ_0)\}$
2. $\delta(q,0,X)=\{(q,XX)\}$
3. $\delta(q,1,X)=\{(q,X)\}$
4. $\delta(q,\varepsilon,X)=\{(p,\varepsilon)\}$
5. $\delta(p,\varepsilon,X)=\{(P,\varepsilon)\}$
6. $\delta(p,1,X)=\{(p,XX)\}$
7. $\delta(p,1,Z_0)=\{(P,\varepsilon)\}$

Now show all ID for $ID(q,0011,Z_0)$

7. (a) What about the components of CFG. 3

(b) The following grammar generates the language of regular expression $0^*1(0+1)^*$ 4

S -> A+B

A -> 0A | ϵ

B -> 0B | 1B | ϵ

Give leftmost and rightmost derivations of the following strings:

i. 00101

ii. 1001

(c) The following grammar generates prefix expressions with operands x and y and binary operators +,-, and *;

E -> +EE | *EE | -EE | x| y 5

i. Find leftmost and rightmost derivations, and a derivation three for the string +*-xyxy.

ii. Prove that this grammar is unambiguous.

8. (a) Consider the following grammar:

$\delta \rightarrow A1B$

$A \rightarrow 0A|\varepsilon$

$B \rightarrow 0B|1B|\varepsilon$

Now give leftmost derivation of the string 00011. 4

(b) How can you construct a parse tree? 3

(c) What is ambiguous grammar? How can you remove the ambiguity of a grammar? 5

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Jatiya Kabi Kazi Nazrul Islam University
Department of Computer Science & Engineering
CSE 309: Data Communication
3rd Year 1st Semester Final Examination 2022
Session: 2019-20

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

[Answer any 5 (five) of the following questions. You have to write the answers sequentially e.g., a) then b) then c) and so on.]

1. a) Which components are needed for a data communication system? Explain the necessity of data communication. 2+2
   b) Explain the criteria that must be met to make network. 3
   c) Which layer/layers responsible for the following jobs: 3
      i. Error control and flow control
      ii. Routing
      iii. File transfer, access, and management
   d) Let a source is A, destination is B, and message is M. If you want to pass the message from A to B using TCP/IP protocol suite what will be the scenario? 2

2. a) Explain the time and frequency domains. 2+2
   b) The power we use at home has a frequency of 60 Hz. Determine the period of the sine wave. 2
   c) Consider the same channel transmitting a signal with eight signal levels (for each level, send 2 bits and the channel is noiseless). Calculate the maximum bit rate. 2
   d) What do you mean by throughput? What does the Shannon capacity have to do with communications? 2+2

3. a) What are the differences between synchronous and asynchronous transmission? 2
   b) Explain line coding and block coding. Why do we need these? 4+1
   c) Explain the Pulse Code Modulation. 3
   d) The human voice normally contains frequencies from 0 to 4000 Hz. We want to digitize the human voice. What is the bit rate, assuming 8 bits per sample? 2

4. a) Draw a heterogeneous network made of four WANs and three LANs. 2
   b) Let a source is A, the destination is B, and the message is M. If you want to pass the message from source to destination using TCP/IP protocol suite what will be the scenario? 2
   c) What do you mean by encapsulation and decapsulation at the router? 3
   d) Draw an OSI model and describe its network and application layer. 1+4

5. a) Sketch the scenario of digital-to-analog conversion. 2
   b) Explain ASK and FSK with appropriate figures. 3+3
   c) What do you know by carrier signal? Suppose you have an available bandwidth of 100 kHz which spans from 200 to 300 kHz. What are the carrier frequency and the bit rate if we modulated our data by using ASK with d =I? 2+2

6. a) Explain the Amplitude modulation. 3
   b) Explain the necessity of multiplexing in data communication. 2
   c) Which type of multiplexing technique is used in digital signal? Explain with example. 1+4
   d) Eight channels, each with 80-kHz bandwidth, are to be multiplexed together. Find the minimum bandwidth of the link. There is a guard band of 10-kHz between the channels to prevent interface. 2

7. a) Define Asynchronous transmission. Write down the features of parallel and serial transmission 1+4
   b) Discuss RS232C standards and explain the drawbacks of X.25 standard. 3+2
   c) Write down the advantages of Frame Relay. 2

8. a) What is ATM? Draw an architecture of an ATM network. 1+3
   b) Describe about dial up services and DSL. 5
   c) Write a short note on SDH. 3

Jatiya Kabi Kazi Nazrul Islam University

Dept. of Computer Science and Engineering

3rd Year 1st Semester Final Examination-2022

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 do know about front-end and back-end programming languages? Why do they necessary in present world? 3
   (b) What do you understand by HTTP, HTML, and FTP? 3
   (c) Write the general format of URL and explain every part briefly. 3
   (d) Who sets CSS standards? Write the differences between HTTP and HTTPS. 3

2. (a) What do you mean by HTML and DHTML? Why do you use <!DOCTYPE> Declaration in HTML page? 1+2
   (b) What is markup language? Why does HTML call mark-up language? 3
   (c) What do know about events in DHTML? Discuss key-related events with example. 4
   (d) Discuss different value used for TYPE attribute of <INPUT> tag. 3

3. (a) What is HTML Table? Write a DHTML code to design the following table. 3

Dept. Name	No. of Students	No. of Teachers
CSE	200	15
EEE	160	12
STAT	160	10

   (b) What are CSS selectors? How can you write a text "I am a student of CSE" in red color inside a box placed in the middle of a page with dotted 2px width border? 3
   (c) Discuss different ways of adding CSS in a DHTML page. 2
   (d) Narrate CSS box model with its required diagram and proper example program? 4

4. (a) What is PHP? "PHP is one of the popular web programming languages"- Explain. 3
   (b) Write the difference between following in PHP: 4
   (i) include() and require()
   (ii) Session and Cookie
   (c) What is the function of the following array function with example: (1x4=4) 5
   a) preg_replace()
   b) array_keys()
   c) count()
   d) in_array()
   e) krsort()

5. (a) Write the function of $_SERVER['DOCUMENT_ROOT'] and $_SERVER['HTTP_HOST'] and $_SERVER['PHP_SELF'] in PHP? 3
   (b) What are superglobal variables in PHP? Write the names and functions of them. 3

(c) What is an array in PHP? Discuss different types of arrays used in PHP with proper example. 4

(d) What is meant by the code "<?=$err;"? Can you differentiate POST and GET method? 2

6. (a) What do you know about scripting languages? Write an example DHTML program with a button to show current date/time. 1+2

(b) What is client-side validation? Give an example program in DHTML to validate a form with the following fields using JavaScript? 1+4

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

(c) Write several ways of adding Javascript code to a DHTML webpage with example. 4

7 (a) What do know about firewall? Why does it necessary in network communication? 2

(b) Write the differences between Bastion host and Dual-homed host computer? 2

(c) Discuss dual-homed host architecture with the required diagram. 4

(d) What do know about web page transition? Classify and describe each of them with example. 3

8. (a) What do you know about web server? Narrate common features of a web server. 1+3

(b) What do know about cross site scripting and DoS attacks? Discuss them with example. 3

(c) What is load balancer in web server? How can you manage network traffic for anti-overload techniques in web server? 3

(d) What do know about CGI script? Why does it necessary? 2

***** End *****