

Roll No.	
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Tatyasaheb Kore Institute of Engineering and Technology, Warananagar
(An Autonomous Institute, Affiliated to Shivaji University, Kolhapur)
Department of Computer Science and Engineering

T.Y.B.Tech In-Semester Examination-I, September- 2023

Course Name : **Computer Algorithm**
Day & Date : **29/09/2023**
Time : 09.15 AM - 10.45 AM

Course Code: CSE504
Max Marks : 40Marks

Instructions: i. There are three questions in this question paper. Three sub questions for each question. All questions Q1, Q2 and Q3 are compulsory. Solve any two sub questions based on the instructions provided.
ii. Figures to the right indicates full marks, Bloom's Taxonomy Level and Course Outcome (CO) (BL) (**L1- Remembering, L2- Understanding, L3 – Applying, L4 – Analyzing, L5 – Evaluating, L6 - Creating**)
iii. Use of non-programmable calculator is allowed iv. Assume suitable data if required.

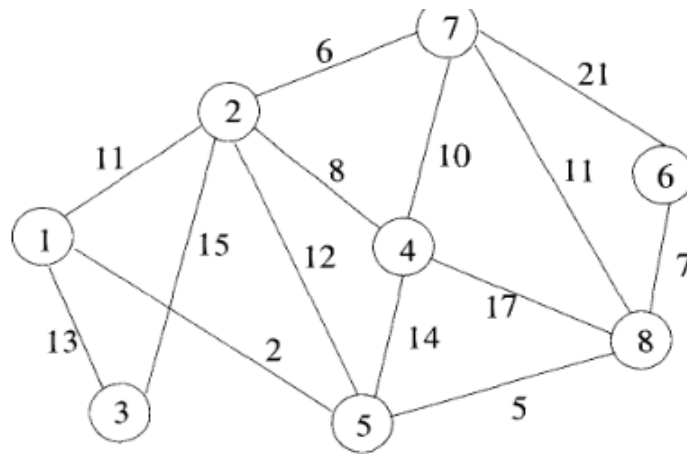
Course Outcome's are:

CO1- Understand and demonstrate algorithm design methods with analysis

CO2-Devise algorithm for given problem statement and analyze its space and time complexity by using recurrence relation

CO3-Categorize the problem to determine polynomial and non-polynomial based on its nature

	Marks	B.L	CO							
Q.1 Attempt any two of the following										
a) Compare the functions $5n$, n^2 and $(2^n)/4$ for various values of n . Give your detailed comment on the growth of these functions	7	L2								
b) Write an algorithm to generate the transpose of a square matrix of size $n*n$. Find time and space complexity of the algorithm.	7	L2	CO 01							
c) Define the terms with example:	7	L1								
i. Optimization Problem										
ii. Feasible Solution and optimum Solution										
iii. Objective function										
Q.2 Attempt any two two of the following										
a) Explain merge sort algorithm, give one running example. Analyze merge sort for its space and time complexity. Apply merge sort to following input	7	L4	CO 02							
<table border="1"><tr><td>12</td><td>5</td><td>17</td><td>13</td><td>31</td><td>9</td><td>6</td></tr></table>				12	5	17	13	31	9	6
12	5	17	13	31	9	6				
b) Illustrate prim's algorithm by applying it to following Graph.	7	L3								



- c) Considering Objective function and constraints, Explain Knapsack Problem with an example. 7 L3

Q.3 Attempt any two two of the following

- a) The complexity of Divide and conquer method is given by recurrence 6 L4

$$T(n) = \begin{cases} T(1) & n = 1 \\ aT(n/b) + f(n) & n > 1 \end{cases}$$

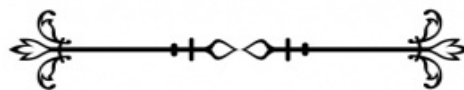
Consider $a=2$, $b=2$, $T(1)=2$ and $f(n)=n$. Solve above recurrence equation.

CO 02

- b) Define Optimal merge pattern problem. Give an greedy method solution for merging. Apply method to following file collection 6 L3

2	5	7	13	3	9	6
---	---	---	----	---	---	---

- c) Prove the following equalities. 6 L4
- $33n^3+4n^2+5=O(n^3)$
 - $10n^2+9=\Omega(n^2)$



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Department of Computer Science and Engineering

T.Y.B.Tech In-Semester Examination-II, October- 2023

Course Name : **Computer Algorithms**
Day & Date : **Monday, 30/10/2023**
Time : **9.15 to 10.45AM**

Course Code: **CSE504**
Max Marks : **40Marks**

Instructions:

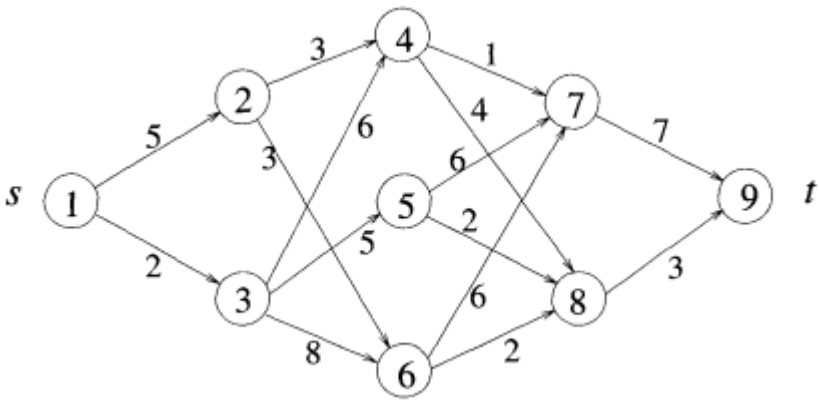
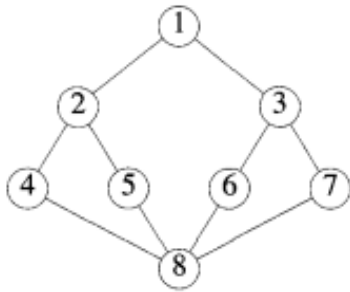
- All three questions are compulsory.
- Figures to the right indicates full marks, Course Outcome (CO) & Bloom's Taxonomy Level (BL) (**L1- Remembering, L2- Understanding, L3 – Applying, L4 – Analyzing, L5 – Evaluating, L6 - Creating**)
- Assume suitable data if required

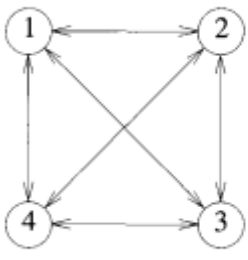
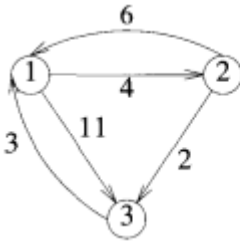
Course Outcomes :

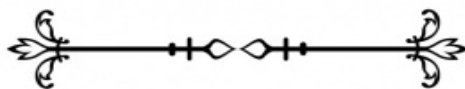
CO:1 Understand and demonstrate algorithm design methods with analysis.

CO2: Devise algorithm for given problem statement and analyze its space and time complexity by using recurrence relation

CO3: Categorize the problem to determine polynomial and non-polynomial based on its nature

		Marks	B L	CO
Q.1	Attempt any two			
a)	Find a minimum cost path from S to T in the following multistage graph of figure1 using forward approach.  <p style="text-align: center;">Figure :1</p>	7	L5	CO 02
b)	Solve the reliability design problem for the following problem instance having three stages D1, D2, D3. The total cost of the system is 105. The cost of the device D1 is 30, D2 is 15, D3 is 20. Reliabilities are $R_1=0.9$, $R_2=0.8$ and $R_3=0.5$. Why this problem is NP Problem.	7	L5	
c)	Define Spanning tree. Construct DFS and BFS spanning tree for following Graph(Figure 02)  <p style="text-align: center;">Figure 2</p>	7	L3	

Q.2	Attempt any two			
a)	With pseudo code, Explain Dynamic programming solution to solve all pair shortest path problem. Write objective function for the same.	7	L3	CO 01
b)	Elaborate BFS and DFS search techniques with suitable example.	7	L3	
c)	Give an algorithm to count the number of leaf nodes in a binary tree t. What is its computing time?	7	L3	
Q.3	Attempt All Questions below.			
a)	<p>Solve the instance of travelling sales person problem to find tour of minimum cost. (Figure 3). Why this problem is NP Problem.</p> <div style="display: flex; align-items: center; justify-content: center;">  <div style="margin-left: 20px;"> $\begin{bmatrix} 0 & 10 & 15 & 20 \\ 5 & 0 & 9 & 10 \\ 6 & 13 & 0 & 12 \\ 8 & 8 & 9 & 0 \end{bmatrix}$ </div> </div> <p style="text-align: center;">(Figure 3)</p> <p>OR _____</p> <p>Compute all pair shortest path for following graph of figure 4. Why this problem is P Problem.</p> <div style="display: flex; align-items: center; justify-content: center;">  <div style="margin-left: 20px;"> $\begin{array}{c ccc} A^0 & 1 & 2 & 3 \\ \hline 1 & 0 & 4 & 11 \\ 2 & 6 & 0 & 2 \\ 3 & 3 & \infty & 0 \end{array}$ </div> </div> <p style="text-align: center;">figure 4</p>	6	L4	CO 3
b)	Describe Binary tree traversal techniques with suitable example.	6	L3	CO 01



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T.Y. B. Tech (Comp. Science & Engg.) (Semester-V)**End Semester Examination, December- 2023**

Course Name : Computer Algorithms
 Day & Date : Tuesday, 26-Dec-2023
 Time : 10:00 am to 12:00 pm

Course Code: CSE504
 Max Marks : 60 Marks

Instructions:

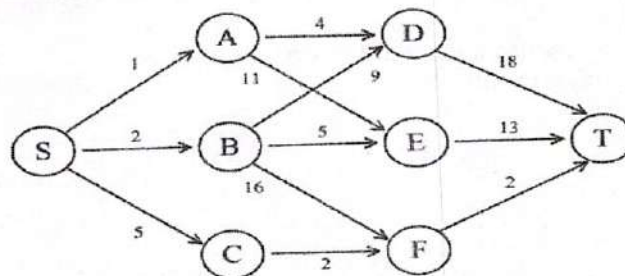
- All questions are compulsory
- Figures to the right indicates full marks, Course Outcome (CO) & Bloom's Taxonomy Level (BL) (L1-Remembering, L2- Understanding, L3 – Applying, L4 – Analyzing, L5 – Evaluating, L6 - Creating)
- Use of non-programmable calculator is allowed
- Assume suitable data if required.

Q. No**Marks****B.L****CO****Q.1****Attempt any two****12**

- Define algorithms and explain satisfying criteria for good algorithm with example
- Write algorithm for recursive Merge sort and compute its time complexity for successful and unsuccessful searches
- Considering Objective function and constraints, Explain Knapsack Problem with an example.

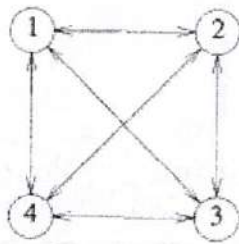
L2**01****L2****L2****Q.2****Attempt any two****12**

- Find a minimum cost path from S to T in the following multistage graph of figure1 using forward approach.

L3**02****Figure1: Graph**

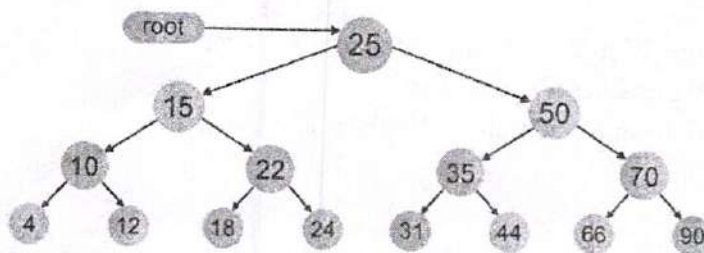
- Elaborate BFS and DFS search techniques with suitable example.
- Solve the instance of travelling sales person problem to find tour of minimum cost. Why this problem is NP Problem.

L3**L3**



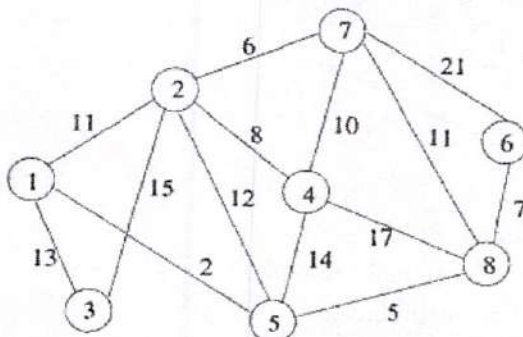
0	10	15	20
5	0	9	10
6	13	0	12
8	8	9	0

- Q.3 Attempt any two** 12
- a) Let $w = \{5, 7, 10, 12, 15, 18, 20\}$ and $m = 35$. Find all possible subsets of w that sum to m . Do this using SumOfSub(). Draw the portion of the state space tree that is generated. L3 02
- b) Explain Backtracking algorithm to solve HAMILTONIAN CYCLES problem with an example. L3
- c) Explain Backtracking algorithm to solve Graph coloring problem with an example. L3
- Q.4 Write short note on any two of the following** 12
- a) AND/OR Graph L2 03
- b) Clique decision problem L2
- c) NP Hard and NP complete problems L2
- Q.5 Answer following questions** 12
- a) Provide the In order, Preorder, Post order Traversal for the given graph. L3 02



OR

- a) What is spanning tree. Write the pseudo code and Draw a minimum cost spanning tree using Prim's algorithm for the given graph. L3 01



- b) Prove the following equalities. L3
- a. $33n^3 + 4n^2 + 5 = O(n^3)$
- b. $10n^2 + 9 = \Omega(n^2)$

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Department of Computer Science and Engineering

T.Y.B.Tech In-Semester Examination-I, September- 2023

Course Name : **Cyber Security and Cyber Laws**
Day & Date : Saturday 30/09/2023
Time : 9.15 to 10.45 AM

Course Code: **CSE-506**
Max Marks : 40Marks

Instructions:

- i. All questions are compulsory
- ii. Figures to the right indicates full marks, Course Outcome (CO) & Bloom's Taxonomy Level (BL) (**L1- Remembering, L2- Understanding, L3 – Applying, L4 – Analyzing, L5 – Evaluating, L6 - Creating**)
- iii. Use of non-programmable calculator is allowed
- iv. Assume suitable data if required

Course Outcomes:

CO1: Explain the cyber security concepts

CO2: Describe the cyber security vulnerabilities and prevention techniques

		Marks	B.L	CO
Q.1	Attempt any two			CO1
a)	Illustrate the following terms related to Cyber Security	7	L1	
	1) Hacker Slang			
	2) Script Kiddies			
	3) Penetration tester			
	4) Phreaking			
b)	Define Malware? Describe different types of Malware?	7	L1	
c)	State the function of perimeter and layered security approach?	7	L1	
Q.2	Attempt any two			CO1
a)	Define Auction Fraud? Classify 4 Categories of online auction fraud.	7	L1	
b)	Define Cyber Stalking? How to Evaluate Cyber Stalking?	7	L1	
c)	Describe Investment offers, common schemes and investment advice related to Internet Fraud	7	L2	
Q.3	Attempt any two			CO2
a)	Illustrate the Different Web Attacks	6	L2	
b)	Explain shill Bidding, Bid Shielding and Bid Siphoning related to Auction Fraud	6	L2	
c)	Enlist the Tips for Avoiding Internet Fraud?	6	L1	



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SWVSM'S
Tatyasaheb Kore Institute of Engineering and Technology, Warananagar
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Department of Computer Science and Engineering

T.Y.B.Tech In-Semester Examination-II, October- 2023

Course Name : Cyber Security and Cyber Laws
Day & Date : Tuesday 31/10/2023
Time : 9.15 to 10.45 AM

Course Code: CSE-506
Max Marks : 40Marks

Instructions:

- i. All questions are compulsory
- ii. Figures to the right indicates full marks, Course Outcome (CO) & Bloom's Taxonomy Level (BL) (L1- Remembering, L2- Understanding, L3 – Applying, L4 – Analyzing, L5 – Evaluating, L6 - Creating)
- iii. Use of non-programmable calculator is allowed
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Course Outcomes

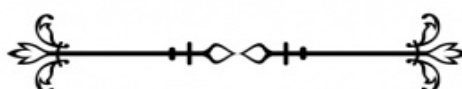
CO1 Explain the cyber security concepts

CO2 Describe the cyber security vulnerabilities and prevention techniques Remember

CO3 Understand the different rules and regulations under I.T. Act

CO4 Analyze the concepts of digital forensics & incident management

	Marks	B.L	CO
Q.1 Attempt any two			CO1
a) List Different Types of viruses?	7	L1	
b) What is Dos? Illustrate with example.	7	L2	
c) State Trojan horses? Describe in detail	7	L2	
Q.2 Attempt any two			CO4
a) Interpret Passive and Active Scanning Technique?	7	L3	
b) Demonstrate the different Windows hacking techniques?	7	L3	
c) Mention Use of Penetration Testing? Explain step by step process and methods	7	L2	
Q.3 Attempt any two			CO2
a) Execution process of SQL Script Injection with example	6	L3	
b) How to detect and eliminate virus, spyware in detail	6	L2	
c) Discuss Common Tools Used for DOS Attack?	6	L1	



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SWVSM's

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Department of Computer Science and Engineering

T.Y.B.Tech In-Semester Examination-I, September- 2023

Course Name :-	Operating System-II	Course Code :-	CSE503
Day & Date :-	Wed, 27-09-2023	Max Marks :-	40 Marks
Time :-	09:15 am to 10:45 am		

Instructions:

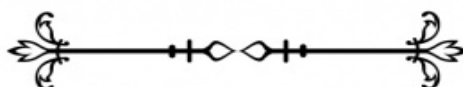
- All questions are compulsory
- Figures to the right indicates full marks, Course Outcome (CO) & Bloom's Taxonomy Level (BL) (L1- Remembering, L2- Understanding, L3 – Applying, L4 – Analyzing, L5 – Evaluating, L6 - Creating)
- Use of non-programmable calculator is allowed
- Assume suitable data if required

Course Outcome's (CO) are-

CO-1 : To provide knowledge to the students about Fundamental architecture of UNIX/Linux operating system fundamentals

CO-2 : To understand File subsystem and related functions (system calls)

Q.1	Attempt any two	Marks	B.L	CO	
a)	Draw & explain Architecture of UNIX OS	7	L1	CO-1	
b)	What is shell? Enlist different types of shell and explain any two in details	7	L2		
c)	Draw and illustrate sample UNIX file system hierarchy and its characteristics. Provide 3 examples of absolute and relative path	7	L2		
Q.2	Attempt any two	Marks	B.L		
a)	List the contents of <i>/etc/passwd</i> file? When it is used by kernel	7	L3	CO-2	
b)	What is file descriptor? List the standard file descriptor. Explain its use and discuss when system call returns the file descriptor	7	L2		
c)	Write down the output of following commands. (i) \$ <i>cat</i> (Enter) (ii) \$ <i>ls > x.txt</i> (Enter) (iii) \$ <i>cat -n x.txt y.txt z.txt</i> (iv) \$ <i>cp ./x.txt xxyy</i> (v) \$ <i>rm xx/yy/x.txt</i> (vi) <i>ls -d</i> (vii) <i>ls -X</i>	7	L3		
Q.3	Attempt All	Marks	B.L		
a)	Write syntax of <i>open()</i> system call? Explain with example	6	L3	CO-2	
OR					
a)	Can we create a new(empty) file using <i>open()</i> system call? If YES, write <i>open()</i> syscall using suitable parameters. If NO, justify	6	L3		
b)	Write difference between <i>write()</i> and <i>lseek()</i>	6	L1	CO-1	
OR					
b)	List the different cases in which the number of bytes which actually read is less than the amount requested in the <i>read()</i> syscall	6	L3		



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SWVSM's

Tatyasaheb Kore Institute of Engineering and Technology, Warananagar

(An Autonomous Institute, Affiliated to Shivaji University, Kolhapur)

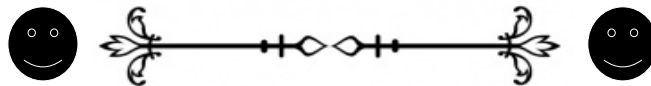
Department of Computer Science and Engineering**T.Y.B.Tech In-Semester Examination-II, October- 2023****Course Name :- Operating System-II****Course Code :- CSE503****Day & Date :- Sat, 28-10-2023****Max Marks :- 40 Marks****Time :- 09:15 am to 10:45 am****Instructions:**

- (i) All questions are compulsory
- (ii) Figures to the right indicates full marks, Course Outcome (CO) & Bloom's Taxonomy Level (BL) (**L1- Remembering, L2- Understanding, L3 – Applying, L4 – Analyzing, L5 – Evaluating, L6 – Creating**)
- (iii) Use of non-programmable calculator is allowed
- (iv) Assume suitable data if required

CO2 : To Demonstrate various UNIX commands, system calls(functions) for file subsystem**CO3 : To understand Process Control subsystem and related functions (system calls) and memory allocation**

Q.1	Attempt any two	Marks	B.L	CO
a)	Enlist seven different <i>exec()</i> functions in detail and differences among the seven <i>exec()</i> functions in tabular format	7	L1	CO3
b)	Write the output of below <i>sample.c</i> code snippet when executed, <pre>#include "apue.h" int main(int argc, char *argv[]) { for (int i = 0; i < argc; i++) printf("argv[%d]: %s\n", i, argv[i]); printf("argc:=%d\n",argc); return(0); } \$ gcc sample.c -o sample \$./sample a b c d e f g h i</pre>	7	L3	
c)	Enlist and Explain the three memory allocation functions specified by ISO C. Differentiate between any two	7	L2	
Q.2	Attempt any two	Marks	B.L	
a)	Explain the <i>fork()</i> system call in detail with suitable examples. Differentiate between <i>fork()</i> and <i>vfork()</i>	7	L1	CO3
b)	Write two major uses of <i>fork()</i> ? Discuss the output of below 'C' program <pre>#include "apue.h" int main() { fork(); fork(); fork(); printf("TKIET\n");</pre>	7	L3	

	}			
c)	Define the Process ID ? Discuss PID 0, PID 1 and PID 2. Explain the functions which returns Process Identifiers	7	L3	
Q.3	Attempt any two	Marks	B.L	
a)	Demonstrate and explain typical memory arrangement of execution of 'C' program with relevant example	6	L3	CO2
	OR			
a)	How a 'C' program is started and how it terminates? Explain it with suitable block diagram and examples	6	L3	
b)	Explain <i>wait()</i> function in detail. Discuss SIGCHLD signal	6	L1	CO3
	OR			
b)	Draw and explain BSD terminal login process in detail	6	L3	
	OR			
b)	List the 8 ways of process termination and describe <i>exit()</i> , <i>_exit()</i> & <i>_Exit()</i> system calls	6	L3	



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SWVSM's

Tatyasaheb Kore Institute of Engineering and Technology, Warananagar

(An Autonomous Institute, Affiliated to Shivaji University, Kolhapur)

T.Y. B. Tech (Comp. Sci. & Engg.) (Semester- V)

End Semester Examination, December-2023

Course Name : OPERATING SYSTEM-II

Course Code: CSE-503

Day & Date : Friday, 22-Dec-2023

Max Marks 60 Marks

Time : 10:00 am to 12:00 pm

Instructions:

- All questions are compulsory
- Figures to the right indicates full marks, Course Outcome (CO) & Bloom's Taxonomy Level (BL)(L1-Remembering, L2- Understanding, L3 – Applying, L4 – Analyzing, L5 – Evaluating, L6 - Creating)
- Use of non-programmable calculator is allowed
- Assume suitable data if required.

Q.1

Attempt any two

- Write C program to create holes of 750 Bytes? Write command to Compile and execute the program?
- Write the output of below `test.c` code snippet when executed,

```
#include "apue.h"
int main(int argc, char *argv[])
{
    int fd, fd1, fd2;
    fd = open("test.t", O_WRONLY);
    fd1 = open("test.t", O_RDONLY);
    close(fd);
    fd2 = open("test.t", O_WRONLY);

    printf("fd=%d\n fd1=%d\n fd2=%d\n", fd, fd1, fd2);
}
```

- list the system call which return and uses the file descriptor. Explain any two?

Q.2

Attempt any two

- List and explain with example process termination?
- Draw and explain BSD terminal login process in detail
- Explain with kernel data structure sharing of files between parent and child process after fork system call?

Marks	B.L	CO
12		
	L3	CO2
	L4	CO2
	L2	CO1
12		
	L2	CO2
	L3	CO3
	L2	CO2

Q.3

Attempt any two

12

- a) Describe when following signals are generated with example:

L2 CO 3

- 1) SIGABRT
- 2) SIGALRM
- 3) SIGINT

- b) The Signal is ----- Event.

L2 CO 3

List the any 5 signal Names, its description, Default Action?

- c) Explain thread concept with example?

L2 CO3

Q.4

Attempt any two

12

- a) `#!/bin/sh`

L4 CO4

`# name of script : script.sh`

`read -p "Enter Login Name:" lnam`

`read -ps "Enter Password:" pass`

`echo "The user Name: $lnam\n"`

`echo -e "The password entered is:$pass"`

`echo -e "\n The Shell program is:$SHELL"`

Above is the shell script. Write command to execute the above shell and write the output?

- b) Write with example 3 different forms of shell **if** statement?

L4 CO4

- c) Write the output of following when typed on the terminal?

L4 CO4

`Sx=5;y=7;z=7.2`

- 1) `test $x -eq $y ; echo -e "Output=$?"`
- 2) `test $x -lt $y ; echo -e "Output=$?"`
- 3) `test $z -gt $y ; echo -e "Output=$?"`
- 4) `test $z -eq $y ; echo -e "Output=$?"`

Q.5

Attempt any two

12

- a) What happens following C statements are executed:

L3 CO 2

1) `intrv =write(1,"Welcome",7);`

2) `intrv= write(1,"WELCOME TKIET\n",7);`

3) `char nam[15];`

`rv= read(1,&nam, 10);`

- b) Explain `execl()` function with example?

L3 CO3

- c) Explain named and unnamed pipe?

L2 CO 3

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Department of Computer Science and Engineering

T. Y. B. Tech. In-Semester Examination-I, September-2023

Course Name :	System Software and Compiler Design	Course Code: CSE502
Day & Date :	Tuesday, 26/09/2023	Max Marks : 40
Time :	9.15 AM to 10.45AM	

- Instructions:**
- i. All questions are compulsory
 - ii. Figures to the right indicates full marks, Course Outcome (CO) & Bloom's Taxonomy Level (BL) (**L1- Remembering, L2- Understanding, L3 – Applying, L4 – Analyzing, L5 – Evaluating, L6 - Creating**)
 - iii. Assume suitable data if required

Course Outcome's are:

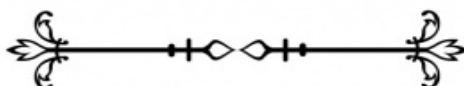
CO1-To identify the role of system programs and application programs

CO2-To understand the basics of system programs like editors, compiler, assembler, linker, loader, interpreter and debugger

CO3 - To design and implement lexical analyzer, syntax analyzer and semantic analyzer

CO4- To identify appropriate code optimizing transformations and issues Code Generation

	Marks	B.L.	C.O.
Q.1 Attempt any two			
a) Define Following terms <ol style="list-style-type: none"> i. Application Domain ii. Execution Domain iii. Specification Gap iv. Execution Gap 	7	L1	CO1
b) Write is Syntax of Assembly Language. Explain Types of assembly language statement with an example	7	L2	
c) Enlist Advanced Assembler Directives and explain with suitable example for each	7	L2	
Q.2 Attempt any two			
a) What is Macro? Explain Macro call and Macro Definition with example	7	L2	CO2
b) Describe data structures used in Pass I of assembler.	7	L2	
c) Write and explain components of Object Module with an example	7	L1	
Q.3 Attempt any two			
a) Discuss the following parameters with suitable examples <ol style="list-style-type: none"> i. Positional Parameters ii. Keyword Parameters iii. Default Parameters 	6	L2	CO2
b) Illustrate a macro which takes A, B, C as actual parameters in macro call and evaluates expression A-B+C with optimization.	6	L3	
c) Define Language processor. List and Explain language processor activities	6	L1	



Roll No.	
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TatyasahebKore Institute of Engineering and Technology, Warananagar
(An Autonomous Institute, Affiliated to Shivaji University, Kolhapur)

Department of Computer Science and Engineering

T.Y.B.Tech.In-Semester Examination-II, October -2023

Course Name :	System Software and Compiler Design	Course Code: CSE502
Day & Date :	Friday, 27/10/2023	Max Marks : 40
Time :	9.15 AM to 10.45 AM	

Instructions:

- All questions are compulsory
- Figures to the right indicates full marks, Course Outcome (CO) & Bloom's Taxonomy Level (BL) (L1- Remembering, L2- Understanding, L3 – Applying, L4 – Analyzing, L5 – Evaluating, L6 - Creating)
- Use of non-programmable calculator is allowed
- Assume suitable data if required

Course Outcomes

CO1: To identify the role of system programs and application programs

CO2: To understand the basics of system programs like editors, compiler, assembler, linker, loader, interpreter and debugger

CO3: To design and implement lexical analyzer, syntax analyzer and semantic analyzer

CO4: To identify appropriate code optimizing transformations and issues Code Generation

		Marks	B.L.	CO
Q.1	Attempt any two			
a)	Explain the role of Lexical Analyzer with suitable diagram	7	L3	
b)	Find FIRST set and FOLLOW set of below grammar	7	L4	
	$E \rightarrow TE'$ $E' \rightarrow +T E' \mid \epsilon$ $T \rightarrow F T'$ $T' \rightarrow *F T' \mid \epsilon$ $F \rightarrow (E) \mid id$			CO2
c)	What are the different ways to recognition of keywords/reserve words with transition diagrams?	7	L1	
Q.2	Attempt any two			
a)	What is a Transition Diagram? Draw transition diagrams for: 1. relop 2. number	7	L1	
b)	Explain method of Removing of Left recursion of grammar with the help of example.	7	L2	CO3
c)	What is ambiguous grammar? Discuss how to eliminate ambiguity of grammar with an example	7	L5	

Q.3 Attempt any two

- a) Illustrate Shift – Reduce Parsing Technique with an example **6 L2**

OR

Derive the String “aabbabba” for left most derivation and right most derivation using a CFG

6 L3

S-> aB|bA

A-> a|aS|bAA

B->b|bS|aBB

CO3

- b) Explain input buffering in Lexical Analysis **6 L3**

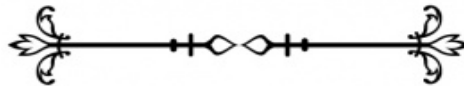
- c) Write the patterns for: **6 L4**

a) Numbers

b) Identifiers

c) Relation operators

d) White spaces



Seat No.

SWVSM's

TatyasahebKore Institute of Engineering and Technology, Warananagar

(An Autonomous Institute, Affiliated to Shivaji University, Kolhapur)

T.Y. B. Tech (Comp. Sci. & Engg.) (Semester-V)

End Semester Examination, December-2023

Course Name : System Software & Compiler Design

Course Code: CSE502

Day & Date : Wednesday, 20-Dec-2023

Max Marks 60 Marks

Time : 10:00 am to 12:00 pm

- Instructions:**
- All questions are compulsory
 - Figures to the right indicates full marks, Course Outcome (CO) & Bloom's Taxonomy Level (BL)(L1-Remembering, L2- Understanding, L3 – Applying, L4 – Analyzing, L5 – Evaluating, L6 - Creating)
 - Use of non-programmable calculator is allowed
 - Assume suitable data if required.

Course Outcomes:

- | | |
|------|---|
| CO 1 | To identify the role of system programs and application programs |
| CO 2 | To understand the basics of system programs like editors, compiler, assembler, linker, loader, interpreter and debugger |
| CO 3 | To design and implement lexical analyser, syntax analyser and semantic analyser |
| CO 4 | To identify appropriate code optimizing transformations and issues Code Generation |

	Marks	B.L	CO
Q.1 Attempt any two	12		
a) Explain Following		L2	CO 1
i. Application Domain			
ii. Execution Domain			
iii. Specification Gap			
iv. Execution Gap			
b) Write and explain an algorithm for Pass I of assembler.		L2	
c) Write and explain algorithm for macro expansion		L1	
Q.2 Attempt any two	12		
a) What are the different ways to recognition of keywords/reserve words with transition diagrams?		L3	CO 3
b) Describe Tokens, Patterns and Lexemes with some examples		L1	
c) What is Recursive Descent Parsing technique? Explain with an example.		L2	
Q.3 Attempt any two	12		
a) Elaborate SDD for construction of syntax tree for an expression. Also construct <i>a - 4 + c</i>		L5	CO 4
b) Write Semantic action or SDD for converting Assignment Statements into Three Address Code along with an example for evaluation of an expression.		L3	
c) What are the properties of three-address instructions? Which are the common forms three-address instruction?		L1	

Q.4 Attempt any two

12

- a) What are the principle sources of code optimization? Explain with example.
- b) What is the core function of code generator? Discuss design issues of code generator
- c) What are the basic blocks? Write and explain algorithm for partitioning three address instructions into basic blocks.

L2 CO 5

L6

L5

Q.5 Attempt any two

12

- a) Explain Advanced Assembler Directives with suitable example for each.
- b) Check the below grammar is in LR (0) or not

L2 CO 2

L4

$E \rightarrow T + E$

$E \rightarrow T$

$T \rightarrow I$

- c) What is an ambiguous grammar and how to eliminate ambiguity from it? Explain with an example.
- d) Write a note on nested macro calls

L2

L2



Seat No.	
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SWVSM's

Tatyasaheb Kore Institute of Engineering and Technology, Warananagar

(An Autonomous Institute, Affiliated to Shivaji University, Kolhapur)

T.Y. Year B. Tech (Comp. Sci. & Engg.) (Semester-VI)

End Semester Examination, December-2023

Course Name : Advanced Computer Architecture

Course Code: CSE602

Day & Date : Friday, 15-Dec-2023

Max Marks 60 Marks

Time : 10:00 am to 12:00 pm

Instructions:

- All questions are compulsory
- Figures to the right indicates full marks, Course Outcome (CO) & Bloom's Taxonomy Level (BL)(L1-Remembering, L2- Understanding, L3 – Applying, L4 – Analyzing, L5 – Evaluating, L6 - Creating)
- Use of non-programmable calculator is allowed
- Assume suitable data if required.

		Marks	B.L	CO
Q.1	Attempt any two	12		
	a) Explain the Flynn's classification (Multiplicity of Instruction and Data Stream) of computer architectures with neat diagrams.		L2	CO1
	b) Explain any four performance evaluation factors for pipeline processors.		L2	CO1
	c) Illustrate three classes of data-dependent hazards according to various data update patterns.		L2	CO1
Q.2	Attempt any two	12		
	a) What is way prediction? How it is used to reduce the cache hit time?		L1	CO3
	b) Explain the use of write merging to reduce the cache miss penalty with neat figure.		L2	CO3
	c) What is Vector Operand? Explain the classification of vector instructions into four primitive types with example.		L1	CO3
Q.3	Attempt any two	12		
	a) Describe the SIMD Computer Organizations with neat diagram.		L2	CO2
	b) Explain NVIDIA GPU Computational structures.		L2	CO2
	c) Draw and explain GPU memory structure		L2	CO2
Q.4	Attempt any two	12		
	a) Draw and explain basic structure of a centralized shared memory architecture.		L2	CO4
	b) State and explain the basic schemes in enforcing coherence.		L2	CO4
	c) Describe Directory Based cache coherence protocol.		L1	CO4

Q.5	Attempt any two	12		
a)	Draw and explain S-access memory organization.		L2	CO3
	OR			
a)	Explain the typical memory hierarchy for server computer and personal mobile devices (PMD).		L2	CO3
b)	List the all and explain any two parallel processing mechanisms in uniprocessor computers.		L2	CO4
	OR			
b)	Explain in short how basic scheduling and loop unrolling is used to increase the ILP.		L3	CO4

Seat No.

Tatyasaheb Kore Institute of Engineering and Technology, Warananagar
(An Autonomous Institute, Affiliated to Shivaji University, Kolhapur)

T.Y.B.Tech.(Comp. Sci. and Engg.) (Sem-II)

End Semester Examination, July-2023

Course Name : **Database Engineering**
Day & Date : **Thursday, 14-Dec-2023**
Time : **10:00 am to 12:00 pm**

Course Code: **CSE601**
Max Marks **60 Marks**

- Instructions:**
- All questions are compulsory
 - Figures to the right indicates full marks, Course Outcome (CO) & Bloom's Taxonomy Level (BL)(L1-Remembering, L2- Understanding, L3 – Applying, L4 – Analyzing, L5 – Evaluating, L6 – Creating)
 - Use of non-programmable calculator is allowed
 - Assume suitable data if required.

	Marks	B.L	CO
Q.1 Attempt any two	12		
a) Consider a 2D array <div style="text-align: center;">int arr[5][5]</div> in C programming language. Explain different levels of abstraction with the above array as reference.		4	1, 2
b) Consider the following schema and set of functional dependencies: Class(course_id, title, dept_name, credits, sec_id, semester, year, building, room_no, capacity, time_slot_id) F={ course_id → title, dept_name, credits, building, room_no → capacity course_id, sec_id, semester, year → building, room_no, time_slot_id } Assuming there are no Repeating Groups in the given relation, predict the highest normal form of the given relation. Normalize the relation to 3NF		5	1, 2
c) List and explain the desired properties of decomposition		2	1, 2
Q.2 Attempt any two	12		
a) The following relations keep track of Library Management system. Book_info(<u>bookid</u> , bname, bauthor, price, edition, publication, pur_date,) Student(<u>lib_car_num</u> , stud_name, class, branch, roll_no) Issue_table(issue_date, sub_date, <u>bookid</u> , <u>lib_car_num</u> , due)		5	3

Write the following SQL queries:

- Find the details of the books issued to the library card number 1.
- Give the maximum dues that student has to pay from all students along with his name
- Give the names of the student who's name starts with 'N', ends with 'n' and has 'ya' as substring.

- b) Construct a B+ Tree Index for the following Input search key, assume degree of tree (n) as 3 (Show every step for insertion.)

2, 7, 11, 3, 5, 23, 29, 17, 20, 31

- c) List the Aggregate functions of SQL with appropriate example.

Q.3 Attempt any two

a)

T_1	T_2
read (A) write (A)	read (A) write (A)
read (B) write (B)	read (B) write (B)

Given the above schedule, check if it is conflict serializable.

- If yes show the serial schedule to which the above schedule is conflict equivalent.
- If no elaborate why?

- b) Explain the ACID properties of the transaction, with appropriate example to explain each of the properties.
- c) Consider the following Transaction

Read (A)
Write (A)
Read (B)
Write (B)

Explain the transaction states with reference to execution of above transaction from its start to its final stage (possible successful execution or failure)

Q.4 Attempt any two

- a) List and explain the types of Failures
- b) Explain the purpose of Checkpoint mechanism. Explain the steps for performing a checkpoint

c)	<T ₀ start> <T ₀ , A, 1000, 950> <T ₀ , B, 2000, 2050>	<T ₀ start> <T ₀ , A, 1000, 950> <T ₀ , B, 2000, 2050> <T ₀ commit> <T ₁ start> <T ₁ , C, 700, 600>	<T ₀ start> <T ₀ , A, 1000, 950> <T ₀ , B, 2000, 2050> <T ₀ commit> <T ₁ start> <T ₁ , C, 700, 600> <T ₁ commit>	4	4
	(a)	(b)	(c)		

Elaborate the Recovery actions in deferred database modification scheme given the log as it appears at three instances of time

Q.5 Attempt any two (Unit 1 to Unit 6)

12

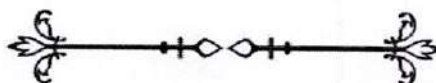
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|----|---|---|------|
| a) | List and explain the Deficiencies of Static Hashing | 4 | 1, 4 |
| b) | List the types of data models. Explain the ER Model with appropriate example. | 2 | 2 |
| c) | | 5 | 4 |

StaffBranch

staffNo	sName	position	salary	branchNo	bAddress
SL21	John White	Manager	30000	B005	22 Deer Rd, London
SG37	Ann Beech	Assistant	12000	B003	163 Main St, Glasgow
SG14	David Ford	Supervisor	18000	B003	163 Main St, Glasgow
SA9	Mary Howe	Assistant	9000	B007	16 Argyll St, Aberdeen
SG5	Susan Brand	Manager	24000	B003	163 Main St, Glasgow
SL41	Julie Lee	Assistant	9000	B005	22 Deer Rd, London

Given the above relation identify if the above relation has update anomalies. If update anomalies are found classify them and elaborate any one of the found anomalies.

- | | | |
|----|---|---|
| d) | Elaborate how Thomas' Write Rule allows greater potential concurrency as compared to Timestamp based protocol | 4 |
|----|---|---|



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Tatyasaheb Kore Institute of Engineering and Technology, Warananagar

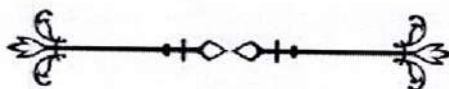
(An Autonomous Institute, Affiliated to Shivaji University, Kolhapur)

T.Y.B.Tech.(Comp. Sci. and Engg.) (Sem-VI)**End Semester Examination, December-2023****Course Name** : Internet of Things (OEC)**Course Code** : CSE607**Day & Date** : Wednesday, 03-Jan-2024**Max Marks** : 60 Marks**Time** : 10:00 am to 12:00 pm

- Instructions:**
- a) All questions are compulsory
 - b) Figures to the right indicates full marks, Course Outcome (CO) & Bloom's Taxonomy Level (BL)
(L1-Remembering, L2- Understanding, L3 – Applying, L4 – Analyzing, L5 – Evaluating, L6 - Creating)
 - c) Use of non-programmable calculator is allowed
 - d) Assume suitable data if required.

	Marks	B.L	CO
Q.1 Attempt any two	12		
(a) List the structural aspects of IoT and explain in brief		L1, L2	1,4
(b) Enlist and explain Key IoT technologies in brief.		L1, L2	1,4
(c) Draw Object Classification diagram and explain characteristics of an IoT object		L1, L2	1
Q.2 Attempt any two	12	B.L	CO
(a) What is Raspberry Pi? Illustrate different components of Raspberry Pi board.		L1, L2, L3, L4	3,4
(b) (i) State the latest configuration of Raspberry Pi (<i>Hardware: Processor, RAM, No. of Ports, wireless configuration and software part</i>) (ii) Distinguish Raspberry Pi Vs. Arduino		L1, L2, L3	3, 4
(c) Define components of RFID with suitable diagram		L1, L2	2,4
Q.3 Attempt any two	12	B.L	CO
(a) Discuss Bluetooth and its Low-Energy profile as IoT/M2M wireless technology? Discuss BLE packet and its fields		L1, L2	2,4
(b) Enlist key wireless technology and concepts supporting IoT/M2M applications		L1, L2	2, 4
(c) Explain Cellular and Mobile Network Technologies for IoT/M2M		L1, L2	2,4

Q.4	Attempt any two	12	B.L	CO
(a)	Define and explain Assistive Technology (AT)? What communication technologies for AT with classic smartphone are used ? Explain any one in detail?		L2, L3	1,4
(b)	Define Internet of Things? Explain e-Health/Body Area Network with an appropriate diagram?		L1, L2	1,2,4
(c)	Discuss the working definition of IoT. Explain the City Automation as an IoT application with the use cases of M2M Applications for City Automation		L1, L2	1,2,4
Q.5	Attempt any two	12	B.L	CO
(a)	Discuss Smart Metering/Advanced Metering Infrastructure application with suitable diagram		L1, L2	4
(b)	Discuss NFC as IoT/M2M key wireless technology		L1, L2	1,4
(c)	Explain technical aspects in device intelligence, device power and communication capabilities in IoT		L2, L3	1,4
(d)	Define is WSN? Explain networking nodes with diagram		L1, L2	2,3



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Tatyasaheb Kore Institute of Engineering and Technology, Warananagar

(An Autonomous Institute, Affiliated to Shivaji University, Kolhapur)

T.Y.B.Tech.(Comp. Sci. and Engg.) (Sem-II)

End Semester Examination, July-2023

Course Name : Machine Learning
Day & Date : Saturday, 16-Dec-2023
Time : 10:00 am to 12:00 pm

Course Code: CSE603
Max Marks 60 Marks

- Instructions:**
- a) All questions are compulsory
 - b) Figures to the right indicate full marks, Course Outcome (CO) & Bloom's Taxonomy Level (BL)(L1-Remembering, L2- Understanding, L3 – Applying, L4 – Analyzing, L5 – Evaluating, L6 - Creating)
 - c) Use of a non-programmable calculator is allowed
 - d) Assume suitable data if required.

		Marks	B.L	CO
Q.1	Attempt any two	12		
a)	Define Machine learning and list the steps involved in MLDC.	6	L1	1
b)	Calculate the slope and intercept using a linear regression model for the given data set. Find the predicted value for given X=7. X= (1,2,3,4) Y= (3,4,5,7).	6	L5	1
c)	Explain any one Non-Parametric Regression algorithm with one example,	6	L2	1
Q.2	Attempt any two	12		
a)	When we use Linear Classifier, Explain Linear Classifier With a suitable example.	6	L2	2
b)	Cluster the following eight points (with (x, y) representing locations) into three clusters: A1(2, 10), A2(2, 5), A3(8, 4), A4(5, 8), A5(7, 5), A6(6, 4), A7(1, 2), A8(4, 9) Initial cluster centers are: A1(2, 10), A4(5, 8) and A7(1, 2).	6	L6	3
c)	Elaborate on the procedure to develop a classifier model.	6	L4	3
Q.3	Attempt any two	12		
a)	What is Regular Expression? Discuss some general rules used to make patterns with one example	6	L2	4
b)	What are different text processing techniques in NLP and explain with a suitable example.	6	L3	4
c)	Difference between stemming, Lemmatization, and Tokenization.	6	L4	4
Q.4	Attempt any two	12		
a)	What is Neural Networks? Explain some applications of Neural Networks.	6	L3	5

- | | | | |
|---|---|----|---|
| b) Difference between the content-based recommender and popularity-based engines. | 6 | L2 | 5 |
| c) Enlist techniques for building recommendation engines. Explain the content-based recommender engine. | 6 | L2 | 5 |

Q.5 Attempt any two

12

- | | | | |
|--|---|----|---|
| a) Elaborate on the steps involved in preprocessing of data. | 6 | L1 | 1 |
| b) What technique is used for predicting the continuous-valued output? and explain any one technique. | 6 | L4 | 1 |
| c) What is the Sigmoid function? Explain the logistic regression with a suitable example. | 6 | L3 | 2 |
| d) For the given data set, considering Age as the root node calculate the intermediate nodes of the decision tree. | 6 | L5 | 2 |

Assume Profit as Target. Data Set:

Age:[old, old, old, mid, mid, mid, mid, new, new, new]

Competition: [Yes, No, No, Yes, Yes, No, No, Yes, No, No]

Type:[S/w, S/w, H/w, S/w, H/w, H/w, S/w, S/w, H/w, S/w]

Profit:[Down, Down, Down, Down, Down, Up, Up, Up, Up, Up]

