

PART-A (15 Marks)

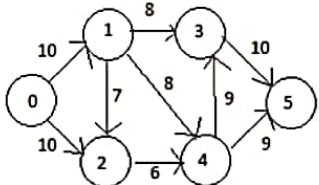
1.

a. Define average case, best case and worst case complexity. Give an example of an algorithm that has the same average case, best case or worst case complexity. Discuss the reason.	2.5
b. Suppose you are given a backpack that can carry a total of 30 Items. Now you have the following items to choose from:	2.5

Item's brand	Amount Available	Total Value
Item1	6	360
Item2	18	180
Item3	3	150
Item4	10	180

Now choose items in a way such that you can achieve highest number of items and also highest value. Note that you can take fractions of the amount available. Write how many items from which brand I need to choose.

2.

a. Find the maximum possible flow from the source to destination. (From 0 to 5) <div style="text-align: center; margin: 10px;">  </div>	5
b. Suppose that the following characters are given with their corresponding frequency (In Thousands): e:9 f:5 d:16 a:45 c:12 b:13 Using Huffman's algorithm, find the code for each character. Compare the result of variable length codeword with fixed length codeword.	5

PART-B (15 Marks)

3. (Answer any two)

<p>a. Write the complexity of the following code snippet:</p> <pre>#include<stdio.h> int main() { int a[2][2] = {2,32,23,1}; for (int i = 0; i < 2; ++i) { for (int j = 0; j < 1; ++j) { for (int k = j + 1; k < 2; ++k) { if (a[i][j] > a[i][k]) { int temp = a[i][j]; a[i][j] = a[i][k]; a[i][k] = temp; } } } } for (int i = 0; i < 2; ++i) { for (int j = 0; j < 2; ++j) { printf("%d ", a[i][j]); } printf("\n"); } return 0; }</pre>	2.5
<p>b. Find an x such that $ax \equiv 1 \pmod{m}$; here $a = 3$ and $m = 11$</p>	2.5

4. (Answer any two)

a. Find LCS of the 2 strings A = "HLLWRLDE" B = "CLOWRADA" Use proper backtracking arrows so that the LCS string can be found.	5
b. Design a cost function to solve the 15-Puzzle problem. Find the solution for the following 15-Puzzle problem using that cost function.	5

1	2		4
5	6	3	8
9	10	7	11
13	14	15	12

Initial State

1	2	3	4
5	6	7	8
9	10	11	12
13	14	15	

Goal State

Shahjalal University of Science & Technology
Institute of Information and Communication Technology
BSc(Engg.) in Software Engineering 2nd Year 2nd Semester Examination, 2020
Session: 2018-19
Course: **SWE 233** (Ethics and Cyber Law)
Full Marks: 30 **Credit: 2.0**

Answer All the Questions

Set-A

1. Answer questions below- a. How ethics is compared with moral? b. Explain: Value Judgement.	2.5*2
2. Explain code of Ethics for Software Engineers.	5
3. Consider two situations below and write your own opinion from the aspect of ethics and law. a. Someone got into a quarrel with a rickshaw driver over rickshaw-fare and eventually slapped. b. A beggar approached someone and was asking money. That someone got angry and spewed filth to abuse the beggar.	5

Set-B

4. Answer questions below- a. Discuss cyber law and cybercrime based on the incident below- <i>Your friend got access to your computer and posted status on behalf of you.</i> b. Define Cyberspace.	2.5*2
5. What are the 3 models of dealing with tension and potential conflict between engineers and managers.	5
6. Exemplify the needs of cyber law in a contemporary society.	5

Shahjalal University of Science & Technology

Institute of Information and Communication Technology

Discipline: Software Engineering

2nd Year 2nd Semester Examination, 2020

Session: 2018-19

Course: **SWE 233** (Operating System Concepts)

Full Marks: 50

Credit:3.0

Time: 2 Hours

Group - A

1. Answer all questions	0.5*10
a. Access latency = average latency + _____	
b. Differentiate between virus and spyware.	
c. Differentiate job and task.	
d. Differentiate synchronous and asynchronous communication between processes.	
e. In UNIX, user is the domain” - True or False?	
f. Name a kind of malicious program which can be a virus-dropper.	
g. Principle of least privilege states that-	
h. Processes alternate between ____ bursts and ____ bursts.	
i. There are two types of sockets. True or false?	
j. True or False- i. preemptive scheduling can result in race conditions	
2.	5
Explain semaphore to solve critical section.	
3.	5
Example multilevel queue scheduling and multilevel feedback queue scheduling.	

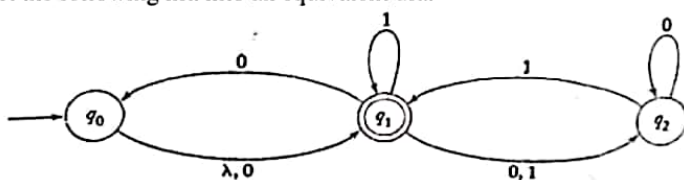
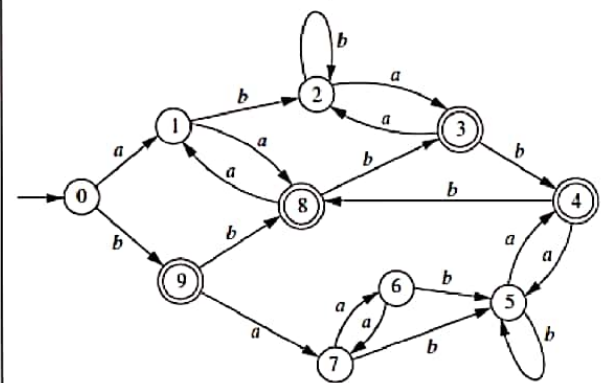
Group - B

4.	0.5*10
a. What does Moore's law state?	
b. What is api?	
c. What is degree of multi-programming?	
d. What is kernel?	
e. What is loop back address?	
f. What is mutual exclusion?	
g. What is system call?	
h. What is time quantum in cpu scheduling?	
i. What is trap door?	
j. What is trojan-horse?	
5.	5
What is deadlock? How does it induce starvation? Explain.	
6.	5
i. What is parallelism? What are the types of parallelism?	
ii. Differentiate concurrency and parallelism.	

Shahjalal University of Science and Technology
Institute of Information and Communication Technology
Software Engineering
Final Examination, 2nd Year 2nd Semester, 2020
Course No: SWE-335 Course Title: Theory of Computation
Credits: 3 Full Marks: 30

Group A

[Answer all the questions]

1.	Answer all the questions	2x2.5=5
a)	<p>Give a simple description of the language generated by the grammar with productions.</p> <p>i. $S \rightarrow aA$ $A \rightarrow bS$ $S \rightarrow \lambda$</p> <p>ii. $S \rightarrow Aa$ $A \rightarrow B$ $B \rightarrow Aa$</p>	
b)	For $\Sigma = \{a,b\}$ construct dfa's that accept the sets consisting of all strings with no more than three a's.	
2.	Answer all the questions	2x5=10
a)	<p>Convert the following nfa into an equivalent dfa.</p> 	
b)	<p>Using the minimization algorithm, Find a minimum-state FA recognizes the same language for the following figures.</p> 	

Group B

[Answer all the questions]

1.	Answer all the questions	2x2.5=5
a)	<p>For each of the following language, find a grammar that generates it.</p> <p>i. $L1 = \{a^n b^m : n \geq 0, m > n\}$</p> <p>ii. $L1 = \{a^n b^{2n} : n \geq 0\}$</p>	
b)	What is Regular expression? Write down the rules for RE.	
2.	Answer all the questions	2x5=10
a)	Find an nfa which accepts $L(r)$, where $r = (ab+b^*)(ba^*+\lambda)$	
b)	Draw a FA accepting binary representations of integers divisible by 3.	

Shahjalal University of Science and Technology
Institute of Information and Communication Technology
BSc (Engg.) in Software Engineering
2nd Year 2nd Semester Final Examination 2020
Course: Numerical Analysis (SWE 231)
Credits: 2.0 Full Marks: 50 Time: 2 Hours

[Answer every question]

Group A

- Q.1. Find the real root of the equation $x^3 - 2x^2 - 4 = 0$ by using False Position method (use $a = 2$ and $b = 3$).
- Q.2. The following table gives certain corresponding values of x and $\log_{10} x$. Using Lagrange's interpolation formula compute the value of $\log_{10} 321.5$.

x	321.0	322.8	324.2	325.0
$\log_{10} x$	2.50651	2.50893	2.51081	2.51188

- Q.3. Solve, by Euler's method of the equation $\frac{dy}{dx} = x + y$, $y(0) = 1$, for $0 \leq x \leq 1$ taking $h = 0.1$.

Group B

- Q.4. Solve, by Runge-Kutta method of the equation $\frac{dy}{dx} = \frac{x^2 + y^2}{10}$, $y(0) = 1$, for $0 \leq x \leq 0.4$, taking $h = 0.1$.
- Q.5. Evaluate $\int_0^6 \frac{1}{1+x^2} dx$ by using the A) Trapezoidal rule, B) Simpson's 1/3 rule and C) Simpson's 3/8 rule.
- Q.6. Using Lagrange's interpolation formula, find the form of the function $f(x)$ from the following table.

x	0	1	3	4
$f(x)$	-12	0	12	24