Department of Computer Science & Engineering

III Year V Semester

5CS4-05: Analysis of Algorithm

Note: Each assignment of Maximum Marks 10.All question carries equal marks.

ASSIGNMENT-I

Q.1.Solve the following recurrence relation using Master's theorem- a) T(n) = 3T(n/2) + n2 b) T(n) = 8T(n/4) – n2logn c) T(n)=2T(n1/2) +log n	BLT-2	CO-1
Q.2. Show all the step of Strassen's matrix multiplication algorithm to multiply the following matrices. $X=\begin{pmatrix}3 & 4\\ 2 & 8\end{pmatrix}$ $Y=\begin{pmatrix}4 & 5\\ 9 & 6\end{pmatrix}$	BLT-5	CO-1
Q.3 Using quick sort algorithm sort the following sequence A={3,19,9,5,12,8,7,4,21,2,6,11}	BLT-4	CO-1
Q.4 Explain asymptotic notations with suitable example.	BLT-2	CO-1
Q.5. Explain merge sort. Using merge sort algorithm sort the following sequence. A= {38, 42, 24, 68, 45, 88, 12, 32}	BLT-4	CO-1

ASSIGNMENT-II

Q.1. Find optimal parenthesization of matrix chain product whose sequence of dimension is (4,10,6,4,5).	BLT-5	CO-2
Q.2. Find out the solution generating by job sequencing. When n=7 with following Profit and Deadline. Profit(p1,p2….p7)=(3,5,20,18,1,6,30) Deadline(d1,d2…..d7)=(1,3,4,3,2,1,2)	BLT-5	CO-2
Q.3. Explain 0/1 Knapsack problem with suitable example.	BLT-2	CO-2
Q.4. X=<a,a,b,a,b> Y=<b,a,b,b>.If Z is an LCS of X and Y ,then find Z using dynamic programming.	BLT-4	CO-2
Q.5. Explain optimal merge pattern with suitable example.	BLT-2	CO-2

ASSIGNMENT-III

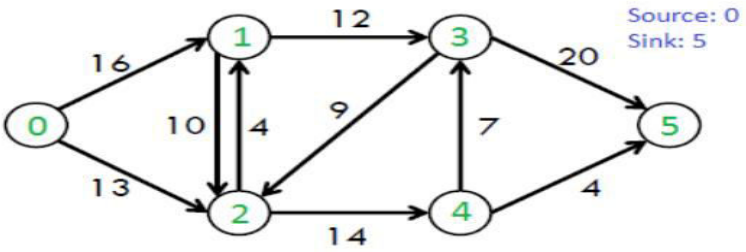
Q.1. Describe Naïve Pattern Matching Algorithm.	BLT-1	CO-3
Q.2. Explain Rabin Karp Method with suitable example.	BLT-2	CO-3
Q.3. Explain both the heuristics of Boyer – Moore Algorithm with suitable example.	BLT-2	CO-3
Q.4. Write short note on Quadratic assignment problem.	BLT-2	CO-3
Q.5. What is backtracking? Write an algorithm to solve N – Queens problem. Trace it for N=6 using back tracking approaches.	BLT-4	CO-3

Department of Computer Science & Engineering

III Year V Semester

5CS4-05: Analysis of Algorithm

ASSIGNMENT-IV

Q.1. What are the randomized algorithms? Differentiate Las- Vegas algorithm and Monte Carlo algorithm.	BLT-1	CO-4
Q.2. Describe multi - commodity flow network.	BLT-2	CO-4
Q.3. Explain the following term: Flow Network, Augmenting Paths, Residual Network and capacity in network.	BLT-2	CO-4
Q.4. a) Find maximum flow in below network b) Find the corresponding minimum cut and check that its capacity is same as that value of maximum flow found in (a part). 	BLT-4	CO-4
Q.5. Briefly explains flow shop scheduling.	BLT-2	CO-4

ASSIGNMENT-V

Q.1. Explain the following terms:- i) P ii) NP	BLT-2	CO-5
Q 2. Explain NP Complete?	BLT-2	CO-5
Q.3 What is COOK's Theorem.	BLT-1	CO-5
Q.4 Explain vertex cover problem with suitable example.	BLT-2	CO-5

*BLT: BLT shows the **Bloom's taxonomy** levels.

Department of Computer Science & Engineering

III Year V Semester

5CS4-02: Compiler Design

Note: Each assignment of Maximum Marks 10.All question carries equal marks.

ASSIGNMENT-I

Q1. What are the different phases of compiler? Explain the function of each phase in brief.	BLT-1	CO-1
Q2. Describe bootstrapping in details.	BLT-1	CO-1
Q3. What is a finite automata? Explain NFA and DFA with an example.	BLT-1	CO-1
Q4. Construct NFA to accept a(a/b)*b.	BLT-4	CO-1
Q5. What are the main functions performed by Lexical analyzer?	BLT-1	CO-1

ASSIGNMENT-II

Q1. What do you mean by LR parser? What is the model of an LR parser? Explain.	BLT-1	CO-2
Q2. What is context free grammar? Give distinction between regular and context free grammar and limitations of context free grammar.	BLT-1	CO-2
Q3. Explain top down and bottom up parsing techniques in detail.	BLT-2	CO-2
Q4. Explain the model of predictive parser.	BLT-2	CO-2
Q5. Explain operator precedence parsing and functions.	BLT-2	CO-2

ASSIGNMENT-III

Q1. Define Syntax Directed Definitions? Explain the various forms of syntax directed definitions.	BLT-2	CO-3
Q2. Define L- attributed definitions. Explain the specifications of a simple type checker.	BLT-3	CO-3
Q3. Write a program to translate an infix expression into postfix form.	BLT-1	CO-3
Q4. Explain the syntax Directed Translation Schemes in details.	BLT-3	CO-3
Q5. Write short notes on: i. Intermediate code generation ii. Types of three address statements	BLT-1	CO-3

Department of Computer Science & Engineering

III Year V Semester

5CS4-02: Compiler Design

ASSIGNMENT-IV

Q1. What are the strategies of storage allocation in run time environment? Explain with suitable diagram. .	BLT-1	CO-4
Q2. What do you mean by symbol table management? Explain in detail.	BLT-1	CO-4
Q3. Explain the key issues in run time organisation.	BLT-2	CO-4
Q4. Explain activation records. Also explain the term dangling reference.	BLT-2	CO-4
Q5. What are the varies parameter passing method?	BLT-1	CO-4

ASSIGNMENT-V

Q1. Explain in brief the various issues of design a code generator.	BLT-2	CO-5
Q2. Write short notes on : i. Basics block and flow graph. ii. Activation records.	BLT-1	CO-5
Q3. Code optimization is an optimal phase of compilation process. Discuss in detail.	BLT-2	CO-5
Q4. What is peephole optimization? Explain its characteristics.	BLT-1	CO-5
Q5. Explain the steps required for code generation from DAG.	BLT-2	CO-5

*BLT: BLT shows the **Bloom's taxonomy** levels.

Department of Computer Science & Engineering

III Year V Semester

5CS4-04: Computer Graphics & Multimedia

Note: Each assignment of Maximum Marks 10.All question carries equal marks.

ASSIGNMENT-I

Q1. Explain Basic Of Computer Graphics with their terminology.	BLT-1	CO-1
Q2. Explain Application of various areas of computer graphics in detail.	BLT-2	CO-1
Q.3 Explain CRT display devices with working operation.	BLT-2	CO-1
Q.4 Differentiate between following: (i) Raster And Random Scan System. (ii) Shadow Mask And Beam Penetration Method.	BLT-2	CO-1
Q.5.Explain Following Input Devices. i. Keyboard ii. Joystick iii. Light-Pen iv. Graphics -Tablet.	BLT-4	CO-1

ASSIGNMENT-II

Q1. Explain DDA algorithm and Write the steps to describe the DDA algorithm.	BLT-2	CO-2
Q2. Draw a line from (0, 0) to (6, 6) using DDA Algorithm and Bresenham's Algorithm.	BLT-3	CO-2
Q3. What is Polygon? Explain different types of polygon.	BLT-1	CO-2
Q4. Draw a circle having radious ,r = 10 using midpoint circle generation algorithm.	BLT-3	CO-2
Q5. Write the steps to describe the Bresenham's algorithm and mid-point circle algorithm	BLT-1	CO-2

ASSIGNMENT-III

Q1. Prove that the two scaling transformations commute i.e S1.S2= S2.S1	BLT-3	CO-3
Q2. Give the 2-D transformations matrix for (a) Translation (b) Rotation (c) Scaling	BLT-2	CO-3
Q3. What do you mean by composite transformations? How it is useful?	BLT-1	CO-3
Q4. What is homogeneous co-ordinates? Discuss the composite transformations matrices for two successive translations and scaling.	BLT-1	CO-3
Q5.Explain clipping and explain the Sutherland and Liang-Barskjy line clipping algorithm.	BLT-2	CO-3

Department of Computer Science & Engineering

III Year V Semester

5CS4-04: Computer Graphics & Multimedia

Note: Each assignment of Maximum Marks 10.All question carries equal marks.

ASSIGNMENT-IV

Q1 Determine eleven points on a Beizer curve with equidistant parameter values control points(x0 , y0) = (50 ,180) , (x1 ,y1) = (250 , 100), (x2 ,y2) = (600 ,300) and (x3 , y3) = (500 , 500) , distributed over a screen of resolution 640 * 350	BLT-4	CO-4
Q2. Define Translation and Rotation in 3-D graphics.	BLT-1	CO-4
Q3. Define Projections and classification of Projection.	BLT-1	CO-4
Q4. Show that the Bezier curve always touches the starting point (for u=0) and the ending point(for u=1).	BLT-3	CO-4
Q5. Explain Viewing Pipeline and Co-ordinates in 3-D Graphics.	BLT-2	CO-4

ASSIGNMENT-V

Q1. Explain in brief RGB, CMY and HSV colour models.	BLT-2	CO-5
Q2. What is the use of compression technique in computer Graphics s? Explain JPEG.	BLT-1	CO-5
Q3. Explain the document architecture and formatting of files or documents in the multimedia systems.	BLT-2	CO-5
Q4. What is Animation? What are the challenges faced in its implementation? Write the steps in generation of animation.	BLT-1	CO-5
Q5. Explain in following in detail. i. Fractals ii. Ray-Tracing iii. C-curve	BLT-2	CO-5

*BLT: BLT shows the **Bloom's taxonomy** levels.

Department of Computer Science & Engineering

III Year V Semester

5CS4-03: Operating Systems

Note: Each assignment of Maximum Marks 10.All question carries equal marks.

ASSIGNMENT-I

Q1. What is Operating system? Explain the architecture of an operating system.	BLT-1	CO-1
Q2. List out the various process state & brifly explain with a suitable state diagram.	BLT-2	CO-1
Q3. Explain the following: (i) Process and Program. (ii) Threads (iii) System Call	BLT-2	CO-1
Q4 Explain the various services of an operating system.	BLT-2	CO-1
Q5. Differentiate between (i) User thread/Kernel thread (ii) Processes/Threads	BLT-4	CO-1

Department of Computer Science & Engineering
III Year V Semester
5CS4-03: Operating Systems

Note: Each assignment of Maximum Marks 10.All question carries equal marks.

ASSIGNMENT-II

<table>
<tr><td>Q1. What is critical section problem? How are semaphores are used for solving critical section problem.</td><td>BLT-1</td><td>CO-2</td></tr>
<tr><td>Q2. What is scheduling? Difference between short term and long term schedulers.</td><td>BLT-4</td><td>CO-2</td></tr>
<tr><td>Q3.Describe basic criteria to select a better CPU scheduling algorithm</td><td>BLT-1</td><td>CO-2</td></tr>
<tr><td>Q4. Consider the following set of process with the arrival time and CPU burst time in given in miliosecond
<table>
<tr><th>PROCESS</th><th>ARRIVAL TIME</th><th>CPU BURST TIME</th></tr>
<tr><td>P1</td><td>0</td><td>22</td></tr>
<tr><td>P2</td><td>3</td><td>15</td></tr>
<tr><td>P3</td><td>8</td><td>18</td></tr>
<tr><td>P4</td><td>10</td><td>25</td></tr>
</table>
Determine average waiting time and turnaround time with preemptive and non preemptive SJF scheduling.</td><td>BLT-5</td><td>CO-2</td></tr>
<tr><td>Q5. . Consider the following set of process with the arrival time and CPU burst time in given in miliosecond:
<table>
<tr><th>Process</th><th>Arrival time</th><th>CPU burst time</th></tr>
<tr><td>P1</td><td>0</td><td>25</td></tr>
<tr><td>P2</td><td>5</td><td>15</td></tr>
<tr><td>P3</td><td>8</td><td>12</td></tr>
<tr><td>P4</td><td>10</td><td>22</td></tr>
</table>
Determine average waiting time and turnaround time with FCFS scheduling algorithm.</td><td>BLT-5</td><td>CO-2</td></tr>
</table>

Department of Computer Science & Engineering

III Year V Semester

5CS4-03: Operating Systems

Note: Each assignment of Maximum Marks 10.All question carries equal marks.

ASSIGNMENT-III

Q1. Explain about deadlock .what are the necessary conditions for deadlock to occur?	BLT-2	CO-3
Q2. Explain the fragmentation and difference between internal and external fragmentation?	BLT-2	CO-3
Q3. Explain the following: (i) Resource allocation graph. (ii) Deadlock characteristic.	BLT-2	CO-3
Q4. What are memory management and explain swapping.	BLT-1	CO-3
Q5. Explain the following . (i) Logical and physical address space (ii) Relocation and address translation	BLT-2	CO-3

ASSIGNMENT-IV

Q1. Explain the following (i) Virtual memory (ii) Segmentation	BLT-2	CO-4
Q2. Explain the various page replacement policies using atleast one example of one policy.	BLT-2	CO-4
Q3. Explain Concept of Thrashing and TLB(translation look aside buffer).	BLT-2	CO-4
Q4. Explain the following (i) Demand paging. (ii) Global versus local allocation.	BLT-2	CO-4
Q5. Consider least recent unit algorithm using a matrix when pages are referenced in the order 0, 1, 2, 3, 2, 1, 0, 3, 2, 3.and calculate page fault.	BLT-5	CO-4

ASSIGNMENT-V

Q1. Explain various Disk Scheduling Algorithm in brief.	BLT-2	CO-5
Q2. Explain Concepts of file & Attribute of a file.	BLT-2	CO-5
Q3. Explain the directory structures and brifly explain about tree structured directory.	BLT-2	CO-5
Q4. Explain the following: Spooling i. File system mounting ii. Disk structure and disk operation	BLT-2	CO-5
Q5. Given the following queue -- 95, 180, 34, 119, 11, 123, 62, 64 with the Read-write head initially at the track 50 and the tail track being at 199 to calculate by sstf and scan and look algorithm.	BLT-5	CO-5

*BLT: BLT shows the **Bloom's taxonomy** levels.

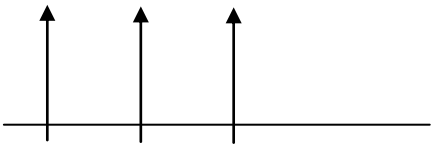
Department of Computer Science and Engineering

III Year V Semester

5CS5-11: Wireless Communication

Note: Each assignment of Maximum Marks 10.All question carries equal marks.

ASSIGNMENT-I

Q.1 Explain the different path loss models free space and two ray models with link budget design (power calculation)	BLT-2	CO-1
Q2. Explain different parameters of mobile multipath channels (i)Time dispersion (ii) Coherence Bandwidth (iii) Doppler spread & coherence Time	BLT-2	CO-1
Q3. What is Fading? Explain large scale Fading.	BLT-1	CO-1
Q4. Explain small scale Fading briefly.	BLT-2	CO-1
Q5. Compute the Rms Delay Spread for the following power delay profile. a) Calculate the Rms Delay Spread for the given figure.  b) If BPSK modulation is used, what is the maximum bit rate that can be sent through the channel without needing equalizer?	BLT-5	CO-1

ASSIGNMENT-II

Q1. Explain FDMA. Define the channel Capacity of FMA system.	BLT-2	CO-2
Q2. Define CDMA with capacity calculation.	BLT-1	CO-2
Q3. Discuss the comparison of FDMA, TDMA and CDMA.	BLT-1	CO-2
Q4. Explain the concept of frequency reuse	BLT-2	CO-2
Q5. Discuss the different interference and how they effect the system capacity?	BLT-1	CO-2

ASSIGNMENT-III

Q1. Explain the structure of a wireless communication link.	BLT-2	CO-3
Q2. Explain offset QPSK.	BLT-2	CO-3
Q3. What do you mean by minimum shift keying.	BLT-4	CO-3
Q4. Explain Gaussian Minimum shift keying.	BLT-2	CO-3
Q5. Explain OFDM principle.	BLT-1	CO-3

Department of Computer Science and Engineering
III Year V Semester
5CS5-11: Wireless Communication

Note: Each assignment of Maximum Marks 10.All question carries equal marks.

ASSIGNMENT-IV

Q1. What do you mean by Adaptive equalization?	BLT-4	CO-4
Q2. Explain Linear and non-linear equalization.	BLT-1	CO-4
Q3. Define zero forcing and LMS Algorithms.	BLT-2	CO-4
Q4. Explain Diversity (i) Micro (ii)Macro	BLT-2	CO-4
Q5. Define Rave Receiver.	BLT-2	CO-4

ASSIGNMENT-V

Q1. Define the MIMO System.	BLT-1	CO-5
Q2.Explain spatial Multiplexing.	BLT-1	CO-5
Q3. What do you mean by beam farming.	BLT-2	CO-5
Q4. Explain transmitter and receiver diversity.	BLT-1	CO-5
Q1. Define the MIMO System.	BLT-1	CO-5

*BLT: BLT shows the **Bloom's taxonomy** levels.

Department of Computer Science Engineering

III Year V Semester

5CS3-01: Information Theory and Coding

Note: Each Assignment of 10 Marks. All questions carry equal marks

ASSIGNMENT-I

Questions	BLT	CO
Q1. Define entropy and explain its significance in the context of information theory. Calculate the entropy for a source with the following probability distribution: P(A)=0.25P(A) = 0.25P(A)=0.25, P(B)=0.25P(B) = 0.25P(B)=0.25, P(C)=0.25P(C) = 0.25P(C)=0.25, P(D)=0.25P(D) = 0.25P(D)=0.25.	2	1
Q2. Define differential entropy and describe how it differs from the entropy of discrete random variables. Calculate the differential entropy for a uniform distribution on the interval [0,1][0, 1][0,1].	3	1
Q3. State the source coding theorem and explain its significance. Given a source with symbols {a,b,c}\{a, b, c\}{a,b,c} and probabilities {0.5,0.3,0.2}\{0.5, 0.3, 0.2\}{0.5,0.3,0.2}, calculate the average length of an optimal Huffman code.	2	1
Q4. Define the capacity of a discrete memoryless channel (DMC). Consider a DMC with input symbols {0,1}\{0, 1\}{0,1} and output symbols {0,1}\{0, 1\}{0,1} with transition probabilities P(Y=0|X=0)=0.9P(Y=0|X=0)= 0.9P(Y=0|X=0)=0.9, P(Y=1|X=0)=0.1P(Y=1|X=0) = 0.1P(Y=1|X=0)=0.1, P(Y=0|X=1)=0.1P(Y=0|X=1) = 0.1P(Y=0|X=1)=0.1, and P(Y=1|X=1)=0.9P(Y=1|X=1) = 0.9P(Y=1|X=1)=0.9. Calculate the capacity of this channel.	3	1
Q5. Define mutual information and conditional entropy. Given two random variables XXX and YYY with joint probabilities P(X=0,Y=0)=0.2P(X=0, Y=0) = 0.2P(X=0,Y=0)=0.2, P(X=0,Y=1)=0.3P(X=0, Y=1) = 0.3P(X=0,Y=1)=0.3, P(X=1,Y=0)=0.2P(X=1, Y=0) = 0.2P(X=1,Y=0)=0.2, and P(X=1,Y=1)=0.3P(X=1, Y=1) = 0.3P(X=1,Y=1)=0.3, calculate the mutual information I(X;Y)I(X;Y)I(X;Y) and the conditional entropy H(Y|X)H(Y|X)H(Y|X).	2	1

Department of Computer Science Engineering

III Year V Semester

5CS3-01: Information Theory and Coding

ASSIGNMENT-II

Questions	BLT	CO
Q1. Define a prefix code and explain why it is useful in data compression. Give an example of a prefix code for the set of symbols {A,B,C,D}\{A, B, C, D\}{A,B,C,D} with probabilities {0.4,0.3,0.2,0.1}\{0.4, 0.3, 0.2, 0.1\}{0.4,0.3,0.2,0.1}.	2	2
Q2. Describe the Huffman coding algorithm. Apply it to the symbols {A,B,C,D}\{A, B, C, D\}{A,B,C,D} with probabilities {0.5,0.25,0.15,0.10}\{0.5, 0.25, 0.15, 0.10\}{0.5,0.25,0.15,0.10} and provide the resulting codewords.	3	2
Q3. Explain the Shannon-Fano coding procedure. Given the symbols {A,B,C,D}\{A, B, C, D\}{A,B,C,D} with probabilities {0.4,0.3,0.2,0.1}\{0.4, 0.3, 0.2, 0.1\}{0.4,0.3,0.2,0.1}, construct the Shannon-Fano code.	2	2
Q4. Briefly describe the Lempel-Ziv coding algorithm. Explain how it differs from Huffman and Shannon-Fano coding.	3	2
Q5. State the channel coding theorem and explain its significance. Define the Shannon limit and discuss its implications for reliable communication over noisy channels.	2	2

ASSIGNMENT-III

Questions	BLT	CO
Q1. Explain the basic concept of error-correcting codes and their importance in digital communication systems. Provide an example of a simple error-correcting code	1	3
Q2. Describe the process of encoding a message using a linear block code. Given a generator matrix GGG and a message vector m=[1,0,1]\mathbf{m} = [1, 0, 1]m=[1,0,1], encode the message.	3	3
Q3. Define the minimum distance of a linear block code and explain its significance. How does the minimum distance affect the error-detecting and error-correcting capabilities of the code?	3	3
Q4. Describe the process of converting a non-systematic generator matrix into its systematic form. Given a non-systematic generator matrix GGG, convert it to systematic form.	3	3
Q5. Explain the syndrome decoding method for linear block codes. Given a parity-check matrix HHH and a received vector r=[1,0,1,1]\mathbf{r} = [1, 0, 1, 1]r=[1,0,1,1], determine if there is an error and identify its position.	2	3

Department of Computer Science Engineering

III Year V Semester

5CS3-01: Information Theory and Coding

ASSIGNMENT-IV

Questions	BLT	CO
Q1. Explain the concept of a Galois field (GF) and its significance in coding theory. What are the basic properties of GF(2)? Provide an example of addition and multiplication operations in GF(2).	4	4
Q2. Describe how polynomial operations are performed over GF(2). Given two polynomials f(x)=x3+x+1f(x) = x^3 + x + 1f(x)=x3+x+1 and g(x)=x2+1g(x) = x^2 + 1g(x)=x2+1 in GF(2), perform their addition and multiplication.	3	4
Q3. Define a generating polynomial for a cyclic code. Given a generator polynomial g(x)=x3+x+1g(x) = x^3 + x + 1g(x)=x3+x+1 in GF(2), generate the cyclic code for the message vector m=[1,0,1]\mathbf{m} = [1, 0, 1]m=[1,0,1].	1	4
Q4. Explain the role of a parity check polynomial in cyclic codes. Given the generator polynomial g(x)=x3+x+1g(x) = x^3 + x + 1g(x)=x3+x+1, determine the parity check polynomial h(x)h(x)h(x).	3	4
Q5. Describe the encoding process for a cyclic code using a shift register. How does the decoder use the syndrome to correct errors? Given a received vector r=[1,0,1,1,0,1] f{r} = [1, 0, 1, 1, 0, 1]r=[1,0,1,1,0,1] and the parity check polynomial h(x)=x4+x3+x2+1h(x) = x^4 + x^3 + x^2 + 1h(x)=x4+x3+x2+1, determine if there is an error.	2	4

ASSIGNMENT-V

Questions	BLT	CO
Q1. Define the rate of a convolutional encoder. Describe a convolutional encoder with a rate of 12\frac{1}{2}21 and a constraint length of 3. Draw the encoder diagram and explain its operation.	3	5
Q2. Explain the difference between a code tree, a trellis, and a state diagram for a convolutional code. Create these representations for a simple rate 12\frac{1}{2}21 convolutional encoder with generator polynomials g1(x)=1+xg_1(x) = 1 + xg1(x)=1+x and g2(x)=1+x+x2g_2(x) = 1 + x + x^2g2(x)=1+x+x2.	3	5
Q3. Describe the maximum likelihood decoding principle for convolutional codes. How does the Viterbi algorithm implement this principle?	2	5
Q4. Provide a step-by-step explanation of the Viterbi algorithm. Apply the Viterbi algorithm to decode the received sequence r=[00,11,01,10]\mathbf{r} = [00, 11, 01, 10]r=[00,11,01,10] for a rate 12\frac{1}{2}21 convolutional code with generator polynomials g1(x)=1+x+x2g_1(x) = 1 + x + x^2g1(x)=1+x+x2 and g2(x)=1+x2g_2(x) = 1 + x^2g2(x)=1+x	3	5
Q5. Define the free distance of a convolutional code and explain its significance. How do you determine the free distance for a given convolutional code?	3	5

*BLT: BLT shows the **Bloom's taxonomy** levels.