

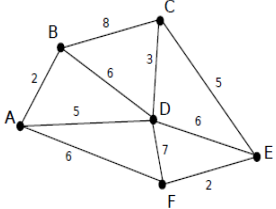
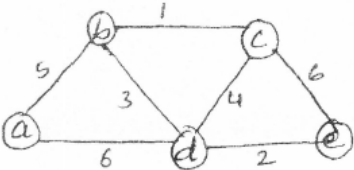
2019-20



Module-3: Greedy Method Review Questions

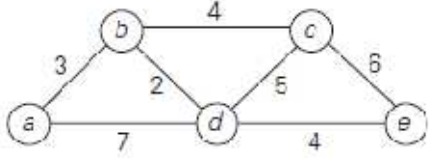


Introduction			
1	Define Optimal solution and feasible solution.	2	Jun 13
2	Define coin change Problem. State the greedy method to solve the coin change problem. For 49 rupees, find the denominations with least no. of coins. The available denominations in rupees are { 1, 2, 5, 10}	6	
3	Define coin change problem. If coins available are of values { 2, 5, 3, 6 }, find the least denominations for a) 55 b)77	4	
Job Scheduling with deadlines			
4	What is job sequencing with deadline problem.	2	Jan 18
5	Obtain the optimal solution for the job sequencing problem with deadline where $n = 4$, $(P_1, P_2, P_3, P_4) = (100, 10, 15, 27)$, $(d_1, d_2, d_3, d_4) = (2, 1, 2, 1)$	4	Jul 16
6	What is the solution generated by job sequencing when $n = 5$, $(P_1, P_2, P_3, P_4, P_5) = (20, 15, 10, 5, 1)$, $(d_1, d_2, d_3, d_4, d_5) = (2, 2, 1, 3, 3)$	6	Jan 15
7	Find solution generated by job sequencing problem with deadlines for 7 jobs given profits 3, 5, 20, 18, 1, 6, 30 and deadlines 1, 3, 4, 3, 2, 1, 2 respectively.	6	Jun 14
8	Let $n = 5$, profits [10, 3, 33, 11, 40] and deadlines [3, 1, 1, 2, 2] respectively. Find the optimal solution using greedy algorithm.	5	Jan 18
Knapsack Problem			
9	What is knapsack problem?	2	Jun 14
10	Obtain solution for a knapsack problem using greedy method for $n = 3$, capacity $m=20$ values 25, 24, 15 and weights 18, 15, 10 respectively.	6	Jun 14
11	Apply greedy method to obtain an optimal solution to the knapsack problem given $M = 60$, $(w_1, w_2, w_3, w_4, w_5) = (5, 10, 20, 30, 40)$, $(p_1, p_2, p_3, p_4, p_5) = (30, 20, 100, 90, 160)$. Find the total profit earned.	4	Jul 18
12	Solve the greedy knapsack problem where $m=10$, $n=4$, $P=(40, 42, 25, 12)$, $W=(4, 7, 5, 3)$	6	Jan 18

13	Find the optimal solution for the knapsack problem where $n=7$, $m=15$ using greedy method <table border="1" data-bbox="531 309 983 416" style="margin: 10px auto;"> <tr> <td>Object</td> <td>1</td> <td>2</td> <td>3</td> <td>4</td> <td>5</td> <td>6</td> <td>7</td> </tr> <tr> <td>Weight</td> <td>02</td> <td>03</td> <td>05</td> <td>07</td> <td>01</td> <td>04</td> <td>01</td> </tr> <tr> <td>Profit</td> <td>10</td> <td>05</td> <td>15</td> <td>07</td> <td>06</td> <td>18</td> <td>03</td> </tr> </table>	Object	1	2	3	4	5	6	7	Weight	02	03	05	07	01	04	01	Profit	10	05	15	07	06	18	03	8	Jan 20 Jul 19
Object	1	2	3	4	5	6	7																				
Weight	02	03	05	07	01	04	01																				
Profit	10	05	15	07	06	18	03																				
Minimum Spanning Trees																											
14	Define MST. Write Prim's algorithm to construct minimum cost spanning tree.	8	Jan 18 Jul 17																								
15	Write Kruskals algorithm to construct MST. Show that the time efficiency is $O(E \log E)$	8 6	Jan 14 Jul 16																								
16	Apply PRIMS and KRUSKAL algorithm for the following graph to get MST. Show the intermediate steps. 	8																									
17	Obtain minimum cost spanning tree for the graph whose weight matrix is given below. $\begin{bmatrix} 0 & 3 & \infty & 7 & \infty \\ 3 & 0 & 4 & 2 & \infty \\ \infty & 4 & 0 & 5 & 6 \\ 7 & 2 & 5 & 0 & 4 \\ \infty & \infty & 6 & 4 & 0 \end{bmatrix}$	8	Jul 16																								
18	Apply Prim's and Kruskal algorithm to find the MST. Show the intermediate steps. 	8	Jul 16 Jan 15																								
19	Apply Prim's and Kruskal algorithm to find the MST. Show the intermediate steps.	8	Jan 16																								

20	Apply Prim's and Kruskal's algorithm to find the MST of the graph given below. 	8	Jan 14 Jul 18
21	Apply Prim's algorithm to obtain a minimum spanning tree for the given weighted connected graph. 	5	Jan 13 Jun 14
22	Apply Prim's algorithm to obtain a minimum spanning tree for the given weighted connected graph. 	7	Jul 12 Jul 13
23	Find the MST using Kruskal's Algorithm	10	Jan 20

24	Find the MST using Kruskal's Algorithm 		Jul 19
Dijkstra's Algorithm			
25	Write Dijkstra's algorithm to find single source shortest path OR Write an algorithm to find single source shortest path	4	Jan 14
26	Apply Dijkstra's algorithm to find single source shortest path for the graph given below. Consider Node 6 as source. 	10	Jan 16
27	Apply Dijkstra's algorithm to find single source shortest path for the graph given below. Source vertex is 5. 	9	Jul 13 Jan 20
28	Determine the shortest paths from vertex 1 to all other vertices. 	6	
29	Apply single source shortest path finding algorithm. Consider source	8	Jul 18

	vertex as (a) 		Jan 18 Jul 19
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Huffman Coding

30	Explain Huffman coding algorithm. With an example show the construction of Huffman tree and generate the Huffman code using this tree.	6	Jul 18												
31	Construct the Huffman code for the following data. <table border="1" data-bbox="295 757 1038 860" style="margin: 10px auto;"> <tr> <td>symbol</td> <td>A</td> <td>B</td> <td>C</td> <td>D</td> <td>_</td> </tr> <tr> <td>frequency</td> <td>0.35</td> <td>0.1</td> <td>0.2</td> <td>0.2</td> <td>0.15</td> </tr> </table> Also i) encode DAD and ADD ii) Decode 10011011011101	symbol	A	B	C	D	_	frequency	0.35	0.1	0.2	0.2	0.15	6	Jul 18
symbol	A	B	C	D	_										
frequency	0.35	0.1	0.2	0.2	0.15										
32	Construct a Huffman code for the following data: <table border="1" data-bbox="295 1003 986 1106" style="margin: 10px auto;"> <tr> <td>symbol</td> <td>A</td> <td>B</td> <td>C</td> <td>D</td> <td>_</td> </tr> <tr> <td>frequency</td> <td>0.4</td> <td>0.1</td> <td>0.2</td> <td>0.15</td> <td>0.15</td> </tr> </table> Encode ABACABAD using the code. Decode 100010111001010	symbol	A	B	C	D	_	frequency	0.4	0.1	0.2	0.15	0.15	5	Jan 18 Jan 20
symbol	A	B	C	D	_										
frequency	0.4	0.1	0.2	0.15	0.15										

Heaps, HeapSort

33	Explain Bottom-up heap construction algorithm with an example. Give the worst-case efficiency.	8	Jul 18
34	Construct a heap for the list 1, 8, 6, 5, 3, 7, 4 by the bottom-up algorithm.	4	Jul 19
35	Sort the following lists by heapsort by using the array representation of heaps. 5, 2, 4, 1, 3 (in increasing order)	6	
36	Sort the array 2, 9, 7, 6, 5, 8 by heapsort.	5 8	Jan 18 Jul 17