AR18

CODE: 18CEE421 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

IV B.Tech I Semester Regular & Supplementary Examinations, November-2022

TRANSPORTATION ENGINEERING-II

(Civil Engineering)

Time: 3 Hours **Max Marks: 60**

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

UNIT-I

1.	a)	What are the functions of sleepers?	7M
	b)	What are the different rail sections used? Explain their advantages and disadvantages in detail.	5M
		(OR)	
2.	a)	Draw neat labeled cross section of a single line and double line broad gauge track in embankment on straight path	5M
	b)	Draw a neat sketch of coning of wheels	7M

UNIT-II

3.	a)	What is super elevation? Why is it necessary to provide super elevation on the curves of a railway track?	7M
	b)	Explain the different types of railway yards	5M
		(OR)	
4.	a)	What is the need for providing transition curves on railways? Explain how the length of transition curve is decided	5M
	b)	What are the different factors to be considered in the site selection of a railway station	7M

UNIT-III

5.	a)	Draw a left handed turnout and explain all the components	7M
	b)	What are the different signals used in railways?	5M
		(OR)	
6.	a)	What is the purpose of a turnout? Give various types with neat diagrams	7M
	b)	What is meant by crossing? Discuss the various types of crossings	5M

UNIT-IV

7.	a)	The length of the runway under the Standard condition is 1620 m. The airport site has an Elevation of 270m. And the reference temperature of the airport is 32.90^0 C. It is decided to construct the runway with can effective Gradient of 0.20 %. Determine the corrections for elevation and temperature	8M
	b)	Discuss airport Zoning in detail	4M
		(OR)	
8.	a)	What are the basic pattern of Runway Configuration	5M
	b)	Explain the different factors affecting runway orientation	7M

UNIT-V

9.	a)	What are the advantages and disadvantages of water transportation?	6M
	b)	What are the requirements of good ports?	6M
		(OR)	
10.	a)	What are various types of dredgers used in harbours?	6M
	b)	What is dredging? Explain its importance	6M

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AR18

CODE: 18EEE441 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

IV B.Tech I Semester Regular & Supplementary Examinations, November-2022

POWER SYSTEM OPERATION AND CONTROL

(Electrical and Electronics Engineering)

Time: 3 Hours **Max Marks: 60**

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

UNIT-I

1. a) Write a short notes on: **6M**
   (i) Inequality constraints. (ii) Penalty function.

   b) 100 MW, 150 MW and 280 MW are the ratings of three units located in a thermal power station. Their respective incremental costs are given by the following equations: **6M**

$$\frac{dC_1}{dP_1} = Rs\ (0.15\ P_1 + 12)$$

$$\frac{dC_2}{dP_2} = Rs\ (0.05\ P_2 + 14)$$

$$\frac{dC_3}{dP_3} = Rs\ (0.21\ P_3 + 13)$$

   Where P_1, P_2 and P_3 are the loads in MW. Determine the economical load allocation between the three units, when the total load on the station is 300 MW.

(OR)

2. a) Derive the condition for optimality when transmission losses are neglected. **6M**

   b) 150 MW, 220 MW and 220 MW are the ratings of three units located in a thermal power station. Their respective incremental costs are given by the following equations: **6M**

$$\frac{dC_1}{dP_1} = Rs\ (0.11\ P_1 + 12)$$

$$\frac{dC_2}{dP_2} = Rs\ (0.095\ P_2 + 14)$$

$$\frac{dC_3}{dP_3} = Rs\ (0.1\ P_3 + 13)$$

   Where P_1, P_2 and $P_3$are the loads in MW. Determine the economical load allocation between the three units, when the total load on the station is 350 MW.

UNIT-II

3. In a two plant operation system, the hydro plant is operation for 10 hrs, during each day and the steam plant is to operate all over the day. The characteristics of the steam and hydro plants are **12M**

$C_T = 0.04\ P_{GT}^2 + 30\ P_{GT} + 10$ Rs/hr

$W_H = 0.12\ P_{GH}^2 + 30\ P_{GH}$ m^3/sec

When both plants are running, the power own from steam plant to load is 150 MW and the total quantity of water is used for the hydro plant operation during 10 hrs is $150x10^6$ m^3. Determine the generation of hydro plant and cost of water used. Neglect the transmission losses.

(OR)

4. a) Explain problem formation and solution procedure for short range hydro thermal scheduling. **6M**

   b) Discuss the dynamic programming method to solve unit commitment problem in power system. **6M**

UNIT-III

5. a) Explain the necessity of maintaining frequency constant. **6M**

   b) Explain different parts of speed governing system. **6M**

(OR)

6. Draw the block diagram of a power system showing the governor, turbine and Synchronous generator, indicating their transfer functions. For a step disturbance of PD, obtain the response of increment in frequency", making suitable assumptions. **12M**
   (a) Without proportional plus integral controller and (b) With proportional plus integral control.

UNIT-IV

7. Develop the block diagram of load frequency control of 2- area control system. **12M**

(OR)

8. a) What is load frequency control problem? Why is it essential to maintain constant frequency in an inter connected power system? **6M**

   b) Explain the state variable model of two area load frequency controller with integral action. Two control areas connected by a tie line have the following characteristics. **6M**

Area 1	Area 2
R=0.01 pu	R=0.02 pu
D=0.8 pu	D=1.0 pu
Base MVA=2000	Base MVA=500

A load change of 100 MW (0.2 pu) occurs in area 1. What is the new steady state frequency and what is the change in the tie own? Assume both areas were at nominal frequency (60 Hz) to begin.

UNIT-V

9. a) Explain how the generators are acted as VAR sources in a power network. **6M**

   b) Explain briefly about the shunt and series compensation. **6M**

(OR)

10. a) What is load compensation? Discuss its objectives in power system. **6M**

    b) Explain the importance of reactive power and its control in power system. **6M**

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AR18

CODE: 18MEE421 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

IV B.Tech I Semester Regular & Supplementary Examinations, November-2022

PROJECT MANAGEMENT AND OPERATIONS RESEARCH

(Mechanical Engineering)

Time: 3 Hours **Max Marks: 60**

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

UNIT-I

1. a) Describe the need of project management with suitable example. 6M
   b) Explain the detailed procedure of project identification and selection. 6M

(OR)

2. a) Explain the customer relationship management. 6M
   b) Which are the critical bottleneck activities where any delays must be avoided to prevent delaying project completion? 6M

UNIT-II

3. Christine is in charge of planning and coordinating next spring's sales management training program for her company. Christine has listed the following activity information for this project: 12M

Construct the project network for this project.

Activity	Activity Description	Immediate Predecessors	Estimated Duration
A	Select location	—	2 weeks
B	Obtain speakers	—	3 weeks
C	Make speaker travel plans	*A, B*	2 weeks
D	Prepare and mail brochure	*A, B*	2 weeks
E	Take reservations	*D*	3 weeks

(OR)

4. The time estimates (in weeks) for the activities of a PERT network are given below: 12M

Activity	t_o	t_m	t_p
1-2	1	1	7
1-3	1	4	7
1-4	2	2	8
2-5	1	1	1
3-5	2	5	14
4-6	2	5	8
5-6	3	6	15

i) Draw the project network and identify all the paths through it. ii) Determine the expected project length.

UNIT-III

5. The food company has to process five products on three machines: - A, B & C. Processing times are given in the following table: 12M

Product	A	B	C
1	4	4	6
2	9	5	9
3	8	3	11
4	6	2	8
5	3	6	7

Find the sequence that minimizes the total elapsed time also find minimum total elapsed time, idle time of each machine.

(OR)

6. You are given the following data for a linear programming problem where the objective is to minimize the cost of conducting two nonnegative activities so as to achieve three benefits that do not fall below their minimum levels. 12M

Benefit	Benefit Contribution per Unit of Each Activity		Minimum Acceptable Level
	Activity 1	Activity 2	
1	5	3	60
2	2	2	30
3	7	9	126
Unit cost	$60	$50	

Formulate a linear programming model for above problem.

UNIT-IV

7. A company produces a single product at three plants for four customers. The three plants will produce 60, 80, and 40 units, respectively, during the next time period. The firm has made a commitment to sell 40 units to customer 1, 60 units to customer 2, and at least 20 units to customer 3. Both customers 3 and 4 also want to buy as many of the remaining units as possible. Management wishes to know how many units to sell to customers 3 and 4 and how many units to ship from each of the plants to each of the customers to maximize profit. The net profit associated with shipping a unit from plant *i* for sale to customer *j* is given by the following table: 12M

		Customer			
		1	2	3	4
Plant	1	$800	$700	$500	$200
	2	$500	$200	$100	$300
	3	$600	$400	$300	$500

Formulate this problem as a transportation problem where the objective function is to be maximized by constructing the appropriate parameter table that gives unit profits.

(OR)

8. The coach of an age group swim team needs to assign swimmers to a 200-yard medley relay team to send to the Junior Olympics. Since most of his best swimmers are very fast in more than one stroke, it is not clear which swimmer should be assigned to each of the four strokes. The five fastest swimmers and the best times (in seconds) they have achieved in each of the strokes (for 50 yards) are 12M

Stroke	Carl	Chris	David	Tony	Ken
Backstroke	37	32	33	37	35
Breaststroke	43	33	42	34	41
Butterfly	33	28	38	30	33
Freestyle	29	26	29	28	31

The coach wishes to determine how to assign four swimmers to the four different strokes to minimize the sum of the corresponding best times.

(a) Formulate this problem as an assignment problem.

(b) Obtain an optimal solution.

UNIT-V

9. Solve the following game by applying dominance rules. 12M

A	B			
	I	II	III	IV
I	19	6	7	5
II	7	3	14	6
III	12	8	18	4
IV	8	7	13	-1

(OR)

10. Machines in a factory have increased cost as they continue in service due to increased running cost. The initial running cost is Rs 3,500 and resale price drops as time passes until it reaches a constant value of Rs 500. Determine the proper length of service before machines should be replaced. Cost data are given below. 12M

Year of Service	1	2	3	4	5
Running Cost	1800	2200	2700	3200	3700
Resale Value	1900	1050	600	500	500

AR18

CODE: 18ECT418 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

IV B.Tech I Semester Regular & Supplementary Examinations, November-2022

VLSI DESIGN

(Electronics and Communication Engineering)

Time: 3 Hours **Max Marks: 60**

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

UNIT-I

1.	a)	Give NMOS fabrication process flow with the help of neat sketches of appropriate diagram masks and cross section at each process steps.	7M
	b)	What is Moore's law? Explain its relevance with respect to evolution of technology?	5M
		(OR)	
2.	a)	What are the various masks used in CMOS p-well process? What is the significance of each?	8M
	b)	Write short notes on CMOS technology.	4M

UNIT-II

3.	a)	Develop the relationship between Ids versus Vds of MOSFET.	6M
	b)	Derive an equation for trans conductance of an n-channel enhancement MOSFET operating in active region.	6M
		(OR)	
4.	a)	Show that the pull up to pull down ratio of an n-MOS inverter driven through one or more pass transistors is 8:1.	8M
	b)	Explain the alternative forms of pull-up in CMOS technology.	4M

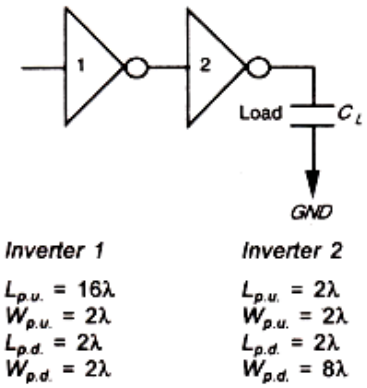
UNIT-III

5.	a)	Draw the stick diagram and mask layout for CMOS two input NOR gate and stick diagram of two input NAND gates.	10M
	b)	What are the different types of design rules?	2M
		(OR)	
6.	a)	What is a stick diagram? Draw the stick diagram and layout for a CMOS XNOR gate.	6M
	b)	Explain the VLSI design flow with the help of flow chart.	6M

UNIT-IV

7.	a)	Why we need scaling? Explain in brief the types of scaling indicate the effect of scaling on MOSFET characteristics.	6M
	b)	Derive the scaling factors for the following parameters i)Gate area ii)Gate capacitance iii)Channel Resistance	6M
		(OR)	

8. a) Two nMOS inverters are cascaded to drive a capacitive load $C_L = 16C_g$ as shown in Figure. Calculate the pair delay (V_{in} to V_{out}) in terms of geometry indicated in the figure. 8M



b) Discuss the limits of scaling. 4M

UNIT-V

9. Explain about design capture tools. 12M

(OR)

10. Briefly explain about chip level testing and system level testing techniques 12M

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AR18

CODE: 18CSE434 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

IV B.Tech I Semester Regular & Supplementary Examinations, November-2022

IMAGE PROCESSING

(Common to CSE & IT)

Time: 3 Hours **Max Marks: 60**

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

UNIT-I

1.	a)	Explain Image sampling and quantization.	6M
	b)	Describe different components of Image Processing.	6M
		(OR)	
2.	a)	Explain 4-connectivity, 8-connectivity, m -connectivity with reference to relation between pixels. Where is the concept of connectivity used in Image Processing?	8M
	b)	What are the applications of Image Processing?	4M

UNIT-II

3.	a)	Explain about contrast stretching with a neat diagram.	6M
	b)	Explain Smoothing Spatial filters.	6M
		(OR)	
4.		Explain Histogram Equalization with derivation & example.	12M

UNIT-III

5.	a)	Write short notes on Variable Length Coding?	6M
	b)	Explain in detail JPEG compression standard.	6M
		(OR)	
6.	a)	Discuss redundancies observed in an Image. How can we exploit these redundancies in Image processing?	6M
	b)	Write short notes on LZW coding.	6M

UNIT-IV

7.	a)	Discuss about i) Dilation & Erosion ii) Opening & closing	6M
	b)	Describe the steps involved in morphological algorithms.	6M
		(OR)	
8.	a)	Discuss Image morphology using Logical operation.	6M
	b)	Explain about i) Thinning ii) Thickening	6M

UNIT-V

9.	a)	Explain Basic Adaptive Thresholding.	6M
	b)	Describe the basic formulation for Region-based segmentation .	6M
		(OR)	
10.	a)	Discuss region splitting and merging.	6M
	b)	Discuss in detail the detection of discontinuities- point detection and line detection,	6M

AR16

CODE: 16HS4004 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

IV B.Tech I Semester Regular & Supplementary Examinations, November-2022

MANAGERIAL ECONOMICS &FINANCIAL ANALYSIS

(Civil Engineering)

Time: 3 Hours **Max Marks: 70**

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

UNIT-I

1.	a)	Define economic and explain its scope.	7 M
	b)	What are the exceptions of law of demand?	7 M
		(OR)	
2.	a)	Briefly explain the relation of managerial economics with other disciplines.	7 M
	b)	What are the determinants of demand?	7 M

UNIT-II

3.	a)	Define income elasticity of demand and explain its types.	7 M
	b)	What are the statistical elements of demand forecasting?	7 M
		(OR)	
4.	a)	Define price elasticity of demand and explain its types.	7 M
	b)	What are the factors of demand forecasting?	7 M

UNIT-III

5.	a)	Define Cobb Douglas production function.	7 M
	b)	Briefly explain the concept law of returns to scale.	7 M
		(OR)	
6.	a)	Differentiate between internal and external returns to scale.	7 M
	b)	A firm has a fixed cost of Rs 50,000. Selling price per unit is Rs 50 & variable cost per unit is Rs 25. Present sales or production is 3,500 units. Calculate, a. BEP in units and sales. b. Margin of Safety. c. Observe what is the change in BEP units, sales and Margin of Safety if fixed cost increases from Rs 50,000 to Rs 60,000.	7 M

UNIT-IV

7.	a)	Define price determination under monopoly.	7 M
	b)	Briefly explain the different market structures.	7 M
		(OR)	
8.	a)	Define price determination under perfect competition.	7 M
	b)	Describe the techniques of capital budgeting.	7 M

UNIT-V

9.	a)	Illustrate the Format of Trading account.	7 M
	b)	Illustrate the Format of Profit and Loss account.	7 M
		(OR)	
10.	a)	Define account and explain types of accounts.	7 M
	b)	Illustrate the Format of Balance sheet.	7 M

AR16

CODE: 16IME4029 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
IV B.Tech I Semester Supplementary Examinations, November, 2022
OPERATIONS RESEARCH
(Mechanical Engineering)

Time: 3 Hours **Max Marks: 70**

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

UNIT-I

1. a) Define Operations research? What are the areas of applications of OR? 4M

   b) Use method of penalties and solve the LPP 10M
   Max $Z = 6x_1 + 4x_2$
   Subjected to constraints
   $2x_1 + 3x_2 \leq 30$, $3x_1 + 2x_2 \leq 24$, $x_1 + x_2 \geq 3$ and $x_1, x_2 \geq 0$

(OR)

2. a) Explain the significance of Slack and surplus variable. 4M
   b) Solve the given LPP by simplex method? 10M
   Maximize $Z = 3x_1 + 2x_2 + 5x_3$
   Subjected to constraints
   $x_1 + 2x_2 + x_3 \leq 430$, $3x_1 + 2x_3 \leq 460$, $x_1 + 4x_2 \leq 420$ and $x_1, x_2, x_3 \geq 0$

UNIT-II

3. a) Give the generalised mathematical formulation of an assignment problem. 4M

   b) There are three parties who supply the following quantities of coal and three consumers who require the coal as follows: 10M

Party 1:	14 tons	Consumer A:	6 tons
Party 2:	12 tons	Consumer B:	10 tons
Party 3:	5 tons	Consumer C:	15 tons

   The cost matrix is given below:

	A	B	C
1	6	8	4
2	4	9	3
3	1	2	6

Find the schedule of a transportation policy which minimizes the cost by row minimal method.

(OR)

4. A salesman estimates that the following would be cost on his route, visiting the six cities as shown in the table. Solve it by travelling salesman method. 14M

To city/From city	1	2	3	4	5	6
1	∞	20	23	27	29	34
2	21	∞	19	26	31	24
3	26	28	∞	15	36	26
4	25	16	25	∞	23	18
5	23	40	23	31	∞	10
6	27	18	12	35	16	∞

UNIT-III

a) Define a) Jockeying b) Balking 4M

b) A machine operator has to perform three operations: turning, threading and knurling on a number of different jobs. The time required to perform these operations (in minutes) for each job is known. Determine the order in which the jobs should be processed in order to minimize the total time required to turn out all the jobs. Also find the idle times for the three operations. 10M

Job	Time for Turning (minutes)	Time for Threading (minutes)	Time for Knurling (minutes)
1	3	8	13
2	12	6	14
3	5	4	9
4	2	6	12
5	9	3	8
6	11	1	13

(OR)

6. a) Define sequence problem? Give two examples of sequencing problem from your daily life? 4M

   b) A self service store employs one cashier at its counter. Nine customers arrive on an average every 5 minutes while the cashier can serve 10 customers in 5 minutes. Assuming Poisson distribution for arrival rate and exponential distribution for service time, find 10M

   1. Average number of customers in the system.
   2. Average number of customers in the queue.
   3. Average time a customer spends in the system.
   4. Average time a customer waits before being served.

UNIT-IV

7. a) What are the advantages and applications of group replacement policy? 4M

   b) Solve the following game. 10M

		B			
		I	II	III	IV
A	I	19	6	7	5
	II	7	3	14	6
	III	12	8	18	4
	IV	8	7	13	-1

(OR)

8. a) Give the limitations of game theory in brief. 4M

b) The cost of the machine is Rs 6100 and its scrap value is only Rs 100. From the experience maintenance costs are found to be 10M

Year	1	2	3	4	5	6	7	8
Maintenance Cost (Rs)	100	250	400	600	900	1250	1600	2000

When should be the machine replaced?

UNIT-V

9. For the following activity data draw the network, find the critical path and the three floats for each activity: 14M

Activity	1-2	1-4	2-3	3-5	3-8	4-8	5-6	5-8	6-7	7-8	7-9	8-9	9-10
Duration (days)	4	36	2	15	10	2	4	9	9	9	8	20	20

(OR)

10. The time estimates (in weeks) for the activities of a PERT network are given below: 14M

Activity	t_o	t_m	t_p
1-2	1	1	7
1-3	1	4	7
1-4	2	2	8
2-5	1	1	1
3-5	2	5	14
4-6	2	5	8
5-6	3	6	15

a) Draw the project network and identify all the paths through it.

b) Determine the expected project length.

c) Calculate the standard deviation and variance of the project length.

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AR13

CODE: 13IT4010 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

IV B.Tech I Semester Supplementary Examinations, November, 2022

NETWORK SECURITY AND CRYPTOGRAPHY

(Information Technology)

Time: 3 Hours **Max Marks: 70**

PART-A

ANSWER ALL QUESTIONS **[1 x 10 = 10 M]**

1. a) what are the prime objectives of modern cryptography
   b) What is the difference between Block chippers and Stream Chipers
   c) What is the key size of Blowfish Algorithm.
   d) What is the key size of RAS algorithm.
   e) What are the limitations of RFC 822.
   f) What is the purpose of a public key infrastructure
   g) What is Security Parameter Index (SPI).
   h) What is dual signature.
   i) What is worm.
   j) What are the two default policies of Packet Filtering Router.

PART-B

Answer one question from each unit **[5x12=60M]**

UNIT-I

2.	a)	Briefly define the monoalphabetic cipher. What is the difference between a monoalphabetic cipher and a polyalphabetic cipher?	6M
	b)	Explain SQL Injection attack	6M
		(OR)	
3.	a)	Explain about Transposition Technique	6M
	b)	What is Buffer Overflow? What are the tasks in exploiting the overflowable Buffer?	6M

UNIT-II

4.	a)	Give the structure of AES. Explain how Encryption/Decryption is done in AES	10M
	b)	What are the weaknesses of DES	2M
		(OR)	
5.	a)	How is key expansion done in Blowfish?	6M
	b)	Explain Diffie-Hellman key exchange algorithm	6M

UNIT-III

6.	a)	How is an enveloped data MIME entity prepared? Write the steps	6M
	b)	Differentiate between V4 and V5 of Kerberos	6M
		(OR)	
7.	a)	Explain S/MIME functionality	8M
	b)	List the transfer encodings used in S/MIME	4M

UNIT-IV

8.	a)	Explain IP Sec overview	8M
	b)	Explain the four protocols defined by Secure Socket Layer	4M
		(OR)	
9.	a)	Briefly explain Encapsulating IP Security Payload	8M
	b)	Explain about web security considerations	4M

UNIT-V

10.	a)	What are the different types of Viruses	6M
	b)	What are design principles of Firewalls	6M
		(OR)	
11.	a)	Explain about password protection system	6M
	b)	What is IDS? Explain the profile based IDS?	6M

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