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P.E.S COLLEGE OF ENGINEERING, MANDYA – 571401
(AN AUTONOMOUS INSTITUTION UNDER VTU, BELGAUM)
DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGG
V – SEMESTER B.E – ACADEMIC YEAR:2010-11

COURSE WITH CODE: ENTREPRENEURSHIP DEVELOPMENT AND MANAGEMENT(P08EC51)

MODEL QUESTION PAPER(NKM)

Duration : 3 hrs **Max. Marks :100**

Note : Answer any FIVE full questions selecting at least Two questions from each part.

Part - A

1	A	Compare how well engineering and management satisfy the several parts of the definition of a profession	5M
	B	What are the positive values of Max Weber's model of bureaucracy?	5M
	C	Why is planning said to have "Primacy" among the managerial functions?	5M
	D	Explain the difference between "optimizing" and "sufficing" in making decisions	5M
2	A	Under what conditions might each of the following logics of departmentalization be desirable: functional, geographic, customer, product and process?	10M
	B	Explain Mcgregor's theory X and theory Y.	10M
3	A	What would be some of the difficulties faced during the actual proposal prepration process and how can they be minimized.	10M
	B	Define the five modes of conflict resolution?	10M
4	A	How would Fayol's 1916 "Advice to Future Engineers" be modified to better suit the world 75 years later?	10M
	B	Write a note on GATT and NAFTA	10M

Part – B

5	A	Identify the entrepreneurial characteristics of Deepak Joshi. How do they match the characteristics described for successful entrepreneur?	10M
	B	Discuss popular myths of entrepreneurship and why they are more fantasy fact.	10M
6	A	Explain the role of incubators in promoting new ventures	6M
	B	Discuss how various state level institutions are supporting SSIs in India	7M
	C	What is venture capital? Discuss various stages in venture financing.	7M
7	A	Draw a schematic diagram of a project feasibility study and explain	7M
	B	What are the major factors influencing franchising?	7M
	C	Mention the benefits of registration.	6M
8	A	What are the RBI guide lines for rehabilitation of a sick SST unit?	10M
	B	What are the symptoms to identify sickness in the SSI section	10M

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V – SEMESTER B.E – ACADEMIC YEAR:2010-11

COURSE WITH CODE: DIGITAL SIGNAL PROSCESSING(P08EC52)

MODEL QUESTION PAPER(MJA)

Duration : 3 hrs **Max. Marks :100**

Note : Answer any FIVE full questions selecting at least Two questions from each part.

Part A

1. (a) Derive DFT and IDFT equations starting from DTFT. 08M
   (b) Find 8 point DFT of the signal x[n] = [1,1,1,1]. 06M
   (c) Determine N point DFT of x[n] = $\cos \frac{2\pi Ko\ n}{N}, 0 \le n \ge L-1$ 06M
2. (a) Explain in detail the overlap and save method of filtering a long sequence through an FIR filter. 10M
   (b) Determine 4 point circular convolution of the following pair length 4 sequence time domain and frequency domain approach. x[n] = [3,2,1,4] and h[n] = [2,1,1,3]. 10M
3. (a) Derive the Radix -2 DIT – FFT algorithm to compute DFT of an N=8 point sequence and the complete flow graph. 10M
   (b) Compute the 8 point DFT of the sequence x[n] = [1,2,3,4,4,3,2,1] using the DIF FFT algorithm. 10M
4. (a) Find the circular convolution of the sequences x_1 [n] = [2,3,1,1] and x_2[n] = [1,3,5,3] using FFT algorithm. 10M
   (b) List the difference and similarity between DIT FFT and DIF FFT algorithm. 06M
   (c) Compute the 4 point DFT of the following sequences using Radix-2 DIT FFT algorithm. x [1,-1,1,-1]. 04M

Part B

5. (a) A Butterworth lowpass filter has to meet the following specifications.
   (i) Passband gain , K_p = -1dB at Ω_p = 4 rad/sec.
   (ii) Stopband attenuation greater than or equal to 20dB at Ω_s = 8 rad/sec.
   Determine the transfer function $H_a(s)$ of the lowest order Butterworth

Filter to meet the above specifications. 10M

(b) Design a Chebyehev I filter to meet the following specifications:
(i) Passband ripple : ≤ 2dB
(ii) Passband edge : 1 rad/sec
(iii) Stopband attenuation : ≥ 20dB
(iv) Stopband edge : 1.3 rad/sec. 10M

6. (a) Design a low pass filter with a cutoff frequency $\omega_c = \pi / 4$, transition width, $\Delta\omega = 0.02\pi$ and a stopband ripple, $\delta_s = 0.01$. Use Kaiser Window. 10M

(b) Design an FIR digital filter to approximate an ideal LPF with a gain of unity, cutoff frequency equal to 850HZ and working at a sampling frequency of 5000HZ. The length of the impulse response should be 5. Use Rectangular Window. 10M

7. (a) Design a digital Butterworth LPF to meet the following specifications:
(i) Passband ripple : ≤ 4dB
(ii) Passband edge : $\pi / 2$ rad/sample
(iii) Stopband attenuation : ≥ 10dB
(iv)Stopband edge : $3\pi / 4$ rad/sample.
Take T=1 sec.using impulse invariance method. 10M

(b). Explain the procedure of the Bilinear transformation Technique(BLT). 10M

8. (a) A Linear time invariant system is given by the following input – output relation.
$2y(n) - y(n-2) - 4y(n-3) = 3x(n-2)$.
(i) Realize the system in Direct form I and Direct form II.
(ii) Write the signal flow graph of Direct II, construct its transpose and realize the transposed structure. 10M

(b) Derive the lattice structure for an FIR filter. 10M

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V – SEMESTER B.E – ACADEMIC YEAR:2010-11

COURSE WITH CODE: INFORMATION THEORY AND CODING(P08EC53)

MODEL QUESTION PAPER(NKM)

Duration : 3 hrs **Max. Marks :100**

Note : Answer any FIVE full questions selecting at least Two questions from each part.

Part - A

1 A With suitable examples, write a note on uncertainty and information. 5M
B Explain source coding theorem 5M
C State and prove Kraft Inequality 10M

2 A Explain the JPEG standard for lossy compression. 5M
B Apply Shannon-Fano-Elias coding scheme and find the codeword for the four symbols having probabilities $\{1/2^2, 1/2, 1/2^3, 1/2^3\}$. 5M
C Determine the Lempel-Ziv code for the following bit stream 10M

0100111110010100000101010110011000
Recover the original sequence from the encoded stream.

3 A Prove that the capacity of a BSC is C = 1 – H(p). Plot Capacity VS Probability of error and interpret. 10M

B Find the capacity of the binary erasure channel. 5M

C Suppose a TV displays 30 frames/second. There are approximately $2x10^5$ pixels per frame, each pixel requiring 16 bits for colour display. Assuming an SNR of 25 dB calculate the bandwidth required to support the transmission of the TV video signal (use the information capacity theorem). 5M

4 A For the code C={00000, 10101, 01010, 11111} construct the generator matrix. Since this G is not unique, suggest another generator matrix that can also generate this set of codewords. 7M

B Show that if there is a binary (n,k,d) code with d* even, then there exists a binary (n,k,d*) code in which all codewords have even weight. 7M

C Show that if C is a binary linear code, then the code obtained by adding an overall parity check bit to C is also linear. 6M

Part – B

5 A Describe Perfect code and Hamming code. 10M

B For a (5,3) code over GF(4), the generator matrix is given by 10M

G = 1 0 0 1 1
0 1 0 1 2
0 0 1 1 3

i. Find the parity check matrix for this code
ii. How many errors can this code detect?
iii. How many errors can this code correct?
iv. How many erasures can this code correct?
v. Is this a perfect code?

6 A Explain the matrix description of Cyclic codes 10M

B Let the polynomial g(x) = x10+x8+x5+x4+x2+x+1 be the generatorpolynomial of a cyclic code over GF(2) with block length 15. 10M

i. Find the generator polynomial G.
ii. Find the parity check matrix H.
iii. How many errors can this code detect?
iv. How many errors can this code correct?
v. Write the generator matrix in the systematic form.
vi.

7 A Explain the matrix description of Convolution codes. 10M

B Desigh a rate ½ convolutional encoder with a constraint length v=4 and $d^*=6$. 10M

i. Construct the state diagram for this encoder
ii. Construct the trellis diagram for this encoder
iii. What is the d_{free} for this code?

iv. Give the generator matrix. G
v. Is this code non-catastrophic? Why?
vi.

8 A Explain the concept of coded modulation. 10M

B Consider a 2/3 convolutional code defined by 10M

$$G(D) = \begin{matrix} 1 & D & D+D^2 \\ D^2 & 1+D & 1+D+D^2 \end{matrix}$$

This code is used with an 8-PSK signal set that uses Gray coding. The throughput of this TCM scheme is 2 bits/sec/Hz.

i. How many states are there in the trellis diagram for this encoder?
ii. Find the free Euclidean distance.
iii. Find the asymptotic coding gain with respect to uncoded QPSK, which has a throughput of 2 bits/sec/Hz.

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V – SEMESTER B.E – ACADEMIC YEAR:2010-11

COURSE WITH CODE: Embedded System Design(P08EC56)

MODEL QUESTION PAPER(HSS)

Duration : 3 hrs **Max. Marks :100**

Note : Answer any FIVE full questions selecting at least Two questions from each part.

Part A

1 a) Define an embedded system? How are they classified? Give examples. 6
b) Explain the role of a watchdog timer in an embedded system. 6
c) Discuss briefly the various memory devices used in an embedded system? 8

2 a) Discuss the memory organization in an 8051 controller? 6
b) Define instruction level parallelism ? How it enhances the speed of a processor? 6
c) Explain the interrupt structure in 8051 controller? 8

3 a) Define synchronous , asynchronous and Iso synchronous communication? Mention their areas of applications? 6

b) Explain the salient features of the following bus interfaces.
i) RS 232 ii) SCI iii) PCI 6
c) Differentiate between a counter and a Timer? Explain the role of a Timer /counter in an embedded system 8

4 a) Explain the need for interrupts in a processor system? Explin how CPU responds for an interrupt? 6

b) Discuss the various types of processor vector address mechanism. 6

c) Explain the mechanism of hardware interrupts in an embedded processor. 8

Part B

5 a) List the features of Java and C ++ which makes them to be used in an embedded system? 6

b) Discuss with examples the use of pointers (C++) in an embedded system 6

c) Define the following with reference to data structures>

i) Queues ii) Stacks iii) Lists iv) Trees 8

6 a) Define Data Flow graphs? Explain how it is employed in the design on embedded system? 6

b) What are finite state machine models? Explain its application with an example 6

c) Explain the concept of semaphore in the design of an OS for an embedded system 8

7 a) Define RTOS? Explain its importance in an embedded system design 6

b) Write short notes on the memory management as applied to an embedded system 6

c) Discuss the functions of Device management. 8

8 Write short notes on the following each 5

i) Applications of embedded systems iii) Interrupt Latency

ii) Types of RTOS iv) Vx works

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V – SEMESTER B.E – ACADEMIC YEAR:2010-11

COURSE WITH CODE: Digital Communication(P08EC54)

MODEL QUESTION PAPER(RBD)

Duration : 3 hrs **Max. Marks :100**

Note : Answer any FIVE full questions selecting at least Two questions from each part.

PART - A

1.a) Define the following with related equations; i)Mean ii)Correlation iii)Ergodicity iv) Power spectral density (12)

b) Specify the properties of Auto – correlation function along with proof. (8)

2.a) If Gδ (f) is periodic in the frequency f with periodic fs, derive the interpolation formula for reconstructing the original signal g(t) from the sequence samples[g (n/2W)]. Draw the related waveforms. (10)

b) A signal x(t) =10 $\cos(500\pi t)\ \cos^2(800\ \pi t)$ is ideally sampled fs = 2000 samples/sec. The signal is passed through an ideal low pass filter with a cut – off frequency 1000Hz.

i) What is Nyquist rate

ii) Sketch the frequency spectrum of the sampled wave

iii) State what frequency components will appear at the output of the filter (10)

3.a) Explain the concept of TDM with a block diagram.
(6)

b) What is meant by 'Regeneration' in PCM system?. Explain the three major processes involved in regeneration . (8)

c)Draw a model of non – uniform quantizer and explain its operation.
(6)

4.a) With related equations and block diagrams explain DPCM Transmitter and Receiver.
(10)

b)Differentiate between slope overload distortion and granular noise.
(4)

c) Show that $(SNR)_0$ in the case of Delta modulation is given by $3pf_s/\delta^2 f_M$ (6)

PART – B

5.a) For a bit – stream pf 101100011011, show encoded waveforms for the following schemes;

i) Polar NRZ
ii) Bipolar RZ
iv) Polar Manchester (6)

b) From basic principle of ISI, derive the ideal solution in base – band binary Transmission for achieving zero ISI .
(10)

c) What is precoding with reference to Duo – binary signaling?. What is its necessity?.
(4)

6.a) Explain the concept of Gram – schnnidt orthogonalisation procedure. Further draw the block diagrams for generating the signal si(t) and the set of coefficients $\{si\}$
(12)

b) Show that response of bank of correlators to noisy- inputs which are orthogonal is zero, where $[X_j X_k]=0$ for $j \neq k$. (8)

7.a)Compare the average power requirements of binary non – coherent ASK, coherent PSK, DPSK and non – coherent FSK schemes operating at a data rate of 100 bits/sec, over a Band pass channel having a bandwidth of 3000hz, $n/2 = 10^{-10}$ $fe = 10^{-5}$
(8)

b)i) With signal space diagram and related equations explain the concept of coherent QPSK system.
ii) If input binary sequence to coherent QPSK system is 01101011, draw the odd and even numbered bits of input sequence and associated PSK waves.
(12)

8.a) What is meant by ;

i) Maximum likely hood Receiver
ii) Matched filter Receiver

explain their functions with related equations.
(10)

b) With a block concept explain the operation of Quadrature receiver using correlators.
(10)

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGG
V – SEMESTER B.E – ACADEMIC YEAR:2010-11

COURSE WITH CODE: VLSI Circuits and Design(P08EC55)

MODEL QUESTION PAPER(BSN)

Time: 3 hrs Max.Marks:100

Note: Answer any **Five** full questions, selecting at least **Two** questions from each part.

PART-A

1. a) What is a transmission gate? Explain its functioning. Also explain how they can be used to control clocking and data flow in a 4-bit parallel adder. 08

b) Draw the CMOS circuits that implement the following.
(1) $F=\overline{a+b.c+a.b.c}$ (2) $S=a\oplus b\oplus c$ 06

c) Explain why the top down approach is advantageous in mass manufacture by illustrating the design hierarchy of a simple micro-controller. 06

2. a) Explain how the gate voltage plays a crucial role in turning ON/OFF of a MOSFET. Obtain the expression for the current flow in a FET. 08

b) Consider a doped semi-conductor where $\sigma=q(\mu_n n+\mu_p p)$ and $np=n_i^2$. Suppose we wish to minimize the conductivity.
(1) Use mass-action law to write in terms of 'p' only.
(2) Find the hole concentration that minimizes σ.
(3) What polarity is required for the highest resistivity? Also find the doping type and density that gives highest resistivity. 06

c) Draw the basic layout for the circuit that implements the function $g=\overline{(a+b).(c+d).e}$. Make use of the fewest number of transistors. 06

3. a) How does latch-up occur in a CMOS circuit? Explain the various technologies that prevent it. 07

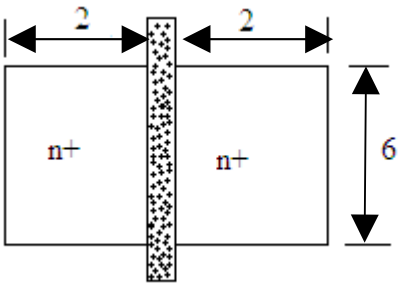
b) What is a unit transistor? What is the need for electrical symmetry in a CMOS circuit? Draw the design of an electrical symmetric NAND2 gate. 07

c) Design a cell that implements the function $F=\overline{(x.y)+(z.x)+(y.z)}$ using the primitive cells. 06

4. a) Define surface charge density. Derive the equation for the threshold voltage for an n-FET. 06

b) An n-FET has a gate oxide with a thickness $t_{ox}=120A^{o}$, the p-FET bulk region is doped with boron at a density of $N_a=8x10^{14}cm^{-3}$. Given $V_{Ton}=0.55V$ and $(w/l)=10$.
(1) Calculate the body bias co-efficient γ.
(2) What is the device threshold if a body bias voltage of $V_{SBn}=2V$ is applied?
(3) The electron mobility is $\mu_n=540\ cm^2/V\text{-sec}$. Calculate the drain current with bias voltage $V_{GSn}=3V$, $V_{DSn}=3V$ and $V_{SBn}=3V$ applied to the device. 07

c) Construct the RC switch model for the FET layout shown in figure below. Assume a power supply voltage of 3V and that the dimensions are in units of microns. $L^1=0.5\mu m$, $L_0=0.05\mu m$, $V_{TOn}=0.6V$, $k^1{}_n=150\mu A/V^2$, $C_{ox}=2.70fF/\mu m^2$, $C_j=0.86fF/\mu m^2$, $C_{jsw}=0.24fF/\mu m$

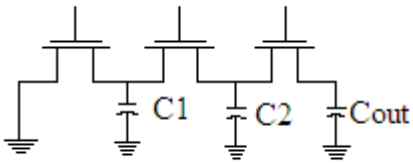


07

PART-B

5. a) Obtain the expression for mid-point voltage V_M for an inverter. Illustrate how V_M varies for different device ratios on the voltage transfer curve. 08

b) Consider the n-FET chain shown in figure below. Given C_{out}=130fF, C_1=36fF, C_2=36fF. The transistors are identical with β_n=2.0mA/V^2 in a process where V_{DD}=3.3V and V_{Tn}=0.70V.
(1) Find the discharge time constant for C_{out}=130fF using the Elmore formula for a ladder RC network.
(2) Find the time constant if we ignore C_1 and C_2. What is the percentage error introduced if we do not include the terminal capacitors?

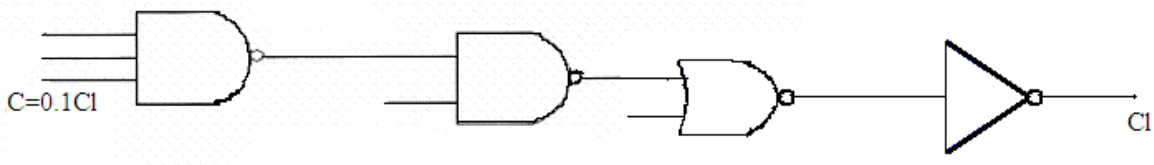


06

c) Determine the expressions for switching times for a NOR2 gate. 06

6. a) Draw and explain the physical structure of an integrated bi-polar junction transistor. Specify how biCMOS is advantageous over CMOS taking the example of a biCMOS NAND2 circuit. 08

b) Consider the logic cascade shown in the figure below. Use logical effort to find the relative size of each stage needed to minimize delay through the chain.



Assume symmetric gates with r=2.5. 06

c) Write short notes on (1) Mirror circuits. (2) Pseudo n-MOS circuits. (3) Tri-state circuits. 06

7. a) Show that $\xi=\sqrt{(rc/4t)}$ .z when interconnect lines are modeled with a series pass FET. 06

b) Consider two interconnect lines separated by a spacing of S=0.40µm. Each individual line has w=0.25µm, T_{ox}=1.2µm and t=0.85µm.
(1) Calculate the self-capacitance per unit length c for a line.
(2) Calculate the coupling capacitance per unit length c_c between the two lines.
(3) Suppose that the lines are both 18µm long. Find the total capacitance seen looking into one of the lines. 06

c) Write a note on floor-planning and routing. 08

8. a) Explain timing circles and clock skew in clocked logic cascade. 10

b) What is pipe-lining? Explain its implementation in CMOS circuitry. 10

Part - A

1	A	With suitable examples, write a note on uncertainty and information.	5M
	B	Explain source coding theorem	5M
	C	State and prove Kraft Inequality	10M
2	A	Explain the JPEG standard for lossy compression.	5M
	B	Apply Shannon-Fano-Elias coding scheme and find the codeword for the four symbols having probabilities $\{1/2^2, 1/2, 1/2^3, 1/2^3\}$.	5M
	C	Determine the Lempel-Ziv code for the following bit stream 0100111110010100000101010110011000 0 Recover the original sequence from the encoded stream.	10M
3	A	Prove that the capacity of a BSC is C = 1 – H(p). Plot Capacity VS Probability of error and interpret.	10M
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	C	Suppose a TV displays 30 frames/second. There are approximately $2x10^5$ pixels per frame, each pixel requiring 16 bits for colour display. Assuming an SNR of 25 dB calculate the bandwidth required to support the transmission of the TV video signal (use the information capacity theorem).	5M
4	A	For the code C={00000, 10101, 01010, 11111} construct the generator matrix. Since this G is not unique, suggest another generator matrix that can also generate this set of codewords.	7M
	B	Show that if there is a binary (n,k,d) code with d* even, then there exists a binary (n,k,d*) code in which all codewords have even weight.	7M
	C	Show that if C is a binary linear code, then the code obtained by adding an overall parity check bit to C is also linear.	6M

Part – B

5	A	Describe Perfect code and Hamming code.	10M
	B	For a (5,3) code over GF(4), the generator matrix is given by G = 1 0 0 1 1 0 1 0 1 2 0 0 1 1 3 i. Find the parity check matrix for this code ii. How many errors can this code detect? iii. How many errors can this code correct? iv. How many erasures can this code correct? v. Is this a perfect code?	10M

6 A Explain the matrix description of Cyclic codes 10M

B Let the polynomial $g(x) = x10+x8+x5+x4+x2+x+1$ be the generatorpolynomial of a cyclic code over GF(2) with block length 15. 10M

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i. Construct the state diagram for this encoder
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iii. What is the d_{free} for this code?
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v. Is this code non-catastrophic? Why?
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B Consider a 2/3 convolutional code defined by 10M

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This code is used with an 8-PSK signal set that uses Gray coding. The throughput of this TCM scheme is 2 bits/sec/Hz.

i. How many states are there in the trellis diagram for this encoder?
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iii. Find the asymptotic coding gain with respect to uncoded QPSK, which has a throughput of 2 bits/sec/Hz.

Part - A

1	A	Compare how well engineering and management satisfy the several parts of the definition of a profession	5M
	B	What are the positive values of Max Weber's model of bureaucracy?	5M
	C	Why is planning said to have "Primacy" among the managerial functions?	5M
	D	Explain the difference between "optimizing" and "sufficing" in making decisions	5M
2	A	Under what conditions might each of the following logics of departmentalization be desirable: functional, geographic, customer, product and process?	10M
	B	Explain Mcgregor's theory X and theory Y.	10M
3	A	What would be some of the difficulties faced during the actual proposal prepration process and how can they be minimized.	10M
	B	Define the five modes of conflict resolution?	10M
4	A	How would Fayol's 1916 "Advice to Future Engineers" be modified to better suit the world 75 years later?	10M
	B	Write a note on GATT and NAFTA	10M

Part – B

5	A	Identify the entrepreneurial characteristics of Deepak Joshi. How do they match the characteristics described for successful entrepreneur?	10M
	B	Discuss popular myths of entrepreneurship and why they are more fantasy fact.	10M
6	A	Explain the role of incubators in promoting new ventures	6M
	B	Discuss how various state level institutions are supporting SSIs in India	7M
	C	What is venture capital? Discuss various stages in venture financing.	7M
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